THE USE OF SPREADSHEET PLATFORMS TO DEVELOP STOCHASTIC ENVIRONMENTAL SIMULATORS

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

THE USE OF SPREADSHEET PLATFORMS TO DEVELOP STOCHASTIC ENVIRONMENTAL SIMULATORS

INTRODUCTION:

Engineers and scientists are often required to predict the values for a variable at some unmeasured point. In many cases it is not practical to measure data at the desired point due to the location being physically inaccessible, having prohibitive sampling costs or if the value is required at a future time or under alternative conditions. Mathematical modeling of these and related situations may prove to be the only viable approach when proceeding with environmental decision making. The United States Environmental Protection Agency (EPA) recognizes this in their Risk Assessment Guidance for Superfund Volume 1 Human Evaluation Manual (Part A) which lists three (3) specific instances where fate and transport modeling may be required:

1. Where exposure points are spatially separate from monitoring points.
2. Where temporal distribution of data is lacking.
3. Where monitoring data are restricted by the limit of quantitation. (EPA, 1989)

The most practical and commonly accepted method for prediction is to use some type of model.

MODELS:

A model is defined as "an abstract representation of a (real-world) physical, social, or other system in terms of mathematical equations, flow diagrams, computer programs, or algorithms" (Lewis and Orav, 1989). In this definition a system is any collection of interacting parts. The most practical method of creating such a system is to use some type of computer modeling program. One common type of computer model is the deterministic code in which a partial differential equation is solved (numerically or analytically) for a given set of input values, parameters, and boundary conditions. The result is a single output value. The majority of "ground-water-management" models are dependent on deterministic flow and solute transport assumptions (ASCE, 1990). In this type of model the input parameters are assumed to be known throughout the system (Fetter, 1993). This assumption is never completely true due to uncertainties in the data. These uncertainties can be addressed by stochastic modeling.

P. A. Lewis and E. J. Orav refer to stochastic models as simulations, which they define as "a controlled statistical sampling technique (experiment) that is used, in conjunction with a model, to obtain approximate answers for questions about complex, multifactor probabilistic problems" (Lewis and Orav, 1989). Deutsch and Journel (1992) use a simpler definition of stochastic model, which is more appropriate to this discussion, by defining it as the process of building alternative, equally probable, high resolution models of the spatial distribution of the variable or variables in question. In stochastic modeling it is assumed that there is a statistical uncertainty in the value of certain input parameters. This method of solution depends on determining or knowing the distribution of these properties within the system and will result in a range of values rather than a unique value. (Fetter, 1993).

UNCERTAINTY:

All computer models that deal with physical data have the problem of uncertainty. Uncertainty, in its simplest form refers to data or assumptions that are indeterminate, indefinite, contain doubt or not reliable. L. G. Langley and William McTernan discuss three types of uncertainties which are generally considered to be the major uncertainties affecting (groundwater) model accuracy and precision:

1. transport mechanisms,
2. proper choice of model code and

3. accurate input parameters (Langley and McTernan, 1992-93).

C. John Mann (1993) divided uncertainties into three types, based on how each arises and is treated. Type I uncertainty comes from measurement error, bias or imprecision. All measurements contain some amount of error, bias or imprecision and should have an associated plus or minus value. In many cases this value is so small in relation to the measured value as to be insignificant, but it does exist and methods have been developed to treat this uncertainty. Type II uncertainty comes from the inherent variation or randomness in natural parameters. This type of uncertainty is particularly important to geologists and others trying to model natural processes and phenomena that is basically stochastic (random). One way to address this type of uncertainty is through the use of probability density functions and stochastic modeling. Type III uncertainty is due to lack of knowledge or scientific ignorance and the inability to model nature accurately. This type of uncertainty includes incomplete knowledge of relationships of components within a model, or an imperfect mathematical model. This type of uncertainty is always present when predictions are made into the future because all the necessary formulations can not be known or estimated accurately. "The uncertainty is proportional to the length of time into the future or past over which the predictions are made" (Mann, 1993). Type III uncertainties have been largely ignored since they are due to a lack of knowledge and therefore are theoretically undeterminable. Since the EPA now requires a probabilistic standard in its licensing requirements for nuclear waste, Type III uncertainties are now evaluated subjectively in risk assessments for those repositories (Mann, 1993).

A simplified list of the common sources for the three types of uncertainties was presented by Mann (1993) and is includes as Table 1. The uncertainties induced by Type I and Type II sources can be described by probability density functions and these functions can be used in stochastic models. Type III uncertainties can only be evaluated subjectively at this time. A comparison of the three types of uncertainty addressed by Langely and McTernan with the list in Table 1 indicates that both the uncertainty of 1) transport mechanisms and 2) proper choice of model code parallel the entries "imperfect concepts" and "imperfect (or incorrect) models under the Type III sources. These sources can not currently be addressed subjectively. The uncertainty of accurate input parameters is a type II, or stochastic, uncertainty and as such can be addressed with stochastic modeling.

Although stochastic modeling addresses the Type II uncertainties it also presents some problems. Either an acceptable stochastic model must be found or the elements of

TABLE 1: SOURCES OF UNCERTAINTY

Type I Uncertainty (errors, bias, imprecision)

Errors in measurement (gross, bias, operator, conceptual, etc.
    Conceptual error in population measured
Bias in measurement process(device, method, technique)
Imprecision of measurement process (device, method, technique)
Inadequate sampling
Physical limitation to sampling
Inability to determine accurate pdf's
Inability to know true accuracy (true bias)
Inability to truly isolate a system
Computational inaccuracies (mathematical analog imperfect)

Type II Uncertainty (stochasticity)

Inherent natural variation
Heterogeneity in materials
Anisotropy in parameters
Inability to characterize a variable adequately
Inability to determine an accurate pdf for a variable
Physical inability to sample adequately
Practical need to use average values or other indicators rather than pdf's
    Noise in natural system
Noise in computational system

Type III Uncertainty (ignorance)

A. Lack of knowledge
Incomplete knowledge
Erroneous knowledge
Imperfect concepts, laws, hypotheses, and principles
Use of subjective probabilities rather than objective probabilities
Ambiguity in concepts, data, models
Vagueness in concepts, data, models
Fuzziness in concepts, data, models
Distortion in concepts, data, models
Confusion in evidence
Dissonance in evidence
Nonspecificity in evidence

B. Need for generalizations
Need for simplifications
Use of incorrect models (conceptual or mathematical)
Use of imperfect models (conceptual or mathematical)
Computational inaccuracies (mathematical analog imperfect)

Source: Mann, 1993

stochastic modeling must be applied to an acceptable deterministic model. If a deterministic model is used, the distribution functions of the variable input parameters must be statistically sampled and the model run a number of times until a statistically acceptable answer is obtained. This sampling must either be done manually or by some type of computer program specifically written to perform this function. Obviously, manually performing a statistical sampling of the distribution function, then imputing that variable into the model and running it for hundreds or maybe thousands of repetitions is not practical. Likewise, creating a program to perform these functions is often not practical for many environmental professionals who are not trained computer programmers. Programming may require a large and impractical investment of time to 1) learn the programming language and 2) perform the programming itself. This time requirement is reduced significantly if the "programmer" already knows the programming language and is working within a familiar framework.

One approach to addressing the shortfall between the computer programmer and user is to use the programming (macro) capability in conjunction with the DOS command interface functions present in spreadsheet programs such as Lotus 1-2-3®, Excel®, or Quattro Pro®. These programs have the capability to manipulate data, perform complex mathematical calculations, and control other programs. Most engineers, if they are computer literate at all, are familiar with one or more of the popular spreadsheet programs. Recent advances in the availability of stochastic "ADD-IN"s for these spreadsheet programs, as well as the proliferation of public domain software which can be called from the spreadsheet allow for the development of sophisticated stochastic models within a platform both readily available and understood by most engineers.

This paper discusses two applications of Lotus 1-2-3® macros and spreadsheet capabilities to develop environmental simulators capable of addressing uncertainty. In this way, the public domain EPA codes were altered from a deterministic to a stochastic base. The first application uses a series of macros to control the generation of Monte Carlo realizations of one or more selected input parameters, save those parameters in the proper format, call and run the EPA's Industrial Source Complex Diffusion (ISC2) deterministic model and retrieve the model output into the spreadsheet. This process is automatically repeated for the number of realizations selected by the operator.

The second application uses the spreadsheet capabilities to manipulate data, control input and output functions and run several different DOS programs to generate the values necessary to create a conditioned geostatisical simulation of a selected parameter or variable. The macro generates a field of conditioned geostatisical values which can be input to a deterministic model. As in the first application, the macros will repeat this process automatically for a number of realizations selected by the operator to generate a stochastic model.

CHAPTER II

METHODOLOGY:

THE SPREADSHEET PLATFORM:

A spreadsheet is a computer representation of an accountant's columnar pad. Each worksheet is divided into cells which may contain a number, a formula or text. In addition, a cell may contain a special formula called an @function. An @function is a built in formula within Lotus 1-2-3® that can be accessed by entering its name in a cell. These formulas can be used for financial, statistical, and scientific calculations, as well as creating conditional formulas which allow the spreadsheet to switch between optional calculations or actions. Regardless of its content, each cell may be linked to any other cell or cells in the worksheet so changes in one cell can effect the content of other cells.

LOTUS 1-2-3® was used as the spreadsheet platform for this effort due to its overwhelming availability to the engineering community, the availability of probability based "ADD-IN"s and its capabilities to call DOS programs through MACROS. Other spreadsheets, however, could have also been as easily applied.

Lotus 1-2-3® has a menu of command options that can be activated by pressing the [/] key (the square brackets [] will be used throughout this paper to designate an individual key entry). Table 2 shows some of the most common Lotus® menu options used in these applications. Once the menu is activated by pressing the [/] key, individual options can be selected by either moving the cursor to the desired option and pressing [ENTER] or by typing the first letter of the option name, i.e. [R] activates the RANGE option.

It is also possible to record a series of keystrokes and 1-2-3 commands in a worksheet so they can be played back, as needed, to perform a set task. This series of recorded keystrokes, @functions and macro commands is called a <u>Macro</u>. A macro may be initiated by pressing the [ALT] and [F3] together, then selecting the desired macro's name from the menu that follows. Macros with names containing only a backslash [\] and a single letter, such as "\A", may be initiated by pressing [ALT] and the letter ("A" in the example) together. Macro commands and keystrokes are input as labels (text) within a named range (normally a series of cells within a column). There can be (and usually are) more then one keystroke or command per cell. Keystrokes refer to single key entries such as [/] (slash) whereas commands can be either a key name such as [PGDN] or an <u>advanced macro command</u> such as {BRANCH}, both of which are written in braces {} in the macro. Macros can be linked

TABLE 2.

PARTIAL LIST OF LOTUS® MENU COMMANDS

PRIMARY COMMAND	SECONDARY COMMAND	DESCRIPTION
WORKSHEET	various	Change various options on the worksheet.
RANGE	ERASE	Erases data in a range
RANGE	NAME	Creates and deletes range names
RANGE	VALUE	Copies a range of data, replacing any copied formulas with their current values.
COPY		Copies a range of data, including formulas & formats to another range in the same or different file.
MOVE		Transfers a range of data, including formulas and formats to another range in the same file.
FILE	COMBINE	Incorporates data from a worksheet file on disk into the current file.
FILE	IMPORT	Reads data from a text file on disk into the current worksheet.
FILE	OPEN	Reads a worksheet file into memory and places it before or after the current file.
FILE	RETRIEVE	Reads a worksheet file into memory. The retrieved file replaces the file that was current.
FILE	SAVE	Saves worksheet files on disk.
PRINT	PRINTER	Selects the printer as the output destination
PRINT	FILE	Selects a text file on disk as the print destination. Allows the operator to create text files to share data with other programs.
PRINT	[P,F] ALIGN	[P,F] indicates second level command can be either PRINTER or File. Align command assures that page breaks, headers, footers and graphs are placed in the proper position on the printed page.
PRINT	[P,F] CLEAR	Removes the print Range and other settings from existing print specifications.
Print	GO	Go sends the selected data to the printer or file
PRINT	OPTIONS	Allows the operator to select various additional print options including Other-Unformatted which is used to suppress page breaks in test files.
GRAPH	various	Various graph commands are used to create and view graphs of selected data.
DATA	PARSE	Separates and converts a single column of long labels into several columns of data.
DATA	QUERY	Locates and edits selected records in a database.
DATA	SORT	Arranges records in a database table in the order the operator specifies.
SYSTEM		Temporarily suspends 1-2-3 and returns to DOS so DOS commands can be used without ending the current 1-2-3 session.
QUIT		Ends the current 1-2-3 session and returns to DOS system.

together to form complex command structures and create a "program" within the worksheet. One major advantage of using macros is that there will be only a relative few new commands to learn, unlike a normal programming language such as Fortran or Basic. Table 3 lists the names and descriptions of some of the "advanced macro commands" commonly used in these applications. A complete list of advanced macro commands, along with their description and form is in appendix C.

Another feature of the LOTUS 1-2-3® spreadsheet is the availability of ADD-IN programs such as @RISK® (Palisade 1992). An ADD-IN is a program that communicates directly with LOTUS 1-2-3® and extends the capabilities of LOTUS 1-2-3®. There are three types of ADD-INS: @functions, macro commands, and applications. The ADD-IN @functions and macro commands are accessed in the same way and behave the same as built in @functions and macro commands once the ADD-IN has been loaded into memory. ADD-IN applications usually are created to perform a specific task. An ADD-IN program can contain any combination of @functions, macro commands and applications.

In the first application program, called RISC2, the ADD-IN @RISK® was used to provide Monte Carlo processing capability to Lotus 1-2-3® and to the U. S. Environmental Protection Agency's Industrial Source Complex Diffusion (ISC2) air pollution model. The @RISK® ADD-IN programs can be also be

TABLE 3.

PARTIAL LIST OF ADVANCED MACRO COMMANDS USED IN THIS EFFORT

MACRO COMMAND	DESCRIPTION
{APPENDBELOW}	Copies data in one range to the bottom of another range, automatically extending the second range to include the copied data.
{APPENDRIGHT}	Copies data in one range to the right of another range, automatically extending the second range to include the copied data.
{CONTENTS}	Copies the contents of one cell to another cell as a label. Usually used to store a numeric value as a string.
{LET}	Enters a label or number in a cell.
{CLOSE}	Closes an open text cell.
{OPEN}	Opens a new or existing text file so work can be performed on that file.
{READ}	Copies a series of bytes from the open text file to a cell.
{READLN}	Copies an entire line from the open file to a cell.
{SETPOS}	Changes the location in the open file at which data is read from or written to.
{WRITE}	Writes a string to the open text file.
{WRITELN}	Writes a string to the open text file and adds an end-of-line sequence.
{subroutine}	Performs a subroutine call: Executes the subroutine at the specified location before continuing down the current column of instructions.
{BRANCH}	Performs a branch: Transfers macro control from the current column of macro instructions to another location.
{FOR}	Creates a for loop: Repeats a subroutine a specified number of times.
{IF}	Sets up a condition that 1-2-3 evaluates to determine whether to continue with the macro instructions that follow {IF} in the same cell or to go directly to the instructions in the next cell.
{QUIT}	Ends the macro, returning keyboard control to the user.
{RETURN}	Used in subroutines to end the subroutine and return macro control to the instruction following the subroutine.
{SYSTEM}	Temporarily suspends the 1-2-3 session and passes command to the operating system. When the operating system command is completed, automatically resumes the 1-2-3 session and continues the macro --VERY IMPORTANT--
{GETLABEL}	Displays a prompt in the control panel, waits for a response to the prompt, and enters the response as a label in a cell.
{GETNUMBER}	Displays a prompt in the control panel, waits fro a response to the prompt, and enters the response as a number in a cell.
{MENUBRANCH}	Displays a customized menu in the control panel, waits for the operator to select a menu item, then branches to the macro instructions associated with that menu item.
{FRAMEOFF}	Turns off the display of the worksheet frame (column letters and row numbers).
{FRAMEON}	Restores display of worksheet frame.

used to perform risk analysis of spreadsheet data. The combination of the risk analysis capability with the spreadsheet's capability to manipulate data, perform complex mathematical calculations, and control other programs and functions through the use of macros provides a powerful tool for environmental engineers. Spreadsheets can be used to accomplish all this without the need to learn the complex command structure of most programming languages.

BACKGROUND:

Lotus 1-2-3® and other spreadsheet software allow the spreadsheet to interface with DOS programs. In general, LOTUS 1-2-3® will interface with models (DOS programs) that use some form of an ASCII file for input and output. This ability is crucial to the effort discussed in this paper. The menu selection [/] System listed in Table 2 allows the operator to temporarily exit the spreadsheet without ending or effecting the current worksheet and execute DOS commands. The worksheet can be reactivated be typing "EXIT" at the DOS prompt. The more important system option is the advanced macro command {SYSTEM} as described in Table 3. This command allows the macro to exit the spreadsheet and automatically execute a DOS command. When the DOS command is complete the spreadsheet is reactivated and the macro continues with the next command in the macro column.

There are four basic steps in using Lotus 1-2-3® to create a stochastic model from a deterministic one:

1) Create a range of lotus cells with input values or alphanumeric strings that, when output in ASCII format (text file), duplicates the input format required by the deterministic model.

2) Retrieve an appropriate statistical value of the random variable into the Lotus spreadsheet and, if necessary convert it into a usable form.

3) Create a "Macro" to:
1) replace the desired variable within the input range with the appropriate statistical value,
2) run the deterministic model 1 time, and
3) import the output value from the deterministic model to a range within the spreadsheet (if desired).

4) Create a "Macro" to repeat steps 2 and 3 the desired number of times for the simulation.

The spreadsheet can be expanded to include preprocessing of the model input, post processing of the model results and linking models together. The two example programs demonstrate some of these capabilities. The first application is named RISC2 and uses the @RISK® ADD-IN to create a number of Monte Carlo realizations of the selected variable which are input to the EPA's Industrial Source Complex Diffusion (ISC2) deterministic model to determine the probability range of output concentrations. The second application is named COGMOD and uses the spreadsheet capabilities in conjunction with COVAR, and various STATPAC programs to generate a conditioned simulations of a geostatistical distribution for subsequent input into a deterministic model. More detailed descriptions of each of these applications follow.

RISC2 OBJECTIVE:

The objective of this effort was to create a environmental decision support model (system) employing a stochastic air pollution model developed from a public domain DOS based deterministic code. Controlled by the spreadsheet platform and augmented by the Monte Carlo "ADD-IN" this DOS code becomes capable of being accessed repeatedly with randomly selected inputs to produce a stochastic output. The EPA <u>Industrial Source Complex</u> (ISC2) Dispersion model, a Lotus 1-2-3® worksheet and the @RISK® "ADD-IN" were used in this effort.

A Decision Support System is defined by G. L. Simons, in his book "Expert Systems and Micros, (1985)," as: "...an interactive data processing and display system which is used to assist in a concurrent decision-making process and which also conforms to the following characteristics:

i. it is sufficiently user-friendly to be used by the decision maker(s) in person

iii. it displays its information in a format and terminology which is familiar to its user(s)

iii. it is selective in its provision of information and avoids exposing its user(s) to an information overload." (Simons, 1985)

Decision support systems are designed to assist in decision making, but not remove the human element from the process.

To satisfy the criteria for a decision support system, RISC2 was created to be almost entirely menu driven. This model consists of two main and two minor divisions, either of which can be selected from the main menu. The flowsheet in Figure 1 shows how these four divisions interact. The first major division of the worksheet is designated as the preprocessor module which Figure 1 shows as the FUNCTION menu within an area labeled PREPROCESSOR MODULE. This division creates an input file for the ISC2 model by using a series of menus and Lotus® macros. The second major portion (designated as the RISK MODULE) combines certain functions of the Lotus® "ADD-IN" program @RISK® with LOTUS 1-2-3® macros and the ISC2 model to perform a Monte Carlo simulation. This module is represented by the RISK menu enclosed in the RISK MODULE area. Figure 1 also presents the structure of the entire macro prepared for this effort. The two minor divisions, MODEL and FILE, (see Menu Section) are also introduced. These run the ISCST model a single time and either import or export ASCII files to and from the spreadsheet, respectively. These will be discussed more fully later in this paper.

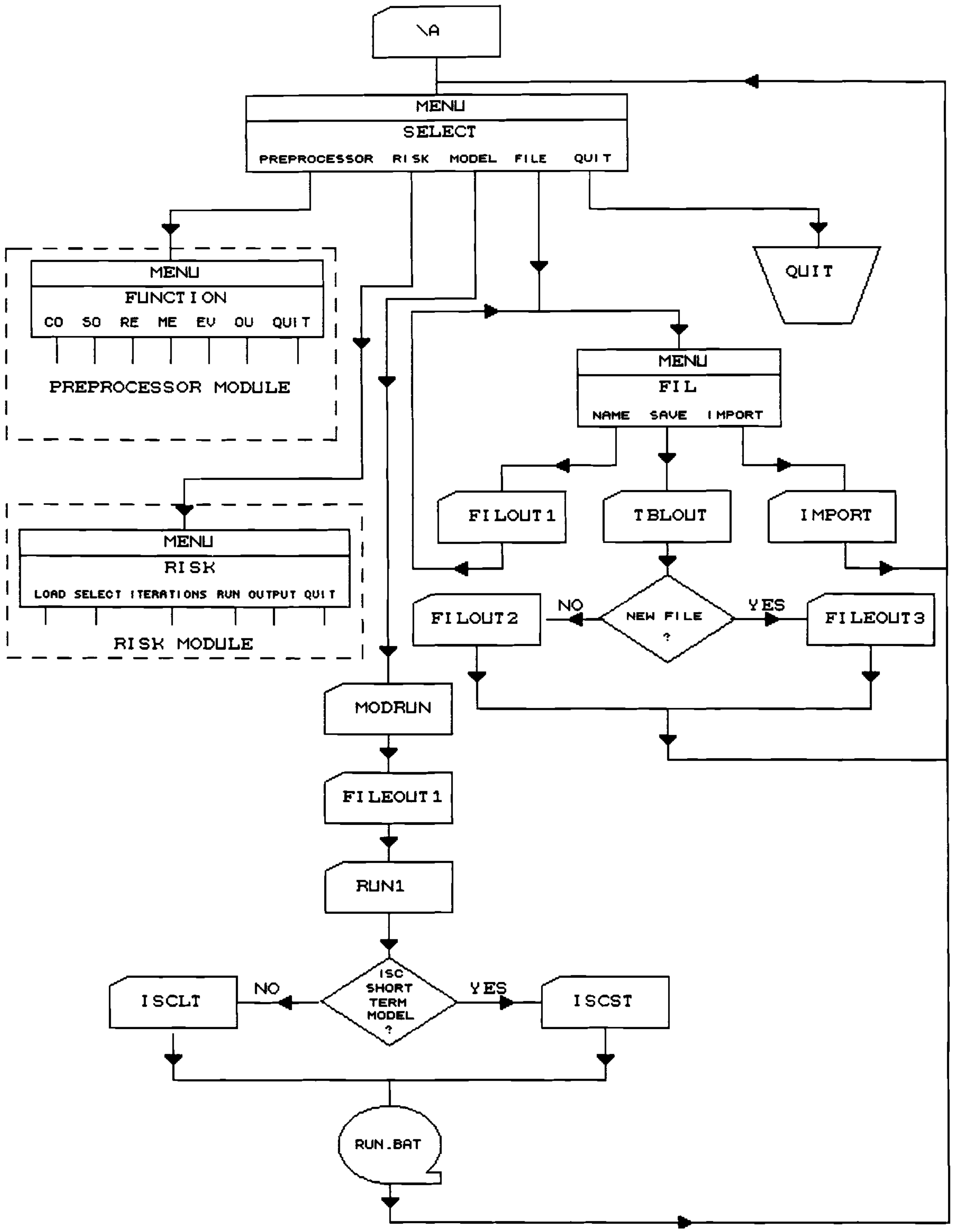


Figure 1. Primary Structure of Stochastic Decision Support System: RISC2

INDUSTRIAL SOURCE COMPLEX DISPERSION (ISC2) MODEL:

The ISC2 models (long term, ISCLT and short term, ISCST) were specifically designed for the EPA to meet the specifications in their Guideline on Air Quality Models (EPA, 1992). They are popular with the modeling community in part due to the large number of options for various conditions that the model will accept. Two types of input data are required, 1) the runstream setup file which contains the modeling options, source and receptor location information, meteorological file specifications and output options and 2) the meteorological data file. The macros discussed in this paper only affect the runstream setup file input data. The meteorological data are not subject to randomization with this version of RISC2. Although the ISCLT and ISCST are separate models, many of the runstream input parameters are identical and both models are included in the ISC2 documentation. The ISC2 runstream setup file consists of a series of lines or records, each of which must contain a "pathway", a keyword and one or more parameters. Each item or "field" in a record must be separated from the others by at least one blank space. There are five different "pathways" which must be included in the ISC2 runstream file in a specific order. These pathways and the order in which they must be input are as follows:

CO - Specify overall job **CO**ntrol options

SO - Specify **SO**urce information

RE - Specify **RE**ceptor information

ME - Specify **ME**teorology information and

OU - Specify **OU**tput options

Each pathway starts with the keyword "STARTING" and ends with the keyword "FINISHED". The keyword specifies the type of option or input data on a line, while the parameter defines the specific option selected or input data. The runstream line (or record) generally has the appearance of this example CO record:

CO MODLOPT DFAULT RURAL CONC

where CO is the PATHWAY, MODLOPT is the KEYWORD and DFAULT, RURAL and CONC are PARAMETERS specifying 1) that the model use the EPA default options, 2) in a rural (vs urban) setting with 3) all input and output contaminant values in concentrations (vs depositions).

LOTUS 1-2-3® MACROS FOR RISC2:

The macros in RISC2 create the runstream setup file. The lines (or records) are created by a series of menu selections and interactive input by the operator. The macro prompts the operator to select an area for comments (usually the "HOME" screen) and an area where the runstream file will be created (usually [PGDN] one time from home to location A23). The Lotus "frame", the row of letters across the top and the column of numbers down the left side of the screen, is turned off by the macro command {FRAMEOFF} to improve appearance and avoid potential confusion during the creation of the runstream file.

The macro menus are created in much the same way as the macros discussed in the section on the spreadsheet platform. These menu items are entered, one per cell, in the first row of the menu location. The cell below each item is reserved for a description (up to 512 characters) of the menu item and is not used in the macro operation. The macro commands start in the following cell (third row) below each menu item and continue down the column until either a command redirects the macro or a blank cell is encountered. The macro menu is named by using the "/ Range Name Create" command to name the first cell of the macro menu. An example of the macro menu structure for the HEIGHTS macro menu which sets the keyword for receptor heights in the runstream file is found in Table 4. When this macro menu is accessed the screen will display a menu showing two selections, <u>FLAT</u>, for setting all receptors at a constant height, and <u>ELEV</u>, which allows the operator to input receptors at varying heights. When either of these selections is highlighted the cell below that selection, either "IGNORE ALL TERRAIN HEIGHTS or ALLOWS INPUT OF RECEPTOR HEIGHTS", will be displayed to describe the selection. When an item is selected, by highlighting that item and pressing [ENTER], the

TABLE 4.

EXAMPLE OF MACRO MENU STRUCTURE FOR "HEIGHT" MACRO MENU

	A	B	C	DESCRIPTION
1	HEIGHT	FLAT	ELEV	MENU SELECTION macro name
2		IGNORE ALL TERRAIN HEIGHTS	ALLOWS INPUT OF RECEPTOR HEIGHTS	description of option
3		{LET OPT,FLAT}	{LET OPT,ELEV}	macro command {LET}
4		/RNDOPT~	/RNDOPT~	macro keystrokes
5		{MENUBRANCH T}	{MENUBRANCH T}	macro command {MENUBRANCH}

macro commands below the description are followed, one keystroke or command at a time until the macro is completed.

In this example, if FLAT is selected from the menu, the first cell below the description contains a macro command, in braces{}, which places the word "FLAT" in the cell previously named "OPT". The following cell contains a series of keystrokes that call up the Lotus® menu [/], range [R], name [N], options, and delete [D] the name "OPT". The final cell in the macro contains the {MENUBRANCH} command which transfers the command line of the macro to a macro menu, in this case the macro menu named "T".

RISC2 PROGRAM:

The first macro menu is the "SELECT" menu which contains the options to run "PREPROCESSOR", "RISK", "MODEL", "FILE" or "QUIT". Figure 1, which was previously discussed, shows how the various selections in this menu interact. The "QUIT" selection exits the macro and returns the operator to normal Lotus® operations. Each of the other selections initiates a series of macros which will be referred to as modules. Since the functions and macro structure of the modules vary significantly each module will be discussed separately starting with the "PREPROCESSOR" module.

RISC2 PREPROCESSOR MODULE:

Selection of the "PREPROCESSOR" module calls up the "FUNCTION" macro menu as shown in Figure 1. This menu contains the ISC2 runstream pathway name selections "CO", "SO", "RE", "ME", "EV", and "OU" in the order they must be addressed (from left to right). Selection of any of the pathways causes the macro to first write the corresponding pathway name and the word "STARTING" in the first blank line of the runstream file, then proceed to the first menu of selections for that pathway. In this way the ISC2 runstream file operations developed by the U.S. EPA and previously introduced are now controlled by the spreadsheet platform and easily accessed by MACROS developed for this effort.

The "CO" pathway contains more options and is more complex than the other pathways addressed in the preprocessor module. Figure 2 shows the structure of the menus used to create the runstream records for the "CO" pathway. Table 5 lists the ISC2 (short term) keywords and input parameters used in this pathway and shows what menu and macro is used to input each keyword or parameter in the appropriate field and record. The "CO" pathway will be discussed in detail to demonstrate the construction of the program. The first menu in the "CO" pathway is the "T" macro menu which contains selections for "TITLES", "MODEL OPTS", "INTERVALS", "POLLUTION ID", "RUN OR NOT", "TERRAIN HEIGHTS", "MORE" and "QUIT". These selections are mandatory keywords and are ordered from left to right in the same order as they should appear in the ISC2 runstream file. The "TITLES" selection allows the operator to type up to two (2) lines of titles or comments in the runstream file. The macro places the "CO" pathway designation in the first cell of the first blank line of the runstream file, moves right one (1) cell and gives that cell a name (TITLE1). Almost all selections from any menu in this "PREPROCESSOR" will perform these same functions prior to performing any specific functions unique to that selection, therefore this step will not be discussed in subsequent selections. The

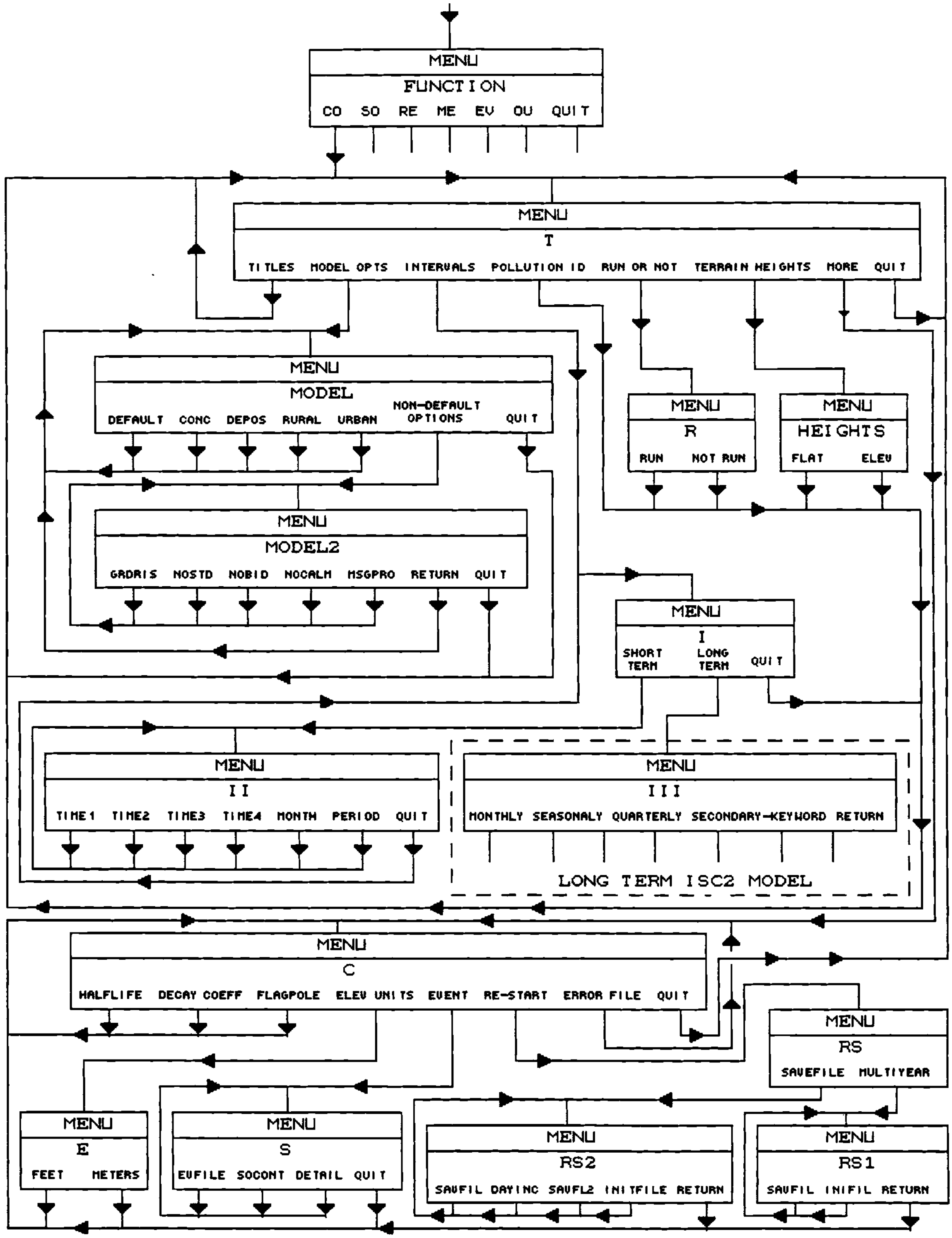


Figure 2. Macro menu structure for the ISC2 CO pathway keywords and parameters in the RISC2 Preprocessor

TABLE 5.

LIST OF ISC2 "CO" PATHWAY KEYWORDS AND PARAMETERS WITH THE CORRESPONDING SPREADSHEET MENUS AND MACRO NAMES

KEYWORD	PARAMETER	MENU	MACRO
TITLEONE	Title1	T	TITLES
TITLETWO	Title2	T	TITLES
MODELOPT	DFAULT	MODEL	DFAULT
MODELOPT	CONC or DEPOS	MODEL	CONC or DEPOS
MODELOPT	RURAL or URBAN	MODEL	RURAL OR URBAN
MODELOPT	GRDIS	MODEL2	GRDIS
MODELOPT	NOSTD	MODEL2	NOSTD
MODELOPT	NOBID	MODEL2	NOBID
MODELOPT	NOCALM	MODEL2	NOCALM
MODELOPT	MSGPRO	MODEL2	MSGPRO
AVERTIME	Time1	II	TIME1
AVERTIME	Time2	II	TIME2
AVERTIME	Time3	II	TIME3
AVERTIME	Time4	II	TIME4
AVERTIME	MONTH	II	MONTH
AVERTIME	PERIOD	II	PERIOD
POLLUTID	Pollut	T	POLLUTION ID
HALFLIFE	Haflif	C	HALFLIFE
DCAYCOEF	Decay	C	DECAY COEFF
TERRHGTS	FLAT or ELEV	HEIGHTS	FLAT OR ELEV
ELEVUNIT	METERS or FEET	E	FEET or METERS
FLAGPOLE	Flagdf	C	FLAGPOLE
RUNORNOT	RUN or NOT	R	RUN or NOT-RUN
EVENTFIL	Evfile	S	EVFILE
EVENTFIL	Evopt	S	SOCONT or DETAIL
SAVEFILE	Savfil	RS2	SAVFIL
SAVEFILE	Dayinc	RS2	DAYINC
SAVEFILE	Savfl2	RS2	SAVFL2
MULTYEAR	Savfil	RS1	SAVFIL
MULTYEAR	Inifil	RS1	INIFIL
ERRORFIL	Errfil	C	ERROR FILE
ERRORFIL	DEBUG	C	ERROR FILE

macro then prompts the operator for Title 1 which may contain up to 80 alpha-numeric characters by using the macro {GETLABEL} command. The {GETLABEL} command follows the structure {GETLABEL "operator prompt",range name}. The macro command shows whatever "operator prompt" that is entered in the command at the top of the screen. Once the operator responds to the prompt and presses [ENTER] the response is entered in the named range (TITLE1). This macro command is used extensively throughout this worksheet since it allows the operator to input character strings without interrupting the macro commands.

The second menu selection is "MODEL OPTS". After the macro inserts the "CO" pathway and "MODELOPT" keyword in the runstream file it lists a series of optional keywords and descriptions on the comment screen, then proceeds to the "MODEL" macro menu which contains these optional keywords as selections. If the operator chooses "DFAULT", "CONC", "DEPOS", "RURAL" or "URBAN" the macro moves the cursor to the end of the runstream file and names the cell "OPT". It then enters the selection name in the "OPT" cell and deletes the name "OPT". The model allows any number of selections to be made from the "MODEL" menu with all selections being placed on the same line. Selection of the "NON-DEFAULT" option transfers macro command to the "MODEL2" macro menu. This macro menu contains the non-default optional keyword selections "GRDRIS" for gradual plume rise, "NOSTD" for no stack-tip downwash, "NOBID" for no buoyancy-induced dispersion, "NOCALM" to bypass calms, and "MSGPRO" to specify use of a missing data routine. The macro treats these selections in the same manner as the selections from the "MODEL" macro menu. In addition to these selections the "MODEL2" macro menu contains the selection "RETURN". This option returns the macro command to the "MODEL" menu. Both the "MODEL" menu and the "MODEL2" menu contain the "QUIT" option. The "QUIT" selection from either menu returns the operator to the "T" menu for additional selections.

Selection of the "INTERVALS" mandatory keyword from the "T" menu transfers macro command to the "I" macro menu. This menu allows the operator to select either the short term or long term ISC2 model and "QUIT" to return to the "T" macro menu. Selection of the "SHORT TERM" interval inputs the number "1" in the macro worksheet cell named "TERM" whereas the "LONG TERM" selection inputs a "2" in this same cell. This cell will be accessed by the macro later. Assuming the "SHORT TERM" model is selected, after the "1" is input into "TERM" the macro command is transferred to the "II" macro menu. This macro menu contains four (4) time interval selections named "TIME1", "TIME2", "TIME3" and "TIME4". The selection of any of these options causes the macro to prompt the operator to enter the short term averaging period in hours. A list of possible time intervals to be employed is displayed on the comments screen to assist the user. The macro then returns command to the "II" menu for another selection. The "II" menu also contains the optional keywords "MONTH" and "PERIOD". The selection of either of these keywords enters the selected keyword in the "TIME" cell which is created and deleted in the same manner is previously discussed. As in the other menus, this menu also contains a "QUIT" option which returns command to the "T" menu.

The next selection in the "T" macro menu is the "POLLUTION ID" mandatory keyword. This selection prompts the operator for the name of the pollutant (up to 8 characters) by using the "GETLABEL" command then transfers the entered string to the last line of the runstream file and returns to the "T" menu. The "GETLABEL" macro command has the same structure and functions in the same manner as the "GETNUMBER" macro command discussed earlier. The difference in the two commands is the "GETLABEL" command inputs the characters entered as a label whereas the "GETNUMBER" command inputs the numeric characters as a value.

The "RUN OR NOT" option transfers macro command to the "R" menu. This menu allows the operator to select either the optional keyword "RUN" or "NOT" which is then input in the appropriate cell of the runstream file and the macro command again returned to the "T" macro menu.

Selection of the "TERRAIN HEIGHT" option transfers the macro command to the "HEIGHTS" macro menu which has two (2) options: "FLAT" and "ELEV". The selection of either option inputs the selected keyword in the appropriate cell (temporarily named "OPT") at the end of the runstream file, deletes the cell name and returns the macro command to the "T" menu.

The "MORE" selection transfers macro command to the "C" macro menu which contains the options "HALFLIFE", "DECAY COEFF" "ELEV UNITS", "FLAGPOLE", "EVENT", "RE-START", and "ERROR FILE". In addition the menu contains the "QUIT" option which returns command to the "T" macro menu. The options "HALFLIFE", "DECAY COEFF" and "FLAGPOLE" each create the appropriate keyword at the first free line of the runstream file then names the next cell to the right of the keyword. The macro then prompts the operator for the keyword's corresponding value and places the value in the named cell. The cell's name is deleted and macro command is returned to the "C" menu. The "ELEV UNITS" selection transfers macro command to the "E" macro menu which contains two (2) selections: "FEET" and "METERS". Either option enters the keyword "ELEVUNIT" on the first blank line of the runstream file then enters either "FEET" or "METERS", depending on the selection made, in the cell immediately to the right of the keyword. Macro command is returned to the "C" macro menu. The "EVENT" option transfers macro command to the "S" macro menu.

The "S" macro menu contains four options: "EVFILE", "SOCONT", "DETAIL" and "QUIT". The "EVFILE" option moves the cursor to the first blank line of the runstream file and enters the keyword "EVENTFIL" then moves one (1) cell to the right on the same line and names that cell "EVFILE". The operator is prompted for the name to be used for the input file which is entered into the cell named "EVFILE". The cell name "EVFILE" is deleted and the macro returns to the "S" menu. The option "SOCONT" moves the cursor to the first empty cell in same line as the previous selection and enters the keyword "SOCONT" in that cell. The option "DETAIL" moves the cursor to the same line and enters the keyword "DETAIL" in the first empty cell. The "QUIT" selection returns macro command to the "C" menu.

The next option in the "C" menu is "RE-START" which allows the operator to specify optional ISC2 keywords and parameters to generate an unformatted file of intermediate ISC2 results. This option allows a modeling session to be continued later if it is interrupted for any reason. This menu option also accesses another menu ("RS"). The "RS" menu contains two (2) selections: "SAVEFILE" and "MULTIYEAR", each of which transfers macro command to an additional macro menu. The

"SAVEFILE" option moves the cursor to the first blank line of the runstream file, inputs the keyword "SAVEFILE" and names the first cell to the right "SAVFIL". It then transfers command to the "RS2" menu. This menu has options of "SAVFIL", "DAYINC", "SAVFILE" "INITFILE" and "RETURN". The "SAVFIL" option prompts the operator for the intermediate storage filename which is then entered in the "SAVFIL" cell. The "DAYINC" option moves the cursor one cell to the right of the "SAVFIL" cell and names the cell "DAYINC". The macro then prompts the operator for number of days between dumps which the macro enters in the "DAYINC" cell. If the operator selects the "INITFILE" the macro moves the cursor to the next blank line, enters the keyword "INITFILE" and names the next cell to the right "INIFIL". It then prompts the operator for the filename for intermediate results. The "RETURN" option transfers macro command to the "C" macro menu. The "MULTIYEAR" selection moves the cursor to the next blank line in the runstream file and enters the "MULTIYEAR" keyword and names two cells to the right. It then transfers macro command to the "RS1" macro menu. This menu contains the options "SAVFIL", "INIFIL" and "RETURN". These selections perform the same functions as the selections with the same names in the previous menu.

The "ERROR FILE" selection from the "C" macro menu moves the cursor to the next blank line of the runstream file and enters the "ERRORFIL" keyword. It prompts the operator for the name of the file of error messages. This name is input in the cell to the right if the keyword and the operator is asked if the "DEBUG" option is desired. If the "DEBUG" options is selected with "Y" for yes the macro inputs the "DEBUG" keyword in the next cell to the right of the file name. The macro then returns to the "C" macro. If the operator chooses "QUIT" from the "C" menu the macro command returns to the "T" macro menu. If the operator chooses "QUIT" from the "T" menu the macro moves the cursor to the next blank line in the runstream file and enters the pathway "CO" followed by the keyword "FINISHED". The macro command is then transferred to the "FUNCTION" menu to change pathways.

The second selection in the "FUNCTION" menu is "SO" for source information. This selection moves the cursor to the next blank line of the runstream file, enters the pathway name "SO" followed by the "STARTING" keyword. The macro command is then transferred to the "SO" macro menu. The "SO" macro menu contains selections for "LOCATION", "DOWNWASH", "EMISSIONS", "UNITS", "VARIABLES", "GROUPS" and "QUIT".

Figure 3 shows the structure and interaction of the various "SO" options. The "LOCATION" option accesses the "SOO" menu which controls input for the X, Y, and Z source coordinates and the source type. The "SOURCE TYPE" selection in this menu

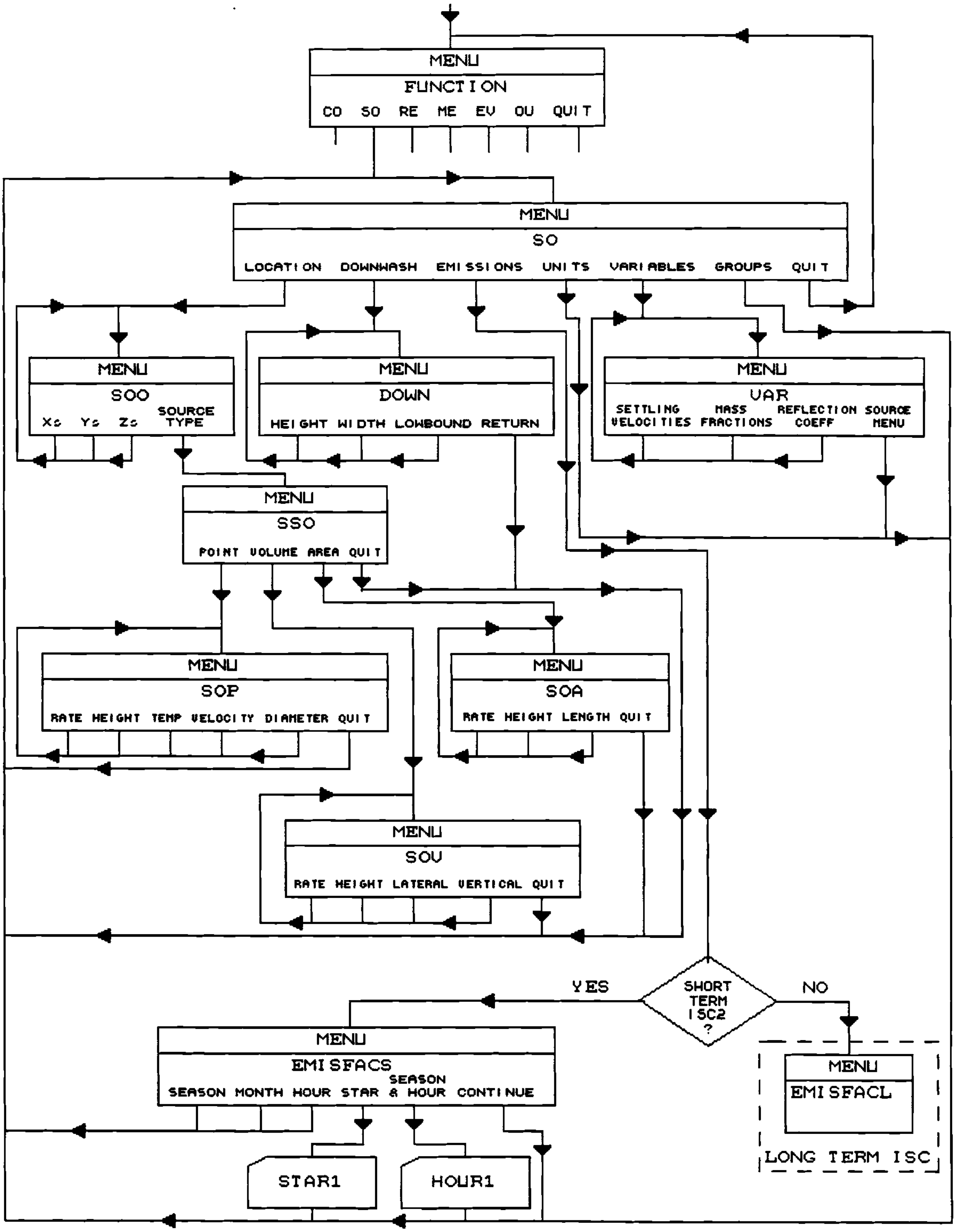


Figure 3. Macro menu structure for the ISC2 "SO" pathway keywords and parameters in the RISC2 preprocessor

accesses the "SSO" menu which contains menu options for "POINT", "VOLUME" and "AREA", each of which access a menu of parameters specific to that type of contaminant source. When the required parameters have been entered from the selected type menu, "SOP" (point), "SOA", (area) or "SOV" (volume) macro control is returned to the "SO" menu by selecting "QUIT". The "DOWNWASH" selection accesses the "DOWN" menu of downwash parameters and returns to the "SO" menu. The "EMISSIONS" selection first determines if the model selected is short term (ISCST) or long term (ISCLT) by using the advanced macro {IF} command. Depending on the model selected the macro then accesses either the EMISFACS (short term) menu or the EMISFACL (long term) menu. Following the selection of the appropriate parameters from either of these menus the macro command is again returned to the "SO" menu. The selections of "UNITS" or "GROUPS" causes the macro to prompt the operator for certain parameters and return to the "SO" menu whereas the "VARIABLES" selection accesses another menu (VAR) for additional selections. Table 6 lists the "SO" pathway's keywords and parameters as well as the menus and macros associated with them. The macro structures, commands and menus used for the "SO" pathway are very similar to those used for the "CO" pathway parameters so they will not be discussed in detail. A complete listing of these macros, however, is located in appendix C.

TABLE 6.

LIST OF ISC2 "SO" PATHWAY KEYWORDS AND PARAMETERS WITH THE CORRESPONDING SPREADSHEET MENUS AND MACROS

KEYWORD	PARAMETER	MENU	MACRO
LOCATION	Scrid	SO	LOCATION
LOCATION	Srctype	SSO	POINT, VOLUME, OR AREA
LOCATION	Xs	SOO	Xs
LOCATION	Ys	SOO	Ys
LOCATION	Zs	SOO	Zs
SRCPARAM	Srcid, Ptemis, Stkhgt, Stktmp, Stkvel, Stkdia (point source)	SO SOP SOP SOP SOP SOP	LOCATION RATE HEIGHT TEMP VELOCITY DIAMETER
SRCPARAM	Srcid, Vlemis, Relhgt, Syinit, Szinit (volume source)	SO SOV SOV SOV SOV	LOCATION RATE HEIGHT LATERAL VERTICAL
SRCPARAM	Srcid, Aremis, Relhgt, Xinit (area source)	SO SOA SOA SOA	LOCATION RATE HEIGHT LENGTH
BUILDHGT	Srcid, Dsbh	SO DOWN	LOCATION HEIGHT
BUILDWID	Srcid, Dsbw	SO DOWN	LOCATION WIDTH
LOWBOUND	Srcid, Idswak	SO DOWN	LOCATION LOWBOUND
EMISFACT	Srcid, Qflag, Qfact	EMISFACS	SEASON, MONTH, HOUR, STAR, SEASON & HOUR
EMISUNIT	Emifac, Emilbl, Conlbl or Deplbl	SO SO SO	UNITS UNITS UNITS
SETVELOC	Srcid, Vsn	VAR VAR	SETTLING- VELOCITIES
MASSFRAC	Srcid, Phi	VAR VAR	MASS FRACTIONS MASS FRACTIONS
REFLCOEF	Srcid, Gamma	VAR VAR	REFLECTION- COEFFICIENT
SRCGROUP	Grpid, Srcid's, Srcrng's	SO SO SO	GROUPS GROUPS GROUPS

A new type of macro command not previously discussed is found in the "HEIGHT" macro of the "DOWN" menu which is derived from the DOWNWASH selection in the "SO" menu. The "HEIGHT" selection macro starts with a macro "IF" command. The {IF} macro command has the structure {IF condition}. If the condition is true the macro continues with the macro command immediately following the {IF} command and in the same cell. If the condition is false the macro continues with the command located in the next cell in the column. In the "HEIGHT" macro the cell containing the "IF" command is {IF <<RISC2>>TERM=2}{BRANCH HTLT}. This can be interpreted as "if the cell named "TERM" in the "RISC2" file equals 2 (long term model) transfer macro command to the macro named HTLT. Since this paper only deals with the short term model, the value in "TERM" is 1 and the macro command proceeds to the next cell in the column. The macro continues through the remainder of the pathway menus until the "SO" pathway is completed.

The remaining selections from the "FUNCTION" menu ("RE", "ME", "EV", and "OU") access menus and operator prompts for the receptor (RE), meteorological (ME), event (EV) and output (OU) pathways. The keywords and parameters associated with each of these pathways along with their program menu location are listed in Tables 7 through 10.

These macros use the same general menu structure as the

TABLE 7.

LIST OF "RE" PATHWAY KEYWORDS AND PARAMETERS WITH THE CORRESPONDING SPREADSHEET MENUS AND MACROS

KEYWORD	PARAMETER	MENU	MACRO
GRIDCART	Netid, STA	GRID	CARTESIAN
GRIDCART	XYINC, Xinit, Xnum, Xdelta, Yinit, Ynum, Ydelta	GRID2 GRID2 GRID2 GRID2 GRID2	INCREMENTS INCREMENTS INCREMENTS INCREMENTS INCREMENTS
GRIDCART	XPNTS Gridx1, Gridx2, Gridx3, etc & Gridy1, Gridy2, Gridy3, etc.	GRID2 GRID2 GRID2 GRID2 GRID2	X-POINTS X-POINTS X-POINTS Y-POINTS Y-POINTS
GRIDCART	ELEV Row, Zelev1, Zelev2, Zelev3, etc.	GRID2 GRID2 GRID2 GRID2	ELEVATIONS ELEVATIONS ELEVATIONS ELEVATIONS
GRIDCART	FLAG Row, Zflag1, Zflag2, Zflag3, etc.	GRID2 GRID2 GRID2 GRID2	FLAGPOLE FLAGPOLE FLAGPOLE FLAGPOLE
GRIDCART	END	GRID2	NEW NETWORK
GRIDPOLR	Netid STA	GRID GRID	POLAR POLAR
GRIDPOLR	ORIG, Xinit, Yinit	GRID3 GRID3	ORIGIN ORIGIN
GRIDPOLR	DIST Ring1, Ring2, Ring3, etc	GRID3 GRID3 GRID3	DISTANCES DISTANCES DISTANCES
GRIDPOLR	DDIR Dir1, Dir2, Dir3, etc	GRID3 GRID3 GRID3	DISCRETE DIR DISCRETE DIR DISCRETE DIR
GRIDPOLR	GDIR Dirnum, Dirini, Dirinc	GRID3 GRID3 GRID3	GENERATED DIR GENERATED DIR GENERATED DIR
GRIDPOLR	ELEV Rad Zelev1, Zelev2, Zelev3, etc	GRID3 GRID3 GRID3 GRID3	ELEVATIONS ELEVATIONS ELEVATIONS ELEVATIONS
GRIDPOLR	FLAG Rad Zflag1, Zflag2, Zflag3, etc	GRID3 GRID3 GRID3 GRID3	FLAGPOLE FLAGPOLE FLAGPOLE FLAGPOLE
DISCCART	Xcoord, Ycoord,	RE RE	DISCRETE- CARTESIAN
DISCPOLR	Srcid, Range, Direct	RE RE	DISCRETE POLAR DISCRETE POLAR
BOUNDARY	Srcid, Dist,(36)	RE	PLANT BOUNDARY
Boundelv	Srcid, Zelev, (36)	RE RE	BOUNDARY- ELEVATIONS

TABLE 8.

LIST OF THE ISC2 "ME" PATHWAY KEYWORDS AND PARAMETERS WITH THE CORRESPONDING SPREADSHEET MENUS AND MACROS

KEYWORD	PARAMETER	MENU	MACRO
INPUTFIL	Metfil	ME	FILENAME
ANEMHGHT	Zref	ME	HEIGHT
SURFDATA	Stanum, Year	DATA2 / ME ME	STATION STATION
UAIRDATA	Stanum, Year	DATA2 / ME ME	STATION STATION
STARTEND	Strtyr, Strtmn, Strtdy, Endyr, Endmn, Enddy, Endhr	PERIOD1 PERIOD1 PERIOD1 PERIOD1 PERIOD1 PERIOD1 PERIOD1	START DATE START DATE START DATE END DATE END DATE END DATE END HOUR
DAYRANGE	Range1, Range2, Range3, etc	PERIOD1 PERIOD1 PERIOD1	DAYRANGE DAYRANGE DAYRANGE
STARDATA	(long term)	STARDAT	STARDATA
WDROTATE	Rotang	DATA	WIND ALIGNMENT
WINDPROF	Stab, Prof1, Prof2, Prof3, Prof4, Prof5, Prof6	DATA DATA DATA DATA DATA DATA DATA	EXPONENTS EXPONENTS EXPONENTS EXPONENTS EXPONENTS EXPONENTS EXPONENTS
DTHETADZ	Stab, Dtdz1, Dtdz2, Dtdz3, Dtdz4, Dtdz5, Dtdz6	DATA DATA DATA DATA DATA DATA DATA	TEMP GRAD TEMP GRAD TEMP GRAD TEMP GRAD TEMP GRAD TEMP GRAD TEMP GRAD
WINDCATS	Ws1, Ws2, Ws3, Ws4, Ws5	DATA DATA DATA DATA DATA	WIND SPEED WIND SPEED WIND SPEED WIND SPEED WIND SPEED
AVESPEED	(long term)	DATA1	WIND SPEED
AVETEMPS	(long term)	DATA1	AVERAGE TEMPS
AVEMIXHT	(long term)	DATA1	MIXING HEIGHTS

TABLE 9.

LIST OF ISC2 "OU" PATHWAY KEYWORDS AND PARAMETERS WITH THE CORRESPONDING SPREADSHEET MENUS AND MACROS

KEYWORD	PARAMETER	MENU	MACRO
RECTABLE	Aveper FIRST, SECOND,... SIXTH, INDSRC	OU1 OU1 OU1 OU1 OU1	RECEPTOR TABLE RECEPTOR TABLE RECEPTOR TABLE RECEPTOR TABLE RECEPTOR TABLE
MAXTABLE	Aveper, Maxnum, INDSRC, SOCONT	OU1 OU1 OU1 OU1	MAXIMUM VALUE- TABLE
DAYTABLE	Avper1, Avper2, Avper3, Avper4	OU1 OU1 OU1 OU1	CONCURRENT VALUES CONCURRENT VALUES CONCURRENT VALUES CONCURRENT VALUES
MAXIFILE	Aveper, Grpid, Thresh, Filnam	OU3 OU3 OU3 OU3	MAXIMUM VALUES MAXIMUM VALUES MAXIMUM VALUES MAXIMUM VALUES
PLOTFILE	Aveper, Grpid, Hivalu, Filnam,	OU3 OU3 OU3 OU3	PLOT FILES PLOT FILES PLOT FILES PLOT FILES
POSTFILE	Aveper, Grpid, Format, Filnam	OU3 OU3 OU3 OU3	POST PROCESSING POST PROCESSING POST PROCESSING POST PROCESSING

TABLE 10.

LIST OF ISC2 "EV" PATHWAY KEYWORDS AND PARAMETERS WITH THE CORRESPONDING SPREADSHEET MENUS AND MACROS

KEYWORD	PARAMETER	MENU	MACRO
EVENTPER	Evname Aveper Grpid Date	EV EV EV EV	PERIOD PERIOD PERIOD PERIOD
EVENTLOC	Evname XR YR	EV EV EV	CARTESIAN- LOCATION / POLAR LOCATION

previous two pathways. Figure 4 illustrates the macro and menu structure of the RECEPTOR or "RE" ISC2 pathway from the FUNCTION menu. The main menu for this pathway is the "RE" menu which contains selections for "GRID", "DISCRETE CARTESIAN", "DISCRETE POLAR", "PLANT BOUNDARY", "BOUNDARY ELEVATIONS" and "QUIT". All of these selections except "GRID" prompt the operator for specific input parameters then return to the "RE" menu for additional selections. The "GRID" option accesses a menu by the same name which has options for "CARTESIAN" and "POLAR", each of which access an additional menu. The "GRID2" menu provides parameter options for receptors located on a Cartesian grid whereas "GRID3" provides polar grid options. When complete the "END" option returns the operator to the "RE" menu. The "QUIT" selection on the "RE" menu returns the macro command to the "FUNCTION" menu.

Figure 5 illustrates the structure of the various meteorological, "ME", pathway menus. These menus control the input parameters that affect how the meteorological data file is used by the ISC2 model but do not affect the meteorological data file itself. The main pathway for this pathway is the "ME" menu. The "FILENAME" selection from this menu accesses the "MES1" menu which contains options for various meteorological input file formats. The "HEIGHT" option in the "ME" menu allows the operator to specify the height of the meteorological sampling point and the "STATION" option

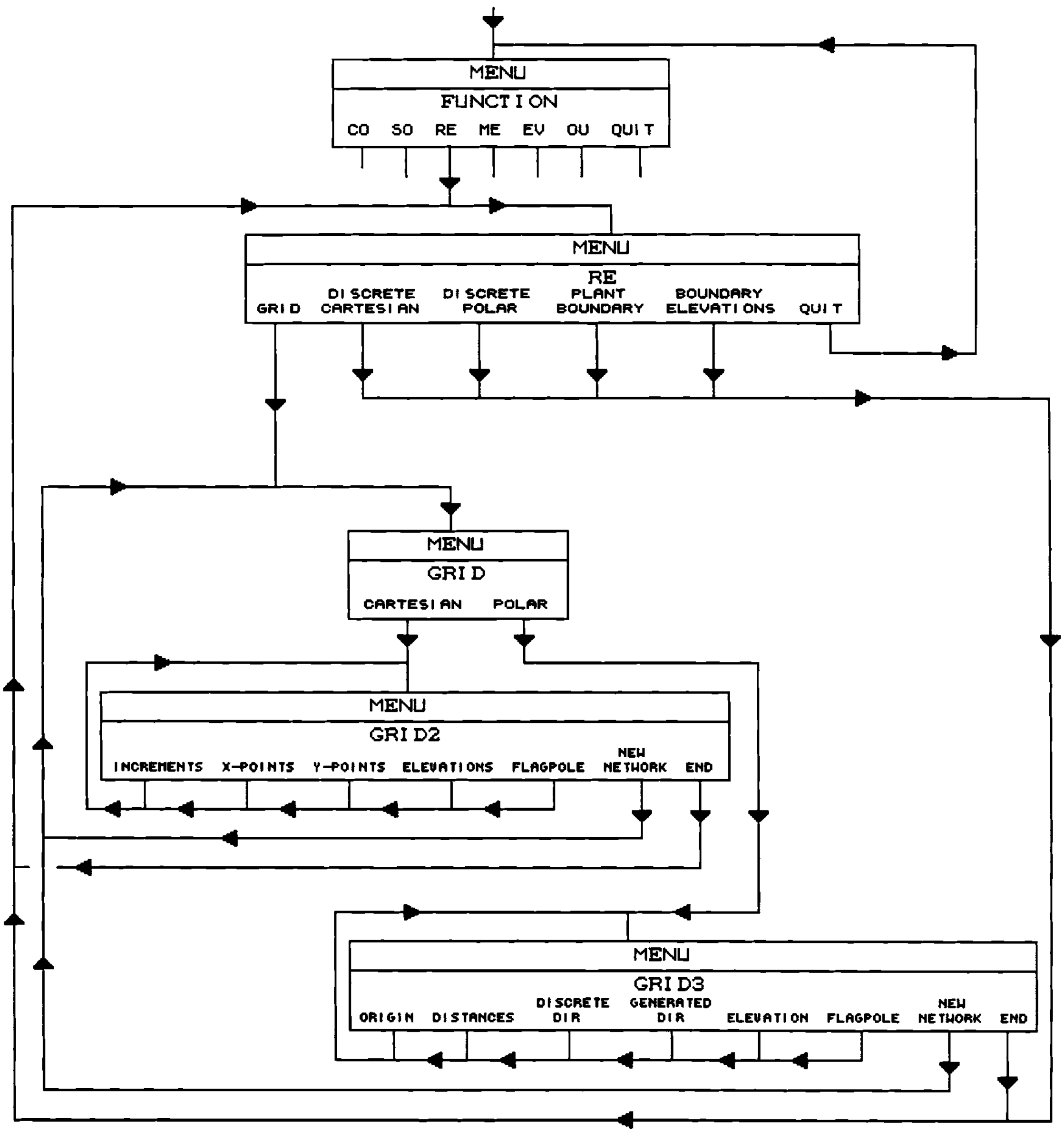


Figure 4. Macro menu structure for the ISC2 "RE" pathway keywords and parameters in the RISC2 preprocessor

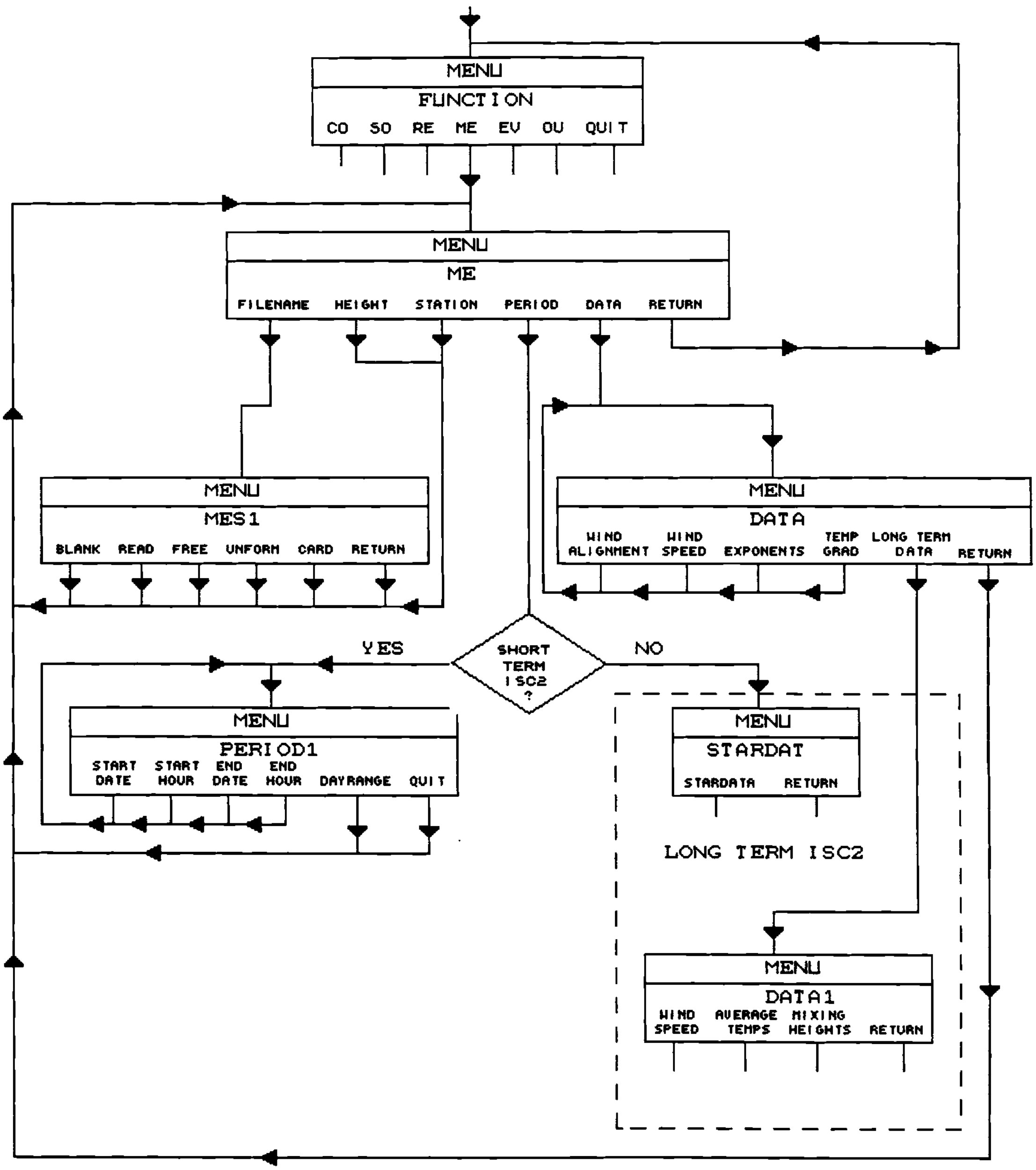


Figure 5. Macro menu structure for the ISC2 "ME" pathway keywords and parameters in the RISC2 preprocessor

allows the operator to specify the station to be used for the model. The "PERIOD" selection macro uses an {IF} command, as discussed earlier, to determine whether the short term (ISCST) or long term (ISCLT) model is used. It then branches to either the short term menu, PERIOD1, or the long term menu, STARDAT, both of which return to the "ME" menu after the appropriate parameters are selected. The final "ME" menu selection is "DATA" which accesses the "DATA" menu which allows the operator to make corrections to some meteorological input file data. The "DATA" menu also accesses an additional menu (DATA1) if long term meteorological data is used.

The macro menu structures for the "EVENT" (EV) pathway and the "OUTPUT" (OU) pathway are shown in Figure 6. Selection of the "EV" pathway option from the "FUNCTION" menu accesses the "EV" menu of options that can be used in conjunction with EVENT processing. The "OU" selection from the "FUNCTION" menu accesses the "OU" menu which has options for "TABULAR" output or "SPECIAL PURPOSE" output. The "SPECIAL PURPOSE" option accesses another menu with options to output maximum values, plot files or files for post processing. The "TABULAR" option macro first uses the {IF} advanced macro command to switch between ISCST and ISCLT output options. The ISCST options in menu "OU1" include "RECEPTOR TABLE" which accesses "OU2" menu of high values to be summarized by receptor. The "CONCURRENT VALUE TABLE" selection also accesses another menu named II.

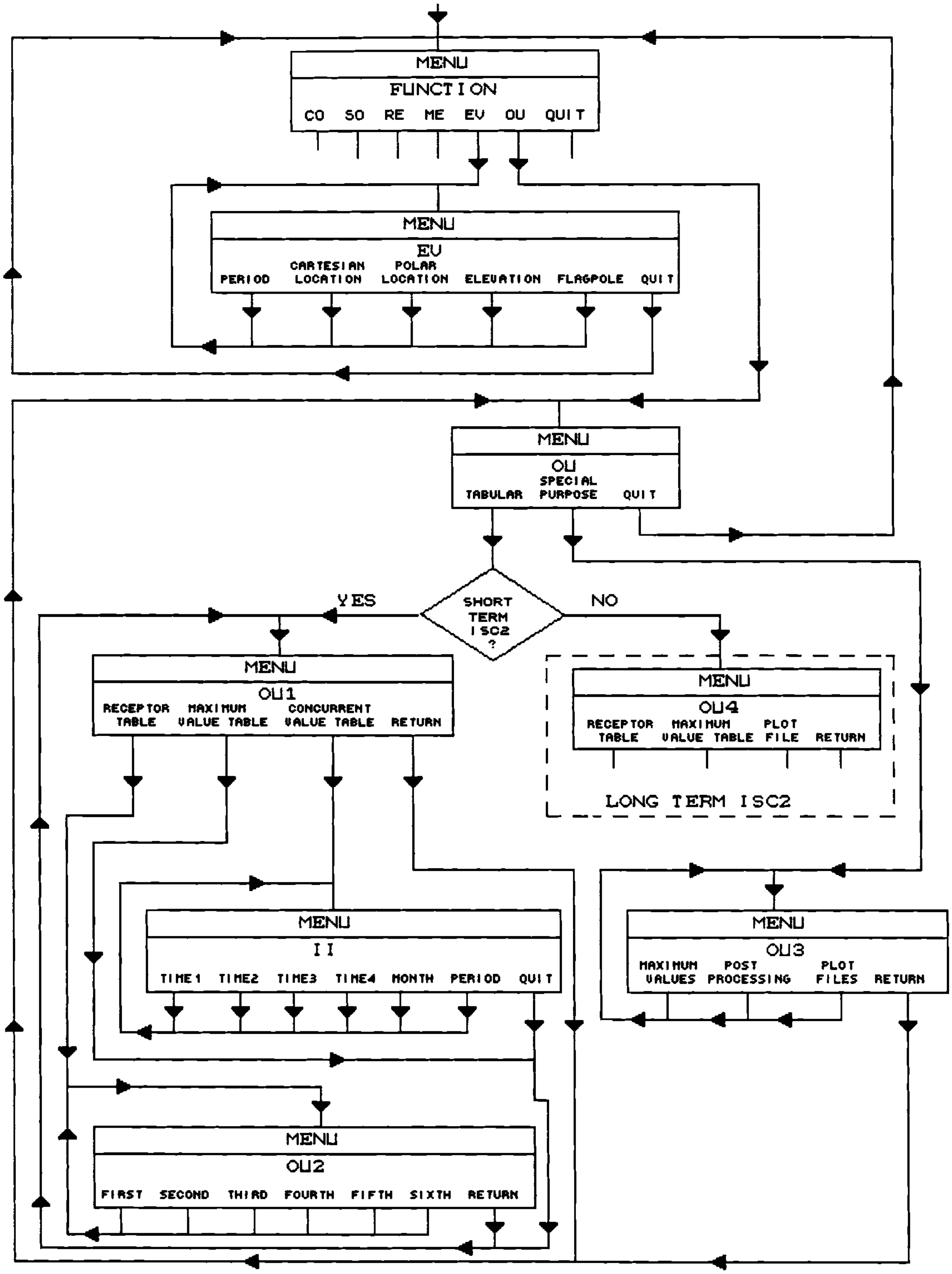


Figure 6. Macro menu structure for the ISC2 "EV" and "OU" pathways keywords and parameters in the RISC2 preprocessor

This is the same menu II as is accessed in the "CO" pathway. In this pathway this menu specifies time intervals to report concentrations at all receptors. Once all the selected keywords and parameters have been entered for a pathway, the operator can finish the pathway and return to the "FUNCTION" menu by entering "QUIT".

Once the input has been completed for all the pathways the operator may save the runstream file and return to the "SELECT" macro menu by choosing "QUIT" from the function menu. This option automatically saves the runstream file by transferring the macro command to the "SAVE" macro within the "FIL" menu. This macro prompts the user for the runstream file name and whether or not it is a new file. This macro not only saves the file to the disk but also inputs the file name in the appropriate locations in other macros so the correct file is automatically run with the model or risk options. The "SAVE" (file) option may also be accessed from the "SELECT" menu by using the "FILE" option.

RISC2 FILE AND MODEL MODULES:

The general structure of the minor divisions "FILE" and "MODEL" were shown in Figure 1, which was previously discussed. The FILE option accesses the "FIL" menu which contains the "IMPORT" selection in addition to the "SAVE" macro previously discussed. The "IMPORT" option allows the operator to import a text file into the worksheet. The macro automatically returns to the "SELECT" menu after the file operations are completed.

The "MODEL" selection from the "SELECT" menu runs the ISC2 model one time in a deterministic manner. The macro determines if the input runstream file is for the short term or long term model, then exits Lotus® through use of the {SYSTEM} macro command and initiates the ISC2 model. Once the ISC2 program finishes running the model the macro command returns to the "SELECT" menu for further processing.

RISC2 RISK MODULE GENERAL INFORMATION:

The RISK module is the second major division of the RISC2 program (following the Preprocessor module). The various options in this division are combined with the ISC2 (under the ITERATIONS and RUN options of RISK) to generate a range of output values at the receptor points and perform a statistical analysis of these values. The method used for this simulation is called Monte Carlo modeling. Monte Carlo modeling directly transforms variations in input parameters to variations in output values. (Nichols and Freshley, 1993).

MONTE CARLO PROCESSING:

The general deterministic modeling process is represented by the equation

$$C_w = g(\underline{X}) \qquad (1)$$

where C_w represents the value of the variable at the receptor, g represents the fate and transport model and $\underline{X}$ represents the vector of all model inputs (Dean et. al. 1989). Given a set of deterministic input parameters X_1, X_2, X_3,...X_n, equation (1) can be expanded so the computed the output variable at the receptor becomes:

$$C_w = g(X_1, X_2, X_3, ... X_n) \qquad (2)$$

Since some or all of the model input parameters ($\underline{X}$) contain elements of uncertainty, as previously discussed, they may be considered random variables that are defined by their cumulative probability distribution functions (cpdf). If $\underline{X}$ is defined by a cpdf and a stochastic model is utilized, the resulting variable output at the receptor will be a cdf $F_{Cw}(C_w')$ where

$$F_{Cw}(C_w') = \text{Probability } (C_w \leq C_w') \qquad (3)$$

and C_w' is a given output concentration (Dean et.al. 1989).

The objective of Monte Carlo simulation, or any stochastic modeling, is to estimate the cumulative distribution function of the variable at a receptor location given the probability distribution of the input parameter(s) (Dean et. al. 1989). The Monte Carlo method involves the repeated generation of random numbers that conform to the cpdf of the selected input variable and the application of the selected model to derive a series of output values at the receptor(s). These values are subsequently analyzed to determine their cpdf and meet the objective of the model. Figure 7 illustrates the six steps Dean et.al. define as the Monte Carlo process. The steps in the figure are summarized by Dean as:

"i. Selection of representative cumulative probability distribution functions for the relevant input variable(s).

ii. Generation of pseudo-random numbers from the distributions selected in (i).

iii. Application of the model to compute the derived inputs and output(s).

iv. Repeated application of steps (ii) and (iii).

v. Presentation of the series of output (random) values generated in step (iii) as a cumulative probability distribution function (cdf).

vi. Analysis and application of the cumulative probability distribution of the output as a tool for decision making" (Dean et.al. 1989).

Monte Carlo sampling techniques from the input variable PDF are entirely random but do reflect the probability distribution, i.e. a greater number of values will be drawn from the areas of the distribution which have higher probabilities of occurrence (@RISK 1992). If an infinite number of sample values are derived from a given PDF the PDF

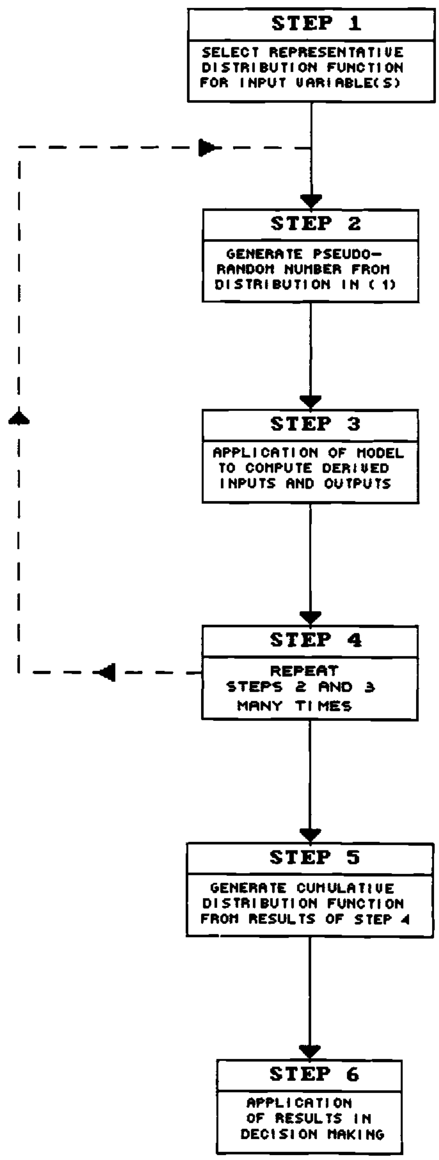


Figure 7. Illustration of the processing steps required for a Monte Carlo simulation

will be reproduced. If a smaller number of samples are used, the values may be "clustered" and not accurately reflect the PDF. As the number of samples increases, the values increasingly reflect the original PDF and the sampling error decreases. After sufficient sample iterations the decrease in sampling error becomes very small and additional iterations do not significantly increase the precision of the results (ASCE 1990). Determination of sufficient model iterations may be performed graphically.

THE @RISK® ADD-IN:

@RISK® is a Lotus® "ADD-IN" (discussed previously) designed to integrate a stochastic simulation into the 1-2-3® worksheet. This specialized program uses either a Monte Carlo sampling technique or Latin Hypercube to randomize the input values from the PDF. This application is limited to the Monte Carlo sampling method since it is widely accepted and proven (Rubinstein, 1981). The @RISK® ADD-IN contains its own specialized screens for selecting variables with uncertainties, inputing the distribution functions for those variables, selecting the number of iterations, running the model and analyzing the output results. This is very efficient but only works on models completely contained within the LOTUS worksheet. That is, the input parameters, the model equations and the output must be contained within normal worksheet cells and can not be dependent upon the execution of a macro. @RISK® only works on models contained within the worksheet because it most of its functions are controlled internally. It automatically recalculates the worksheet for the number of iterations requested, and records the results of each iteration within @RISK® (not on the spreadsheet). Any statistical analyses and graphing of these results are also performed on these internal results, not on values recorded in the worksheet. Since the RISC2 application requires not only a Lotus® macro, but also an external DOS model, most of the @RISK® capability cannot be used. However, that remaining portion of @RISK® that can be used is very important because of the Monte Carlo sampling routine and the wide variety of probability distribution functions supported.

The @RISK® program supports Monte Carlo sampling of forty different probability distributions, called @functions, as listed in Table 11. These @functions look and work the same as the other Lotus® @functions (once @RISK® is loaded). These distribution functions (@functions) are discussed at length and illustrated in the @RISK® manual. Each iteration of a simulation enters a new value for each PDF @function in the appropriate cell of the worksheet.

TABLE 11.

LIST OF PROBABILITY DISTRIBUTION FUNCTIONS INCLUDED WITH @RISK®

@BETA	@HYPERGEO
@BINOMIAL	@INDEP
@CORRMAT	@INDEPC
@CHISQ	@LOGISTIC
@CUMUL	@LOGNORM
@DEP	@LOGNORM2
@DEPC	@NEGBIN
@DISCRETE	@NORMAL
@DISCRETER	@PARETO
@DUNIFORM	@POISSON
@DUNIFORMR	@SIMTABLE
@ERF	@SIMTABLER
@ERLANG	@TEXPON
@EXPON	@TLOGNORM
@GAMMA	@TNORMAL
@GEOMETRIC	@TRIANG
@GENERAL	@TRI1090
@GENERALR	@TRIGEN
@HISTOGRM	@UNIFORM
@HISTOGRMR	@WEIBULL

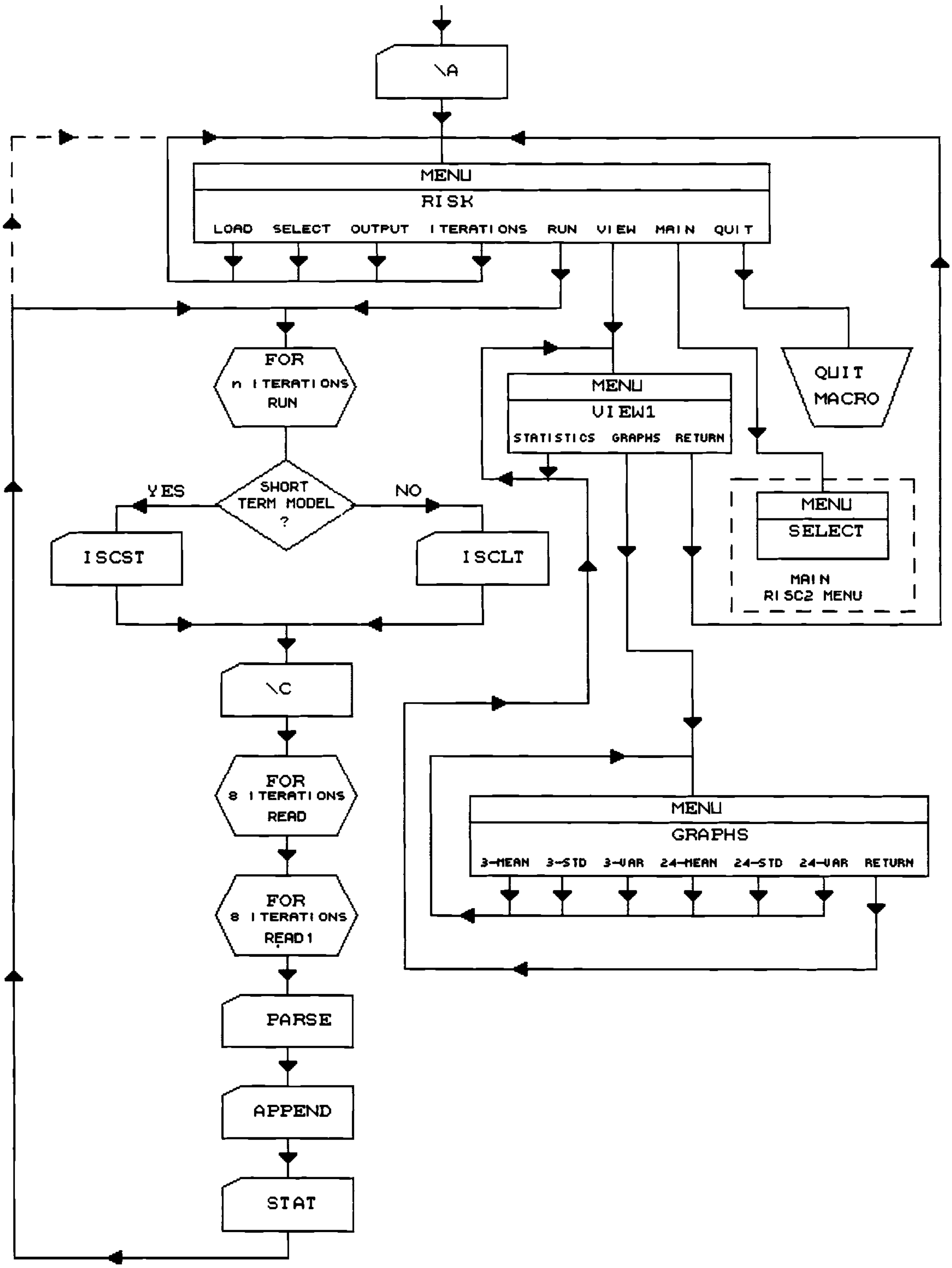


Figure 8. Macro and macro menu structure for the RISK module of RISC2

STRUCTURE OF RISK OPTION:

The RISK module, as illustrated in Figure 8, has much simpler structure than the PREPROCESSOR module. The main "RISK" menu contains options for "LOAD", "SELECT", "OUTPUT", "ITERATIONS", "RUN", "VIEW", "MAIN" and "QUIT". Four of these macro options, "LOAD", "SELECT", "OUTPUT", and "ITERATIONS" prompt the operator for input parameters then return to the "RISK" menu. The "RUN" selection macro uses a {FOR} advanced macro command to run the remainder of the macro and its subroutines the required number of iterations. The {FOR} advanced macro command is followed by an {IF} macro command to determine if the ISCST or ISCLT model is to be used. The remainder of the macro calls the ISC2 model and imports selected output back into the worksheet before returning to the "RISK" menu. The VIEW selection macro accesses the "VIEW1" menu which contains options for "STATISTICS" and "GRAPHS" and "RETURN". The "STATISTICS" option displays the cumulative statistics of the model output while the "GRAPHS" option accesses another menu, called "GRAPHS" to select various output graphs. Both the "VIEW" and "GRAPHS" macros return to the "VIEW1" menu where "RETURN" transfers macro command to the "RISK" menu. The final two options in the "RISK" menu are "MAIN", which returns macro command to the main "SELECT" menu, and "QUIT", which stops all macro processing. Together these options use the spreadsheet platform to control the DOS ISC2 program and generate a stochastic model.

The "RISK" menu and its associated macros are contained on a separate worksheet file which is named RISC2A. This worksheet is automatically opened after the current worksheet and the worksheet file RISC2 is automatically closed. This operation is necessary because in large worksheets, such as the RISC2, the time required for each keystroke or command recalculation is significantly increased when @RISK® is loaded. Using the separate (smaller) worksheet file eliminates this problem.

The first item in the "RISK" menu is the "LOAD" option which loads the @RISK® "ADD-IN". "ADD-IN"s are loaded into the computer memory to interact with the Lotus 1-2-3® program rather than called with an executable file like regular DOS programs. In addition to loading the @RISK® "ADD-IN" this macro assigns the key combination [ALT]-[F7] (pressed at the same time) to activate @RISK®. It also changes the Lotus® spreadsheet calculation mode from automatic to manual. The manual recalculation mode causes Lotus® to only recalculate the cells in the spreadsheet when the [F9] (recalculation) key is pressed or called from a macro. The "SELECT" option allows the operator to select the variable parameter by moving the cursor, highlighting its cell, and pressing [ENTER]. Once the parameter has been selected the operator is prompted to enter the distribution function to be substituted for the value currently in the cell.

The third selection in the RISK menu is the OUTPUT option. This option prompts the operator to select the upper left corner of the range of output values. The macro then names several cells for later use during the output of the model values.

The "ITERATIONS" selection from the RISK menu prompts the operator for the number of iterations desired. The macro saves this value in the cell named "NUM" where it will be accessed by the "RUN" macro. This value for the number of iterations is NOT input into the @RISK® ADD-IN functions. This completes step (i) of the Monte Carlo process outlined by Dean et. al. (1989).

The "RUN" selection from the "RISK" menu completes step (ii) through step (iv) of that process. This macro first calls the @RISK® ADD-IN and selects Monte Carlo sampling with 1 Iteration per simulation within @RISK each time [CALC] is entered, either manually or through the macro. Since the @RISK® Monte Carlo sampling technique uses a random number that is representative of the probability distribution function for each iteration and each iteration is independent, for a given model and a given number of iterations, the output results will be statistically the same whether the number of iterations are controlled by @RISK® or by the some other source, such as the macro. The macro proceeds to the {FOR} command which controls the number of iterations for the RUN macro and its subroutines. The RUN macro determines if the ISCST or ISCLT model is to be used and calls the appropriate model. After the ISC2 model is completed, the RUN macro accesses the \C macro which retrieves and stores the output results in tabular form within the Lotus® worksheet. Once the total number of iterations requested have been reached the macro returns to the "RISK" menu.

The VIEW options accesses the VIEW1 menu which contains selections for STATISTICS, GRAPHS and RETURN. RETURN transfers macro command back to the RISK menu. The VIEW1 menu completes steps v and vi of the Monte Carlo process. The STATISTICS option creates an output table of statistical values including the mean, variance, and standard deviation for the maximum 3 hour and 24 hour model output values. The macro displays the table of results on the screen until the operator presses [ENTER].

The GRAPHS option in the VIEW1 menu accesses the GRAPHS menu which has selections for the three hour and 24 hour means, standard deviations, variances and probabilities. When one of these options is selected the macro creates and displays the corresponding graph.

The QUIT option in the RISK menu stops macro processing and returns the operator to normal LOTUS 1-2-3® worksheet functions.

COGMOD OBJECTIVE:

The objective of this example was to create a conditional simulation program using the LOTUS spreadsheet platform and the readily available or public domain programs COVAR (Williams and El-Kadi, 1986) and STATPAC (Grundy and Miesch, 1987). The LOTUS platform not only controls these programs, but also processes and converts the data between programs. This effort was directed at conditioning hydraulic conductivity but any other two-dimensional spatially correlated data set can be generated by these methods. This (conditioned simulation) follows that of Delhomme (1979) as outlined by M. D. Varljen and J. M. Shafer (1991).

GENERAL ALGORITHM:

Varljen and Shafer define the procedure for performing a conditional simulation of hydraulic conductivity as follows:

1. Define the spatial correlation structure γ from the measured values of hydraulic conductivity z(x) at the sample points x_j j=1,...,M.

2. Calculate the kriged hydraulic conductivity values $z^*(x)$ at each location x_i in the kriged grid area where $i=M+1,\ldots,N$ by using the spacial correlation structure γ and the measured values x_j from step 1.

3. Generate the unconditioned random field $s(x)$ at each grid point while preserving the spatial correlation structure γ of the original measured values at the sample points.

4. Calculate the kriged field $s^*(x)$ for each point in the grid area x_j $i=M+1,\ldots,N$. These values are generated by using the spatial correlation γ and the simulated values $s(x_j)$at the original sample points x_j $j=1,\ldots,M$.

5. Calculate the conditioned hydraulic conductivity random field $z_s(x)$ from $z_s(x) = z^*(x) + [s(x) - s^*(x)]$.

Repeat steps 3 through 5 to generate additional hydraulic conductivity random fields.

Figure 9 schematically illustrates the steps applied in this process.

CONDITIONAL SIMULATION:

The first step in the conditional simulation process was to create a number of realizations of the random function $S(x)$ which have the same spatial correlation as the measured values at the sample points. In this paper the program <u>COVAR</u> (Williams and El-Kadi, 1986) was used to create unconditioned hydraulic conductivity realizations. The second part of the procedure was to force a consistency between the simulated

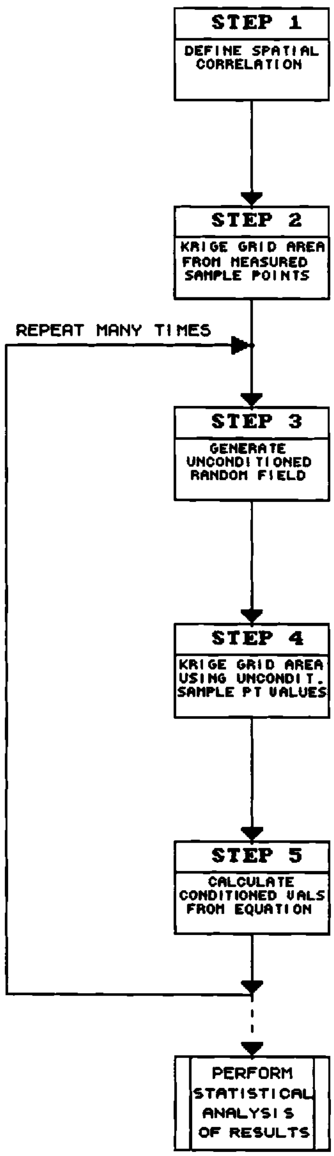


Figure 9. General flow diagram of steps required to perform a conditional simulation

values and the measured values at the sampling locations (i.e. conditioning). This was done by using the group of STATPAC (Grundy and Miesch, 1987) programs to derive an estimated value of the true value at each point in the grid area by kriging the actual data from the sample points. This kriged value varies from the true value by some kriging error value which is expressed as $[z(x)-z^*(x)]$ (Delhomme 1978). This relationship is represented by the equation:

true value = kriged estimate + kriging error

$$z(x) = z^*(x) + [z(x)-z^*(x)] \tag{4}$$

The kriging error is not known but can be simulated by using the values derived from the random simulation of the function $S(x)$ in COVAR. The function $S(x)$ must have the same mean, variance and spatial correlation as the measured values at the sample points.

The values of the function $s(x)$ at the sampling points are kriged to derive a new set of estimated values, $s^*(x)$ for each point in the grid. These kriged values also have a kriging error which is estimated as $[s(x)-s^*(x)]$. This kriging error from the simulated function $s(x)$ is substituted for the actual kriging error $[z(x)-z^*(x)]$ and the conditioned simulation defined as

$$z_s(x) = z^*(x) + [s(x) - s^*(x)]. \tag{5}$$

Point kriging is an exact interpolator so the kriging error, [s(x) - s*(x)] must be equal to zero at the sample points and the measured values at those points are used in the simulation.

Figure 10 schematically illustrates the steps and show the various COGMOD programs applied to this process. The solid "repeat" line shows where steps 3 through 5 are repeated per Varljen and Shafer. The dashed "repeat" line shows where this application repeats steps 4 and 5. This application uses this alternative repeat sequence because all the random field realizations are created at once, then each realization is imported into the kriging application as required rather then creating one realization at a time as in the Varljen and Shafer.

COGMOD uses various STATPAC programs to create the Semivariogram and krige the data. Table 12 lists the STATPAC programs used in this effort and their functions. It does not include all the programs available to the user within the STATPAC package. Since none of the STATPAC programs were modified for this program the user is referred to the STATPAC instruction manual for detailed information and instructions about these programs (Grundy and Miesch, 1987).

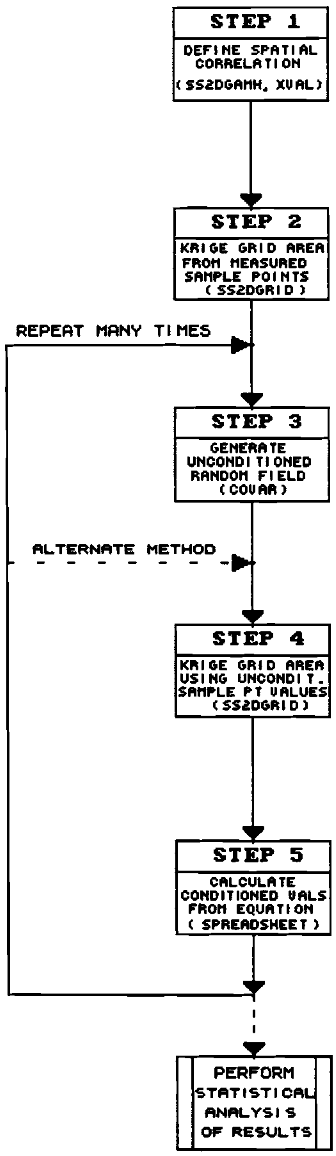


Figure 10. Steps required for conditional simulation and the programs used to perform each step in this effort

TABLE 12.

LIST OF STATPAC PROGRAMS USED IN THIS EFFORT
AND THEIR FUNCTION

PROGRAM NAME	DESCRIPTION
TERFIL	Creates a STATPAC data input file
FILTER	Converts file created by TERFIL to ASCII format for editing
UNFILTER	Converts ASCII file to STATPAC data input file format
BASTAT	Performs basic statistical analysis of input data
SS2DPREP	Preprocess a STATPAC data file for other kriging programs
SS2DVCTL	Prepare an ASCII control file for program SS2DGAMH (or use spreadsheet)
SS2DGAMH	Compute experimental variograms in one to five directions
SS2DXVAL	Cross-validate variogram/drift models
SS2DGRID	Create a grid file for contour mapping by program SS2DCONT
SS@DCONT	Make high resolution contour map of grid file created by SS2DGRID

Step 1 uses the STATPAC programs SS2DGAMH and SS2DXVAL to define the semivariogram of the measured data. These programs will not run unless the STATPAC programs TERFIL and SS2DPREP have been previously employed. TERFIL creates a raw data file of values at sample point coordinates and SS2DPREP prepares these data for use in various other STATPAC programs. These two programs will be discussed later in this paper. In addition, SS2DGAMH requires a control file which can either be created in the STATPAC program SS2DVCTL or from within the LOTUS spreadsheet. This paper will only cover special considerations since normal input parameters are covered in the STATPAC documentation and since actual input parameters are data dependent.

The SS2DVCTRL control file for SS2DGAMH contains several parameters including an option to use a logarithmic conversion in the semivariogram. While the usual response to this option is "no" as the STATPAC kriging programs do not support lognormal kriging, in this application lognormal kriging is supported through LOTUS by means of a macro prepared for this effort. The STATPAC kriging programs are not considered to support lognormal kriging because they do not convert the kriged data either into or out of the logarithmic form. This application has an election within LOTUS to select a lognormal option after the semivariogram options. If the lognormal option is desired it must be selected within the LOTUS application. Once the control file has been created, the SS2DGAMH program requires only a few simple interactive responses to create an experimental variogram.

The initial estimates of the variogram parameters are made by visually fitting a curve to the experimental variogram created by SS2DGAMH. Once the initial estimates have been made the "goodness" of fit can be tested by using the STATPAC program SS2DXVAL. This program performs the cross-validation using one of three options: 1) hole-by-hole suppression, 2) every-other-hole and 3) selected row cross-validation. Hole by hole suppression performs cross validation by deleting one point in the grid then predicting the value at that point using the variogram parameters and the kriging algorithm. Once the value has been predicted, the original value is restored to the data set. The process is repeated until all the points have been tested. In the every-other-hole method the data set is randomly permuted then split into two subsets and one subset used to predict the values of the points in the other subset. In this option the STATPAC program PERMUTER must be used to create the randomly permuted data set. In the selected row option the user specifies the starting row for predicted values. The values of each point from the specified row through the last row of data are predicted from the values of the remaining points. The STATPAC manual states that this option is mostly used to predict values of data points which have not yet been sampled.

Each of the SS2DXVAL options creates the same output for every point in the grid: 1) the kriging error, 2) the theoretical standard deviation of the error and 3) the normalized error. The STATPAC users manual contains a list of criteria for judging the acceptability of the variogram model based on these results. Once the variogram parameters have been determined either from these STATPAC programs or various other programs the user is ready to proceed to step 2.

Step 2 of Varljen and Shafer's procedure is to krige the grid area using the original values at the sample points. In this application the values are kriged in the STATPAC program SS2DGRID. When operated through STATPAC the input parameters for this program are usually entered interactively, in this application, however, the program parameters are entered from a control file created within the LOTUS worksheet. This control file is required for the subsequent kriging iterations of the unconditioned values.

The kriging module is accessed from the worksheet's main function menu. The macro proceeds through a series of interactive questions to create the control file. These questions are the same questions as in the STATPAC SS2DGRID program and are detailed in the STATPAC manual. The second question of the series asks the user if an ASCII output file is desired. The STATPAC manual indicates that the usual response is no but in this application the user must answer "yes" so the kriged results can be imported into the worksheet for additional processing. Additional parameters include the variogram parameters, the maximum distance for the search radius and the maximum number of holes allowed in calculating the kriged values. Care should be taken in selecting these parameters to assure that each point in the grid area can be kriged. If a point is not kriged it results in a zero at that point and an error in the conditioning process. One other input parameter that needs comment is the X-Y coordinates of the southwest corner of the grid area. In the STATPAC programs the southwest corner is assumed to be at the 0-0 coordinate.

Step 3 of the conditioning process is the creation of random field of values for each point in the grid area. There are several different methods of creating this random field including "turning bands" and matrix decomposition. In this application the matrix decomposition method was selected and the program COVAR selected. COVAR is a separate code, not included in the STATPAC package. It is integrated into the conditional simulation by the Lotus® macro. The creation of the unconditioned values while maintaining the same spatial correlation structure is essential to the conditioning process and warrants an in-depth investigation of the program selected.

COVAR, written by Stan A. Williams and Aly I. El-Kadi (1986) was designed to generate two dimensional fields of autocorrelated parameters by matrix decomposition. This program is distributed and supported by the International Ground Water Modeling Center. The matrix decomposition is based on the Choleski algorithm described by Nash (1979). It is used to decompose a symmetric, non-negative definite matrix into a lower triangular matrix. The Choleski algorithm is based on the equation:

$$A = LL^T = R^TR \tag{6}$$

where A is a symmetric and positive definite matrix. This equation can be expanded to:

$$A_{ij} = \sum_{k=1}^{\min(i,j)} L_{ik} \; L_{kj}^T = \sum_{k=1}^{\min(i,j)} L_{ik} L_{jk} \tag{7}$$

The decomposition of this matrix can be performed where

$$L = R^T \tag{8}$$

is the lower triangular matrix.

The program itself requires the operator to first create a data file of X and Y-coordinate locations. This file can be created within LOTUS as part of the DATA module. The file is created interactively with the operator supplying the initial

X and Y coordinates and the distance between points. The Lotus® macro assumes a 20x20 point grid. Lotus® then directly accesses COVAR which is interactive with the operator entering the various required parameters including format, matrix size, mean, standard deviation, correlation length and the number of realizations.

1. The distance between the points in the X direction must be equal to the distance between the points in the Y direction. In addition the maximum X or Y-coordinate value in the data file must be less then 100. The operator must multiply the actual values by a number that will reduce the maximum value to some number less than 100. The new values can be restored in the LOTUS worksheet by using the inverse of the multiplier.
2. The format values must be enclosed in ( ).
3. The maximum number of realizations to be used must be created at the same time since although each realization from a given data set is unique, if COVAR is rerun with the same data set it will generate the same field of values for each realization.
4. The spatial correlation used in the COVAR realization must be the same as that used in the Kriging program in order to create a valid conditioned simulation.

5. COVAR only shows numbers to the fourth place behind the decimal (10^{-5}). When dealing with a normal or lognormal distribution of hydraulic conductivity the derived values can be less then COVAR shows unless a multiplier is used.
6. COVAR uses $\log_{10}$ for lognormal data. Many other programs, including STATPAC, output lognormal values as natural logs or $\log_e$. Care must be taken to use $\log_{10}$ values for all lognormal input into COVAR.

Step 4 of the conditioning process is the kriging of a new data field over the original grid area using the random values created in step 4 at each of the original sample points. The same STATPAC kriging program, SS2DGRID, and control file as in step 2 is used. This kriging is done automatically from within the Lotus® macro as part of the RUNMOD module. In this step the application first imports the correct random field realization output from COVAR and places the hydraulic conductivity values with the proper coordinate values. The macro then extracts the unconditioned hydraulic conductivity value for each of the original sample points and saves these values with the proper format in the STATPAC input file. This file is automatically converted in SS2DPREP and kriged in SS2DGRID using the control file created earlier. These operations will be discussed in more detail later in this paper.

Step 5 calculates the conditioned hydraulic conductivity at each point in the grid area from the equation

$$z_s(x) = z^*(x) + [s(x) - s^*(x)]. \tag{5}$$

where $z_s(x)$ is the conditioned value, $z^*(x)$ is the kriged value derived form the measured values, $s(x)$ is the unconditioned value generated by COVAR and $s^*(x)$ is the kriged value derived from the unconditioned values at the sample points. This calculation is made automatically within the LOTUS worksheet as part of the RUNMOD module. Each of the required values is copied into one area of worksheet. The above formula is copied to the same area with the cells containing the required values substituted for the values in the formulas. As the values in the cell change, the values in the cells are automatically substituted into the formula. This operation will be discussed in more detail later. In this application, steps four and five are repeated for a number of iterations selected by the operator.

COGMOD STRUCTURE:

The COGMOD macros are contained on two worksheets. The general structure of these macros is shown in Figure 11. The

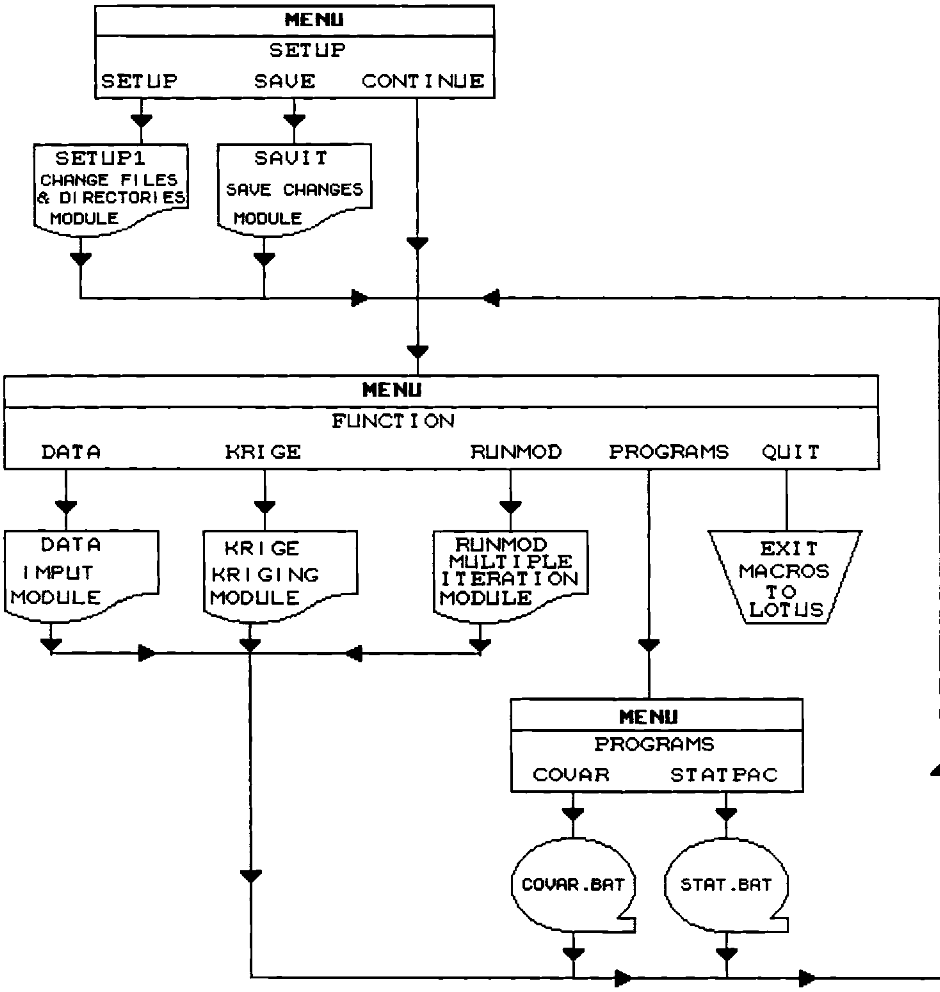


Figure 11. General structure of COGMOD SETUP and FUNCTION menus and the interaction of the associated modules

macros are combined into modules which perform specific functions. The first worksheet contains the title screens, a module to change the directories and file names, and a module to save the changes. Each of the modules can be selected from a menu. Once any desired changes have been made, the macros on the second worksheet can be accessed by selecting the "continue" option from the menu.

The macros on the second worksheet start by allowing the operator to select an area for comments and naming several "cells" just below the comment area. These cells are used by the macros to store certain values or characters which are used internally to process and manipulate the data. The macro then accesses a menu which contains three module selections, DATA, KRIGE and RUNMOD. In addition, this menu has a selection to access a third menu and an option to quit. The third menu allows the operator to run the programs COVAR, STATPAC and MOC directly without the built in LOTUS interface modules. These options may be useful if the operator needs to debug a specific program. Quit exits the macro and returns control to normal LOTUS operations.

The data module allows the operator to create data files for STATPAC and COVAR then prepare the data for kriging and conditioning. The major subroutines and features of the "DATA" module are shown in Figure 12. The module starts with

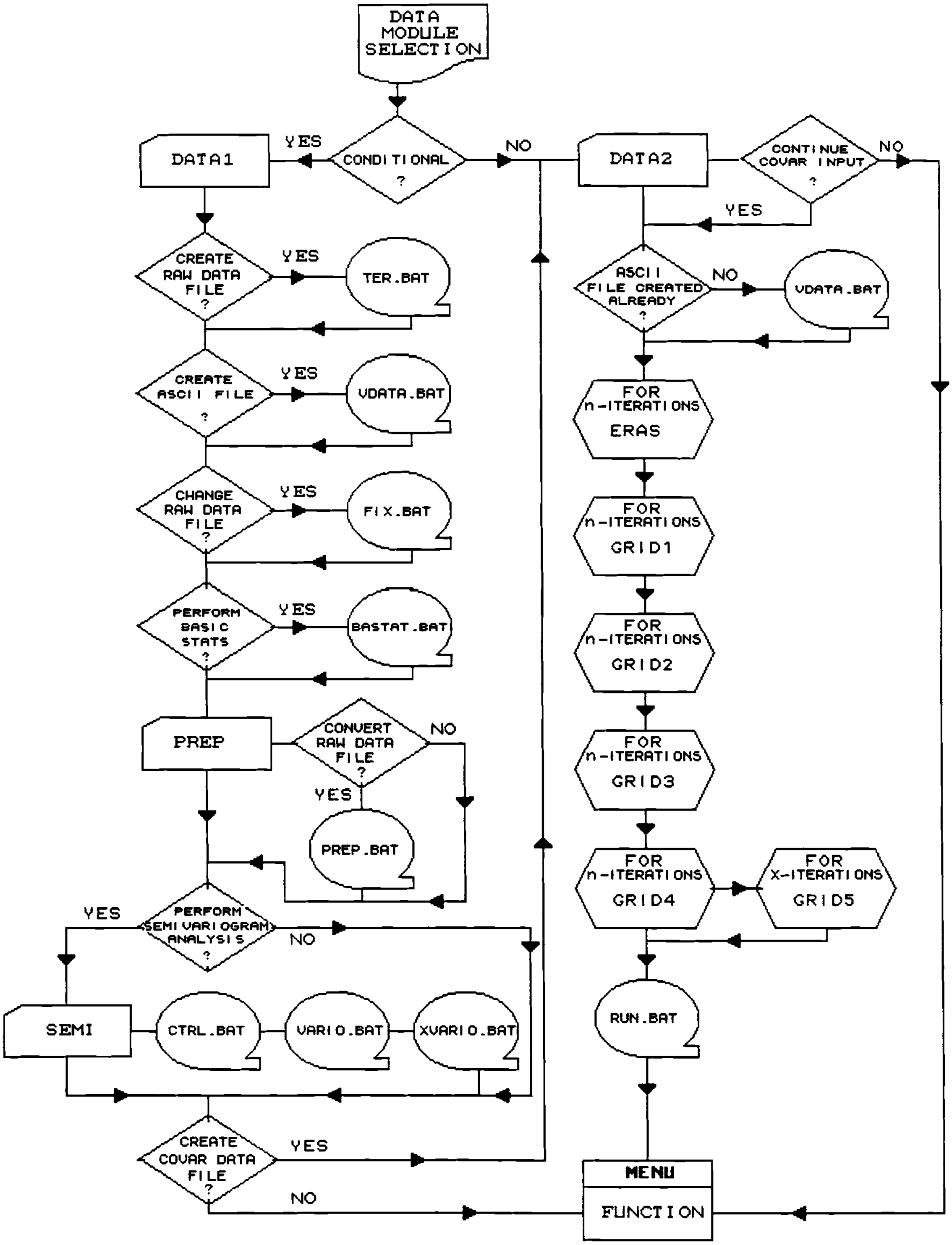


Figure 12. Illustration of the macro structure for the DATA module

the operator selecting either a conditional or an unconditional simulation. If an unconditioned simulation is selected the macro branches to the "Data2" macro and the operator inputs the required parameters for COVAR interactively. A "branch" action refers to the macro transferring macro control from one location to another. This differs from a subroutine in that with a branch control remains at the new location whereas in a subroutine the control is returned to the command following the subroutine in the original column of commands (see appendix of macro commands for details). The macro assumes a 20x20 grid for both the conditioned and unconditioned simulations. The macro prompts the operator for the minimum horizontal and vertical distances and the X and Y coordinates of the southwest corner of the grid area. It then selects the appropriate multiplier and generates a table of X-Y coordinates that conform to the limits imposed by COVAR.

Once the data file has been created the macro exits LOTUS and automatically starts the COVAR program. The macro is capable of exiting LOTUS and starting an independent program by combining the Lotus® macro command "System command" with a simple DOS batch file. This ability is essential to the operation of this procedure. COVAR is interactive and the operator must input the required parameters directly into the program. Once the parameters are entered COVAR generates the requested number of realizations then returns to the Lotus® macro which in turn returns the operator to the "Function Menu" for additional selections.

If a conditioned simulation is specified the macro branches to the "Data1" macro which exits LOTUS and initiates the STATPAC program named "TERFIL". TERFIL is an interactive program which creates a raw data file compatible with the other STATPAC programs. Once this file is created, command is returned to the LOTUS macro where the operator is asked if an ASCII data file is desired. If the operator answers yes, the macro again exits LOTUS and initiates the interactive STATPAC program named "Filter". If the operator answers "No" to this or any other yes/no question, the macro proceeds to the next question or command line. This program creates a new ASCII data file from the information in the "TERFIL" raw data file. Command is returned to the macro where the operator is next asked if any changes in the raw data set are desired. If this is answered yes, the macro exits to yet another STATPAC file named "FIXIT" where changes can be made prior to returning to the macro. The operator is asked if basic statistics on the raw data are desired. If this option is selected the macro again exits LOTUS and initiates the STATPAC program "BASTAT" then returns to the macro when "BASTAT is completed. At this point the macro exits the "Data1" macro and switches command to the "Prep" subroutine. This operation is necessary because the STATPAC variogram and kriging programs require the raw data file from "TERFIL" in a different format. This subroutine prompts the operator for a series of parameters necessary to create a control file for the STATPAC program "SS2DPREP". The parameters are recorded in the Lotus® worksheet then saved as an unformatted text file without margins by the macro using the Lotus® "/ print text" command. This command saves the range of cells as an "unformatted" ASCII file which can be used as a control file for SS2DPREP. All ASCII files from Lotus® in this application are created using the same print command structure. Although the parameters can be entered into "SS2DPREP" directly the program does not save the parameters and it will be necessary to run the program multiple times during the stocastic modelling process. Once the control file is created the macro exits LOTUS, runs "SS2DPREP" then returns to the "Data1" macro at the next command line. The operator has the option to perform a semivariogram analysis within STATPAC at this point. The STATPAC semivariogram analysis is optional but some form of semivariogram analysis is required for the spatial correlation. If the STATPAC semivariogram analysis is selected the macro transfers command to the "Semi" subroutine where the operator is asked a series of questions to create a control file for the semivariogram program. Once all the parameters are recorded the macro runs the STATPAC program "SS2DGAMH" to create an experimental semivariogram which the operator must fit to a mathematical form visually. The macro then automatically runs the STATPAC program SS2DXVAL to cross-validate the model. Once the semivariogram has been created and cross validated the macro returns command to the "Data1" macro for continued processing. The final option in the "Data1" macro is to create a raw data file for COVAR. If this option is selected the macro branches to the "Data2" macro and the operator proceeds through the same steps as outlined in the unconditioned option. A "No" response to any of the options causes the macro to skip that option and prompts the operator at the next selection.

The major subroutines and features of the Krige module are shown in Figure 13. The "Krige" macro creates a control file similar to the one created for SS2DPREP and has an option to convert the raw data to their logarithms. The control file is necessary for the later repetitive kriging operations. The log option is important since hydraulic conductivity is usually considered to be lognormally distributed but the STATPAC kriging programs do not support log functions. This macro finishes by creating a single kriged realization of the sampled data over a given 20x20 grid area.

The macro starts by asking the operator if the raw data have been preprocessed. Normally the answer will be yes if the operator followed the steps outlined by the "Data" module. If

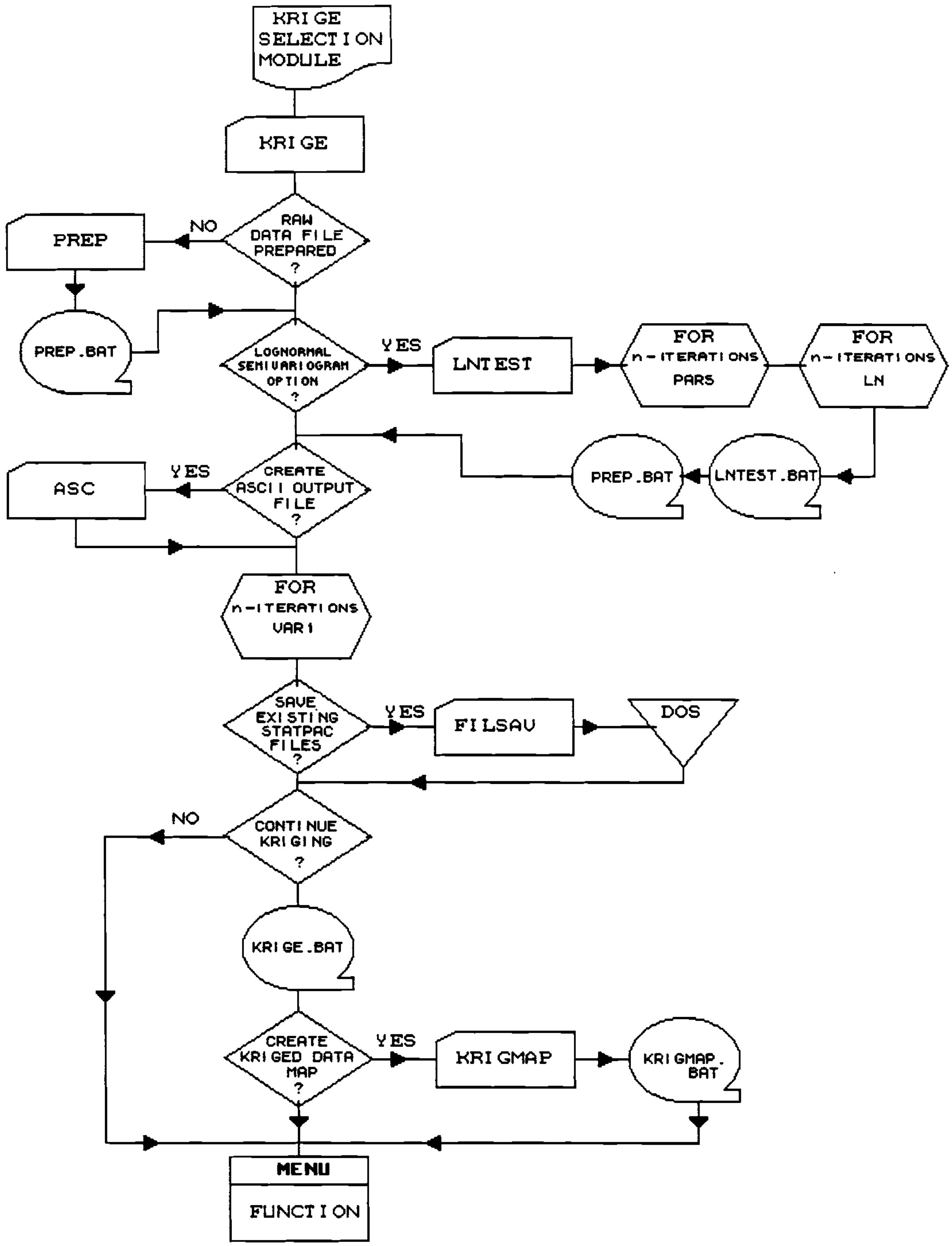


Figure 13. The macro structure for the KRIGE module

for some reason the data have not been preprocessed at this point a "No" response will transfer the command to the "Prep" subroutine (as outlined previously) where the data are converted and the command returned to the "Krige" macro. The operator is next asked if the lognormal option is desired. A "Yes" response transfers command to the "Lntest" macro.

The "Lntest" macro imports the ASCII file of the raw STATPAC data (created in the "Data" module) by using the LOTUS "/ file import text" command. This command imports each line of the text file as a label in a single cell. In order for the macro to convert the original values into their respective logarithms it must first convert the text back to a values in individual cells. The problem is complicated somewhat in this instance by the fact that only every other line of the text file can be converted to values without destroying the spatial integrity of the characters in the ASCII file. The "Lntest" macro uses a special "FOR" command and a subroutine named "Pars" to accomplish this. The subroutine counts the total number of lines present and calculates the number of times it is to parse a line. It then goes to the first line of values and separates the values into individual cells. It skips one line then parses the next line. After it has parsed the correct number of lines the macro command goes to the next line of the "Lntest" macro. The values are changed by using another "FOR" command and the subroutine "Ln". This combination works much the same way as the last "For" statement except instead of parsing each desired line the cell containing the value is edited to automatically calculate the natural log of that value. Since only the value in a cell is displayed (not the formula) the file can be saved as a text file with no change in the spatial characters as discussed previously. The "Lntest macro then exits Lotus® and converts the text file back into a raw data file using the STATPAC program UNFILTER. The macro runs SS2DPREP on this data using the same control file created in the data module. Once all this is finished, the command is returned to the next line of the Krige macro which starts a series of interactive questions to create a control file for the STATPAC krige program SS2DGRID. As discussed earlier the parameters in the control file are the same as those that are asked by SS2DGRID in the interactive mode. The control file is created so SS2DGRID can be run multiple times without operator intervention. When all the parameters are complete the macro saves the control file as a text file in the same manner discussed earlier. The macro then asks if the operator wants to save any existing krige output files. This application is set up to erase all existing kriged output files each time the data is kriged so the same file name can be retrieved for additional processing when running multiple iterations. If the operator wants to save an existing output file he must manually save the file under different file name extension. Following this question the macro asks the operator if he wants to continue as a fail-safe device to protect existing kriged files. If the operator indicates a Yes the macro exits Lotus®, runs SS2DGRID using the control file, then returns command to the macro. The macro then asks if the operator wants to produce a map of the kriged data. If this option is selected the macro exits Lotus®, runs the STATPAC program SS2DCONT to produce a map of the kriged results and returns to the main function menu.

The RUNMOD module is the module that is capable of running multiple iterations of either a conditioned or unconditioned simulation then record the output results of that simulation. It is outlined in Figure 14. This module is selected from the main function menu and activates the macro "RUNMOD". The macro initially clears the screen, clears all existing named ranges and sets up a new series of named cells (for internal calculations). Once this housekeeping is completed it asks the operator if this is a conditioned simulation. If the operator enters a No, the simulation is unconditioned and the macro branches to the macro "Uncond" for further processing. Since the unconditioned simulation is simpler it will be discussed first.

The "Uncond" macro first asks the operator to input the maximum distance from origin in either the X or Y direction. This value will be used later in the macro to determine the

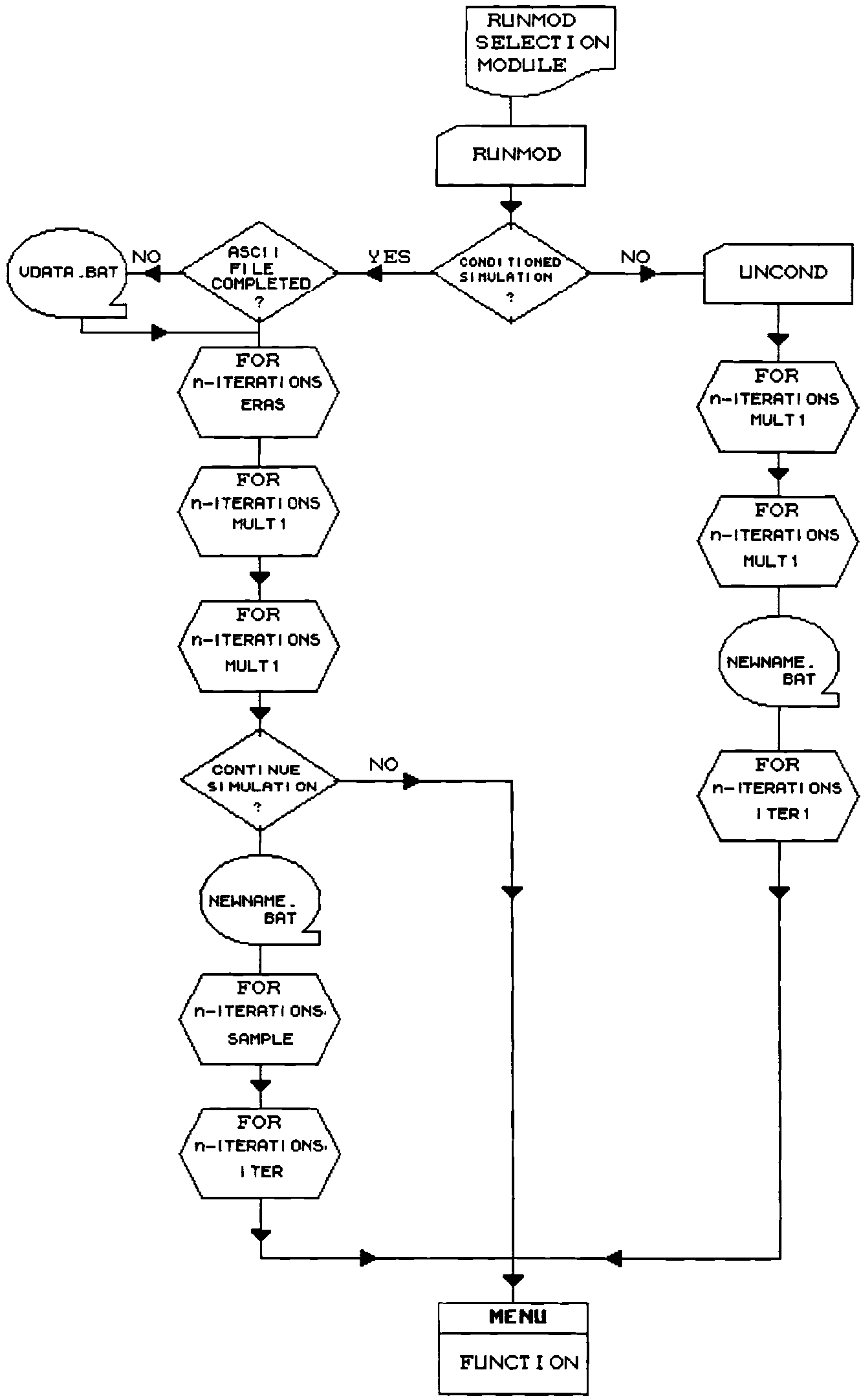


Figure 14. The macro structure for the RUNMOD module

appropriate multiplier to use with the X-Y coordinates from the COVAR raw data file. The macro imports the COVAR data file of X-Y coordinates into an empty area of the worksheet and parses the text into values in cells. The X-Y values are restored to their original values by multiplying each value by a predetermined constant based on the maximum distance. The operator is prompted for the number of iterations desired as well as the maximum and minimum hydraulic conductivity values allowed to be input. The macro creates the range for output before it goes to the "For" statement that runs the subroutine "Iter1" for the requested number of iterations.

The macro "Iter1" opens the COVAR output file and transfers the command to the "Read" subroutine which searches each line of the output file until it finds a match to the realization number desired, then imports the appropriate lines from the file into the LOTUS worksheet. The lines are parsed and values moved to the corresponding X-Y coordinates where they are rounded to the nearest whole number and constrained within the limits defined by the operator in the "Uncond" macro. These values can be saved to a file or a table for subsequent input into flow model. The macro then returns to the first command in "Iter1" to repeat the process until the required number of iterations have been completed. The macros and subroutines associated with "Iter1" are displayed in the Figure 15 flow diagram.

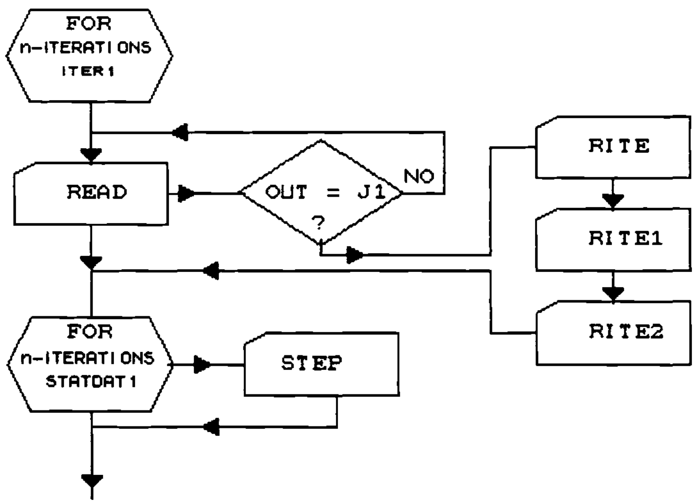


Figure 15. Flow diagram of the macros and subroutines associated with the ITER1 for command in the RUNMOD module

If the operator selects a conditioned simulation the macro asks if an ASCII file has already been created. Normally the file has been created and the macro proceeds by retrieving the ASCII data file into the worksheet. If the file has not been created the macro first creates the file in the same manner as discussed in the DATA module section. This text file is parsed to change the text into values in individual cells and any unused lines are deleted. The COVAR data text file of X-Y coordinates is imported into the worksheet and also changed into values in individual cells in the same manner as in the unconditioned "Runmod". The operator must indicate if the data is normal or lognormal and enter the number of iterations as well as the minimum and maximum hydraulic conductivity values allowable. The macro imports the initial file of kriged grid values created by SS2DGRID and parses the resulting range into values. Since a new TERFIL file is required for each iteration the macro creates a set of header information to be combined the table of X-Y coordinates and the hydraulic conductivities to create the TERFIL data file. The macro then creates the output area of the worksheet and runs the requested number of iterations of ITER. The flow diagram for this subroutine is displayed in Figure 16.

The subroutine ITER first reads the current realization from COVAR into the worksheet, parses the data and transfers the values to the appropriate position in the table of X-Y

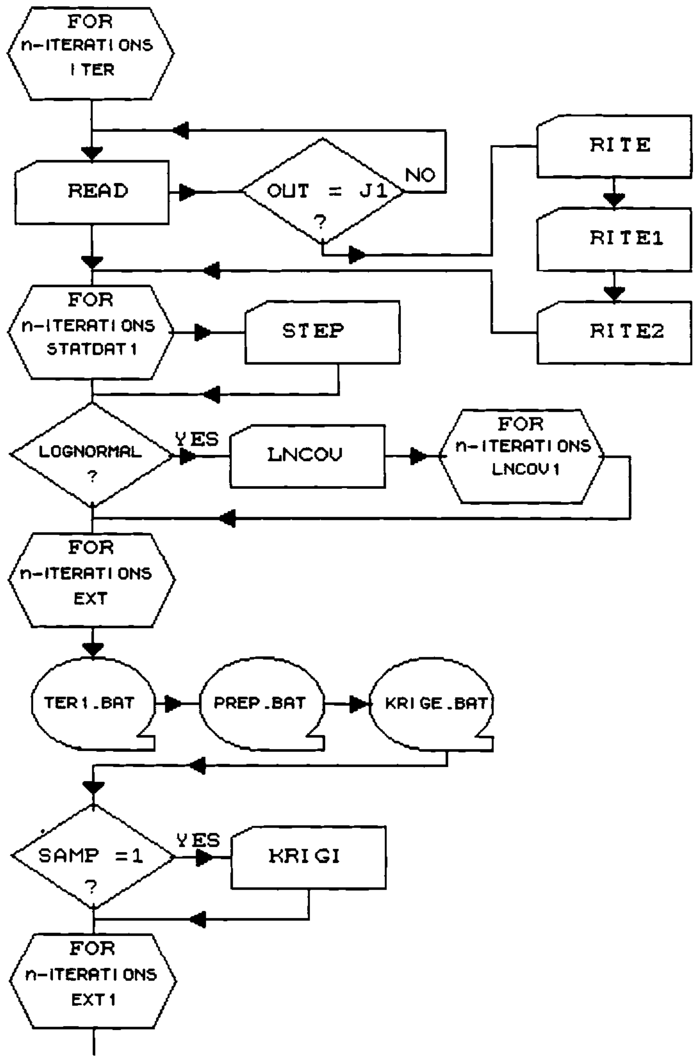


Figure 16. Flow diagram of the macros and subroutines associated with the ITER subroutine

coordinates (in the same manner as in ITER1). IF the lognormal option was selected the macro converts the value into the natural log of the value. The macro extracts the new covar value (or ln of the value) for each sample point from the table of values and creates a new TERFIL raw data file. It prepares the new raw data file with SS2DPREP and Kriges the grid area with SS2DGRID based on the new values. The kriged output file is imported back into the worksheet and parsed. If this is the first iteration of ITER the macro transfers command to the subroutine KRIGI which creates a new table containing the X-Y coordinates of each of the grid points and the corresponding initial kriged values of those points (based on the original sample values). The command is returned to ITER and the new kriged values are copied to the column immediately to the right of the initial kriged values. The values from the COVAR realization are copied into the next column to the right. These values in these two columns will be replaced by new values on each subsequent iteration. The macro copies the conditioning formula (equation 5) for $z_s(x)$ into each cell of the next column to the right of the table. This formula is as follows:

$$z_s(x) = z^*(x) + [s(x) - s^*(x)] \qquad (5)$$

where $z^*(x)$ is the initial kriged value, $s(x)$ is the value from the COVAR realization and $s^*(x)$ is the kriged output based on the new COVAR values at the sample points. The formula also contains a command to round the resultant value to a whole number and an "if" statement to convert the values from logs back to real numbers if the lognormal option was used. Command is transferred to the subroutine EXT1 through a FOR statement. EXT1 uses each set of X-Y coordinates as the search criteria for a data base of original sample points and values. It extracts the original sample value for each sample point and substitutes this value for the calculated value in the output table for strict conformance to the conditioning formula. A sampling of the calculated vs measured values showed the calculated values were within 1 of the measured values in all instances. The difference was due to rounding errors. Once the original values are substituted command is returned to ITER and one more column is created to the right of the existing table. Each cell in this column contains two if statements to limit the output to the limits specified by the operator earlier in RUNMOD and to round the final output to a whole number. The values in this column can be transferred to the appropriate position in a subsequent model input file or saved to a table. The subroutine ITER then starts again and continues until the requested number of iterations has been completed.

CHAPTER III

RESULTS:

This effort resulted in the creation of two separate programs which use the Lotus 1-2-3® spreadsheet platform to generate a stochastic simulation by combining and controlling various parameters and DOS programs. These programs were created in Lotus 1-2-3® version 3.1 for DOS on an IBM compatible with a 486 processor using eight megabytes of RAM. These programs will have to be modified for older versions of Lotus® since some macros are different and there is some variation in macro structure between versions. Likewise, it is anticipated that the programs may require modification for newer versions of Lotus® or other spreadsheet program. Modification of the user's computer configuration may be required if problems are encountered running these programs.

RISC2:

The first example is the RISC2 stochastic air pollution model which uses the EPA's ISC2 deterministic model. This program is designed to be a decision support system with a series of menus and user prompts. This section includes screen displays of the major user prompts and menus required to input the simple example problem found on page 2-11 in the ISC2 users manual and shown in Figure 17. This example is used to illustrate the results of this programming effort.

The user must first call up Lotus 1-2-3® from a DOS prompt and display a blank worksheet before running the program. The RISC2 program is initiated automatically by retrieving the RISC2.WK3 file from the disk into the worksheet. This is done from the Lotus® menu with the [/], [F]ile, [R]etrieve, RISC2, [ENTER] keystrokes (commands). Once the file is retrieved the user is greeted with the title page as displayed in Figure 18. A second title page of information, as shown in Figure 19, is displayed when the operator presses [ENTER]. After exiting the second title page the user is prompted to select an area in the worksheet for the program to display comments and an area for the table used to create the ISC2 runstream file. The comments area is usually located at the HOME screen, i.e. the first twenty rows and eight columns of the worksheet, while the table of input parameters is usually located starting in column "A" on approximately row 23. However, the location of both areas is at the discretion of the user and can be located anywhere in the worksheet. Once these have been defined the program displays the first menu of user options as shown in Figure 20. This screen allows the operator to select from options of: 1) proceeding to the

```
CO STARTING
CO TITLEONE A Simple Example Problem for the ISCST2 Model
CO MODELOPT  DFAULT  RURAL  CONC
CO AVERTIME  3  24  PERIOD
CO POLLUTID  SO2
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO LOCATION  STACK1 POINT  0.0   0.0    0.0
SO SRCPARAM  STACK1 1.00  35.0  432.0  11.7  2.4
SO BUILDHGT  STACK1 34. 34. 34. 34. 34. 34. 34. 34. 34. 34. 34. 34.
SO BUILDHGT  STACK1 34. 34. 34. 34. 34. 34. 34. 34. 34. 34. 34. 34.
SO BUILDHGT  STACK1 34. 34. 34. 34. 34. 34. 34. 34. 34. 34. 34. 34.
SO BUILDWID  STACK1 35.43 36.45 36.37 35.18 32.92 29.66 25.50 20.56
SO BUILDWID  STACK1 15.00 20.56 25.50 29.66 32.92 35.18 36.37 36.45
SO BUILDWID  STACK1 35.43 33.33 35.43 36.45  0.00 35.18 32.92 29.66
SO BUILDWID  STACK1 25.50 20.56 15.00 20.56 25.50 29.66 32.92 35.18
SO BUILDWID  STACK1 36.37 36.45 35.43 33.33
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE GRIDPOLR  POL1  STA
RE GRIDPOLR  POL1  ORIG  0.0   0.0
RE GRIDPOLR  POL1  DIST  100.  200.  300.  500.  1000.
RE GRIDPOLR  POL1  GDIR  36    10.   10.
RE GRIDPOLR  POL1  END
RE FINISHED

ME STARTING
ME INPUTFIL  PREPIT.BIN  UNFORM
ME ANEMHGHT  20 FEET
ME SURFDATA  94823  1964  PITTSBURGH
ME UAIRDATA  94823  1964  PITTSBURGH
ME FINISHED

OU STARTING
OU RECTABLE  ALLAVE  FIRST  SECOND
OU MAXTABLE  ALLAVE  50
OU FINISHED
```

Figure 17. Printout of ISCST2 example problem runstream file from ISC2 users manual page 2-11 Source: EPA 1992

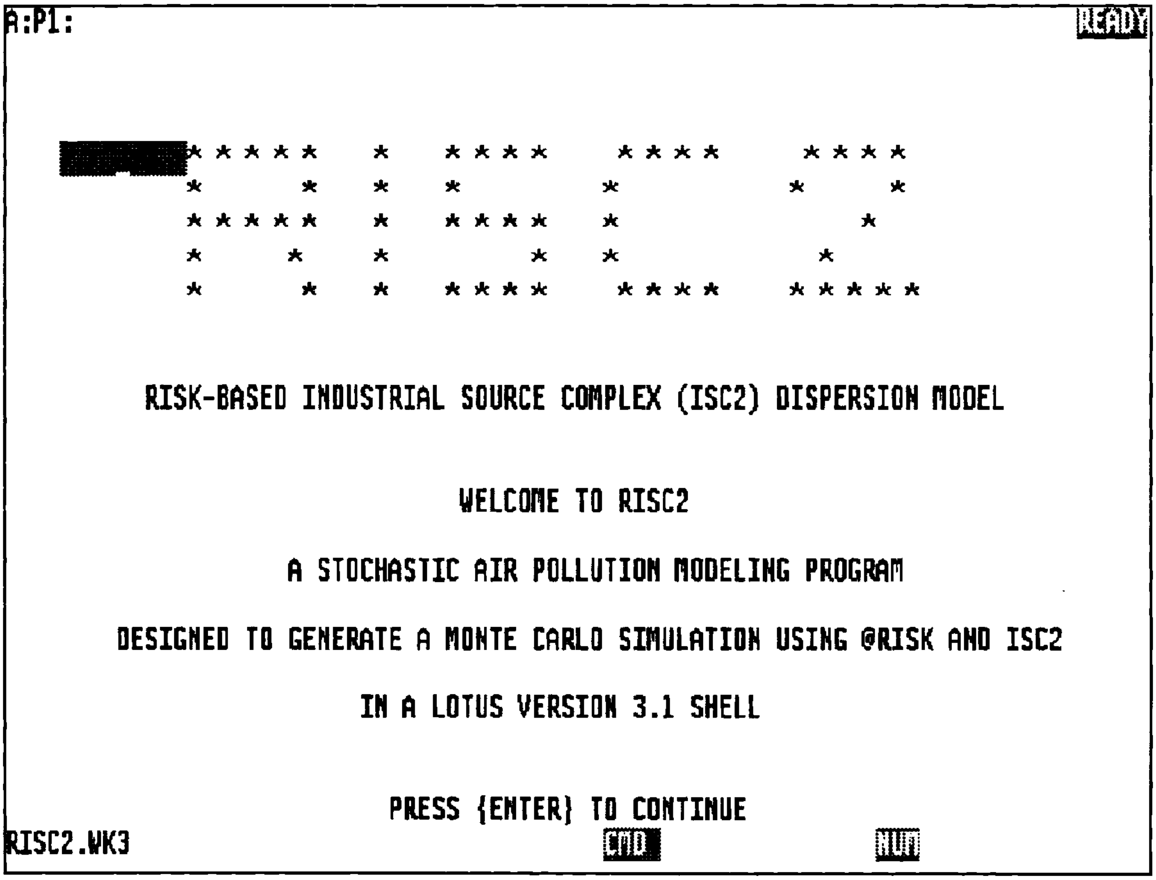


Figure 18. Display of first RISC2 title screen

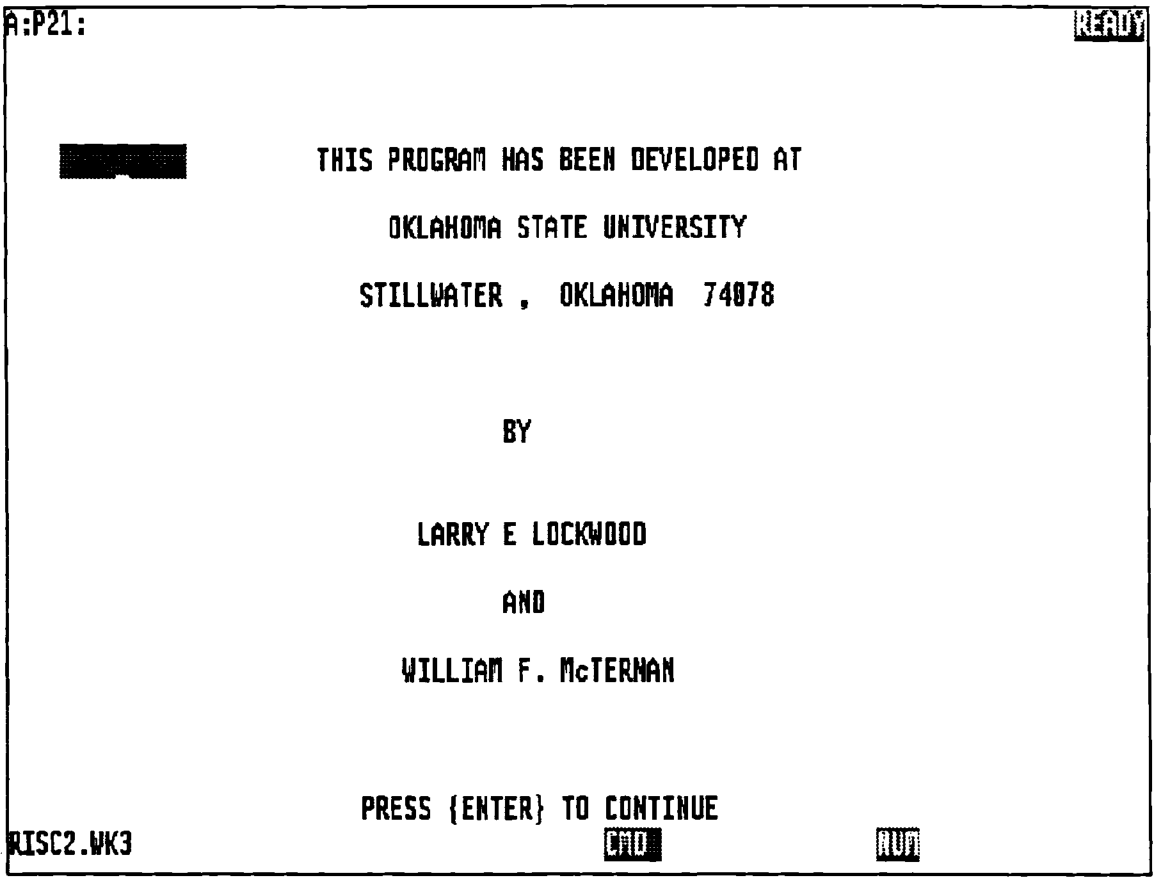


Figure 19. Display of second RISC2 title screen

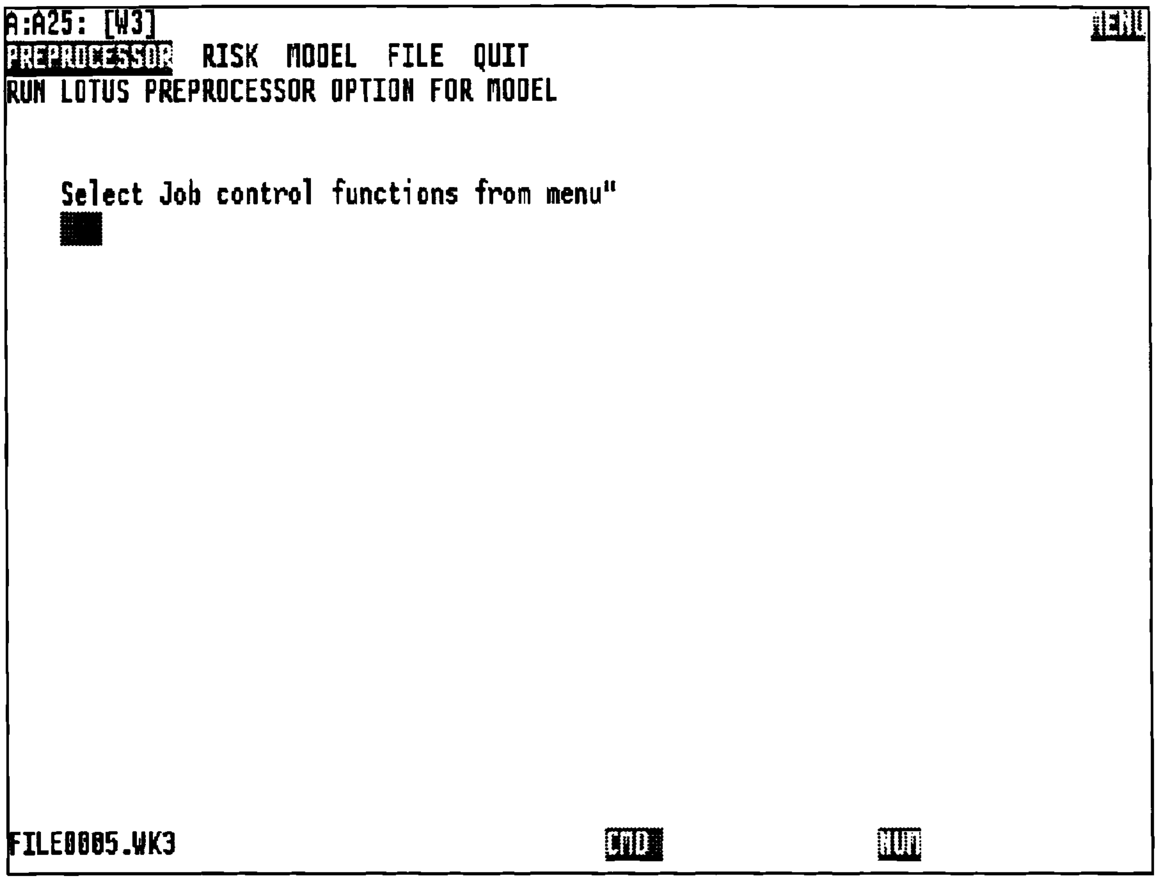


Figure 20. Screen display of main menu of RISC2 program options

preprocessor (PREPROCESSOR), 2) running a stochastic model (RISK) or 3) deterministic model (MODEL), 4) performing certain file operations (FILE) such as saving or importing a text file, or 5) stopping the program (QUIT).

The first operation in the example problem is to input the runstream file using the PREPROCESSOR module. Once this module is selected (by highlighting the selection with the cursor and pressing [ENTER]) from the main menu shown in Figure 20, the program displays the main function menu for the preprocessor module as shown in Figure 21. Each of the selections on this menu (CO, SO, RE, ME, EV AND OU) represent an ISC2 "Pathway" and accesses a series of additional menus and user prompts which are used to complete the table for the ISC2 runstream file. When all the optional keywords and parameters have been specified for the selection (ISC pathway) the program returns to the menu in Figure 21 for additional pathway selections. When all the pathway selections are complete the operator selects QUIT to exit this portion of the program and return to the main menu previously displayed in Figure 20.

Selection of the "CO" option causes the program to display the "CO" menu, as shown in Figure 22, and enter the two keywords "CO STARTING" on the first line of the ISC runstream table. This menu accesses all the "CO" keywords and parameters thru

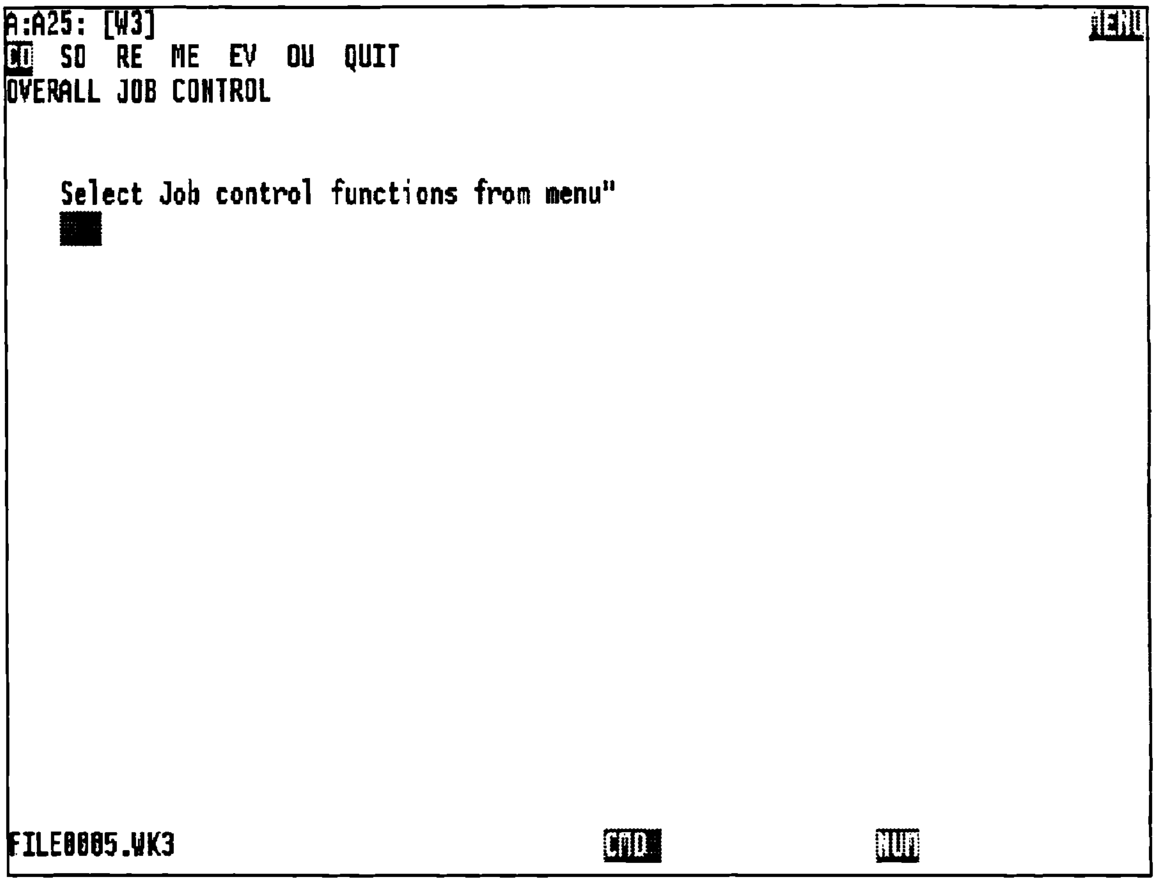


Figure 21. Screen display of main menu in PREPROCESSOR module

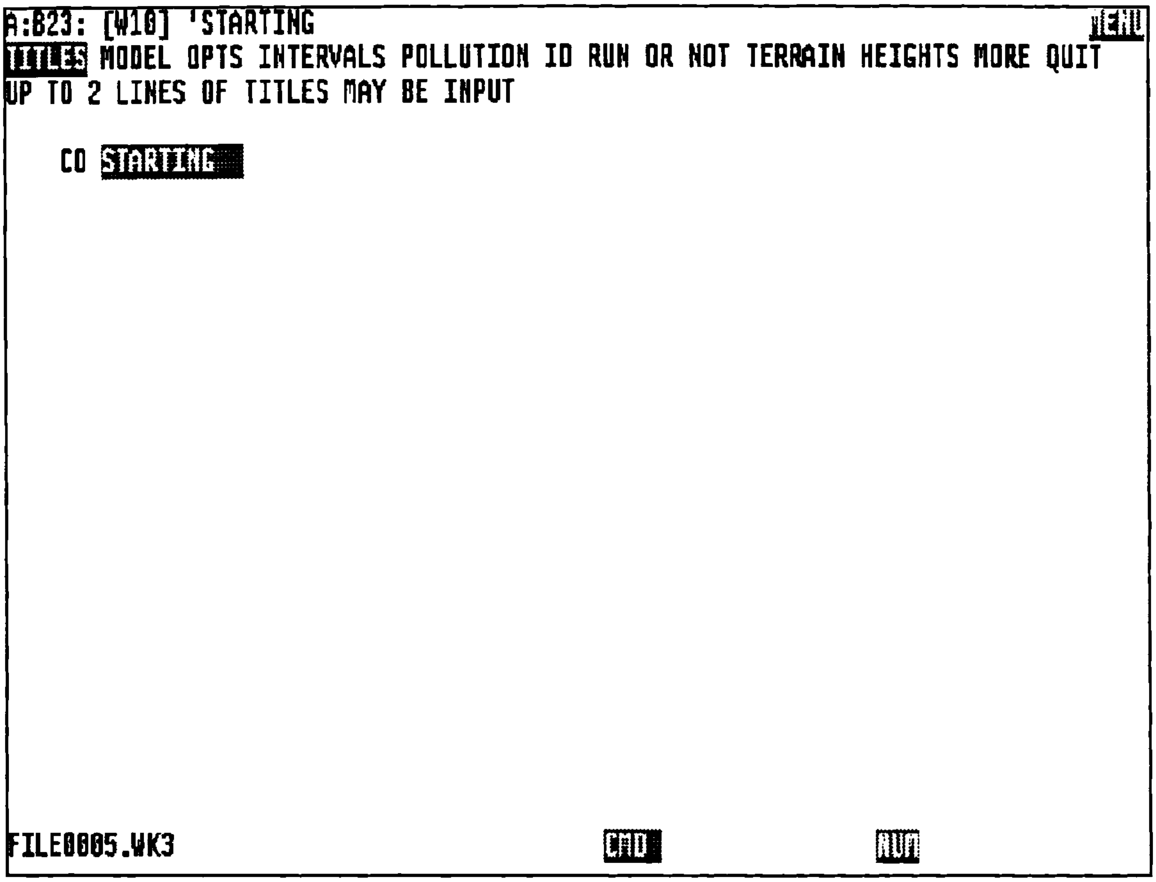


Figure 22. Screen display of main menu for "CO" pathway

subsequent menus and prompts. The first selection from the "CO" menu (Figure 22) is usually TITLES which causes the program to prompt the user for two title lines of up to eighty characters each. In the example problem the title is input by the user as "A Simple Example Problem for the ISCST2 (RISC2) Model".

The next selection from the "CO" menu is MODEL OPTS which allows the user to specify which model options are to be used. This option accesses a menu of both default and non-default model options as shown in Figure 23. The options keywords DFAULT, RURAL, and CONC are entered in the appropriate runstream file locations when these items are selected from the menu in the example problem. QUIT returns the user to the previous menu (Figure 22) for additional "CO" options.

Selection of the INTERVALS option from the "CO" menu (Figure 22) provides the user with a menu (not shown) from which to select either the short term or long term ISC2 model. Since this example problem is for a short term model, the short term model is selected from the menu and the macro changes the screen display to a menu of time options as shown in Figure 24. Selection of TIME1 through TIME4 results in a user prompt for the time interval and a comment screen as displayed in Figure 25. The menu selections of TIME1 followed by a prompt response of 3, and TIME2 followed by a prompt response of 24

```
A:A19: [W3]                                                                MENU
DFAULT  CONC  DEPOS  RURAL  URBAN  NON-DEFAULT OPTIONS  QUIT
Specifies that the regulatory default options will be used.


   DFAULT -- Specifies that the regulatory default options will be used.

   CONC -- Specifies that CONCentration values will be calculated.

   DEPOS -- Specifies that dry DEPOSition values will be calculated.

   RURAL -- Specifies that RURAL dispersion parameters will be used.

   URBAN -- Specifies that URBAN dispersion parameters will be used.

   GRDRIS -- Use non-default option for gradual plume rise.

   NOSTD -- Use non-default option for no stack-tip downwash.

   NOBID -- Use non-default option for no buoyancy-induced dispersion.

   NOCALM -- Use non-default option to bypass the calms processing routine.

   MSGPRO -- Use non-default option for the missing data processing routine
FILE0005.WK3                                   CMD               NUM  CAP
```

Figure 23. Screen display of MODEL OPTS menu for selection of various default and nondefault model options

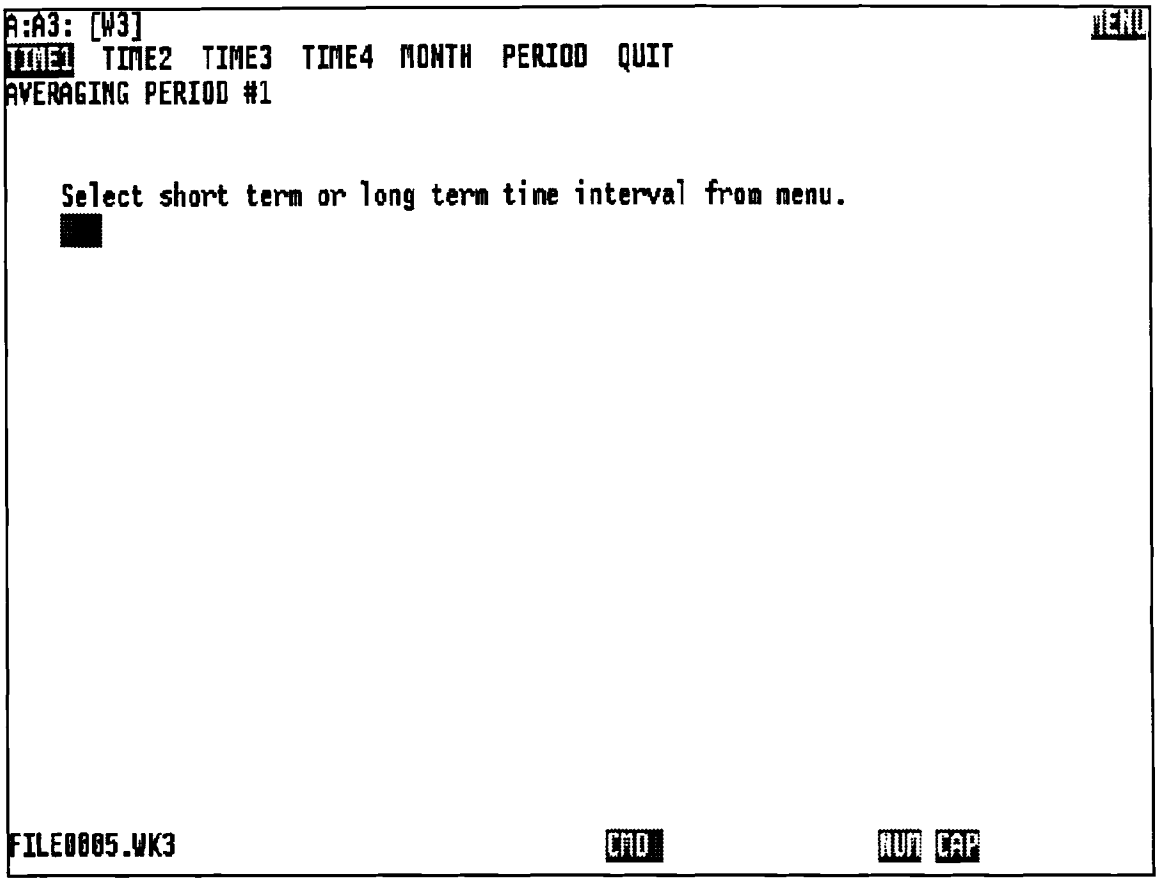


Figure 24. Screen display of AVERTIME menu which appears following the selection of the Short Term Model from the previous menu (not shown)

```
A:A19: [W3]                                                        READY
ENTER SHORT TERM AVERAGING PERIOD IN HOURS:  _


   Select from the following short term averaging periods:
   Select short term or long term time interval from menu.
      1  (hr)

      2  (hrs)

      3  (hrs)

      4  (hrs)

      6  (hrs)

      8  (hrs)

     12  (hrs)

     24  (hrs)


FILE0005.WK3                     CMD              NUM CAP
```

Figure 25. Screen display of user prompt and comments screen for user input of AVERTIME time intervals

correspond to the first two AVERTIME entries in the example problem. Selection of the PERIOD option from this menu completes the AVERTIME parameters and QUIT returns the operator to the "CO" menu (Figure 22).

The final two "CO" menu (Figure 22) selections necessary to run the example problem are POLLUTID and RUNORNOT. The POLLUTID selection prompts the user for an eight character identifier for the pollutant being modeled while the RUNORNOT selection accesses a two item menu with selections of RUN or NOT RUN. In the example problem the POLLUTID is SO2 and the RUNORNOT selection is RUN. The screen displays for these selections is included in appendix B. The selection of QUIT completes the "CO" pathway selections for the example problem, returns the operator to the main PREPROCESSOR menu (Figure 21) and enters the keywords "CO FINISHED" in the runstream table.

Selection of "SO" from the PREPROCESSOR menu in Figure 21 advances the program to the "SO" pathway menu as shown in Figure 26. This menu contains selections for LOCATION, DOWNWASH, EMISSIONS and UNITS. The first selection required for the example is LOCATION. This selection first prompts the user to give the source a name to be used with subsequent parameters assigned to this source location. The program then accesses the menu in Figure 27 for specification of the location and source type. The selections Xs, Ys and Zs each

```
A:B31: [W10] 'STARTING                                                        MENU
LOCATION  DOWNWASH  EMISSIONS  UNITS  VARIABLES  GROUPS  QUIT


   CO STARTING
   CO TITLEONE  A SIMPLE EXAMPLE PROBLEM OF THE ISC2 (RISC2) PROGRAM
   CO TITLETWO
   CO MODELOPT  DFAULT   CONC      RURAL
   CO AVERTIME         3       24 PERIOD
   CO POLLUTID  SO2
   CO RUNORNOT  RUN
   CO FINISHED
   SO STARTING











FILE0009.WK3                            CMD              RUN CAP
```

Figure 26. Screen display of main "SO" pathway menu.

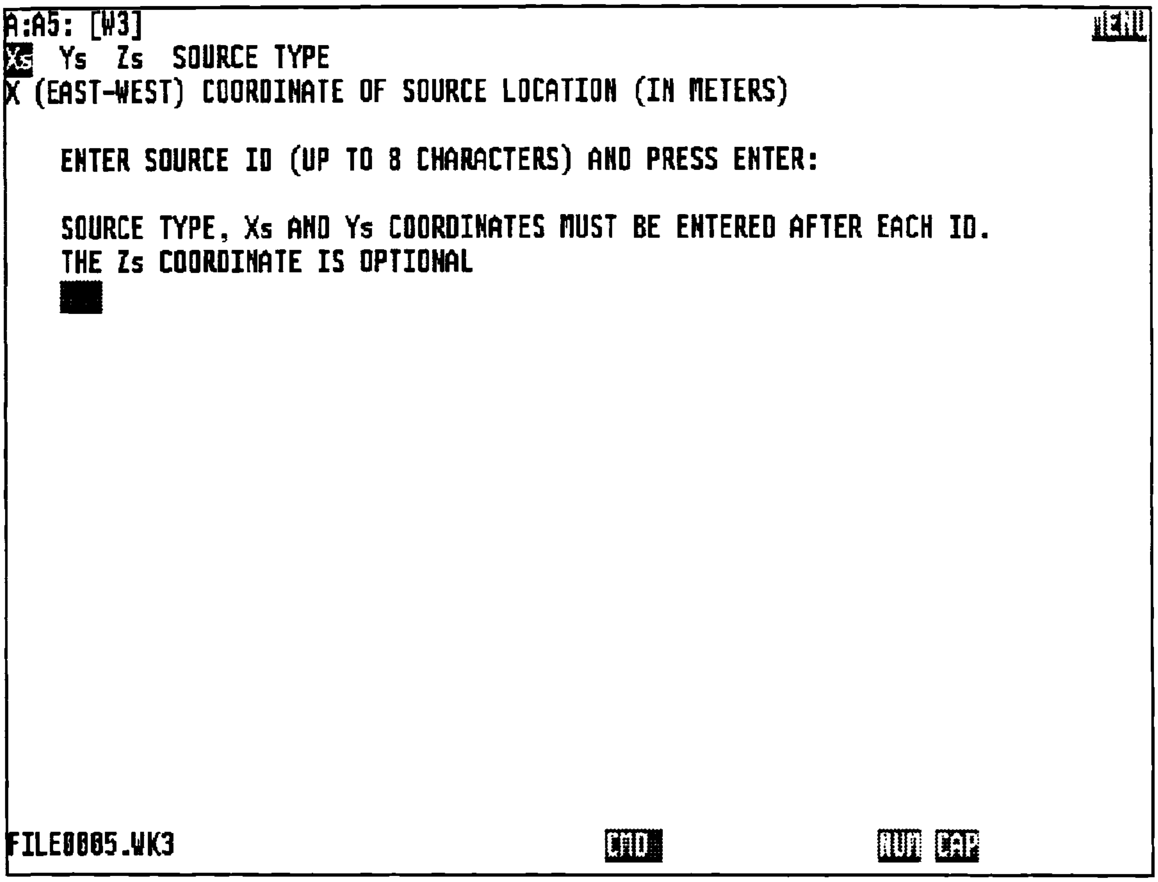


Figure 27. Screen display of location coordinate and source type selection menu

prompt the user for the respective X-Y-Z coordinate of the source while the SOURCE TYPE selection allows the user to choose a POINT, AREA or VOLUME source from the subsequent menu. Each of these type of sources requires specific input parameters which are accessed on separate menus when the source type is selected. This example problem is for a point source so POINT is selected from the menu and the subsequent menu of point source parameters is displayed as shown in Figure 28. Each of the parameters in this menu is a required input as noted in the comments screen displayed in Figure 28. Each of the selections on this menu causes the program to prompt the user for the appropriate parameter value then returns to the menu in Figure 28.

When all the necessary LOCATION parameters have been input the operator returns to the main "SO" menu by selecting QUIT. The selection of DOWNWASH from the "SO" menu (Figure 26) initiates a series of thirty-six user prompts for the building heights at 10 degree intervals around the source followed by a series of thirty-six building widths for the same intervals. The user must also input the source name (selected above) associated with these values once for the building heights and once for the building widths. The program automatically repeats the source name on subsequent lines, as needed, and returns to the main "SO" menu when all these parameters have been entered.

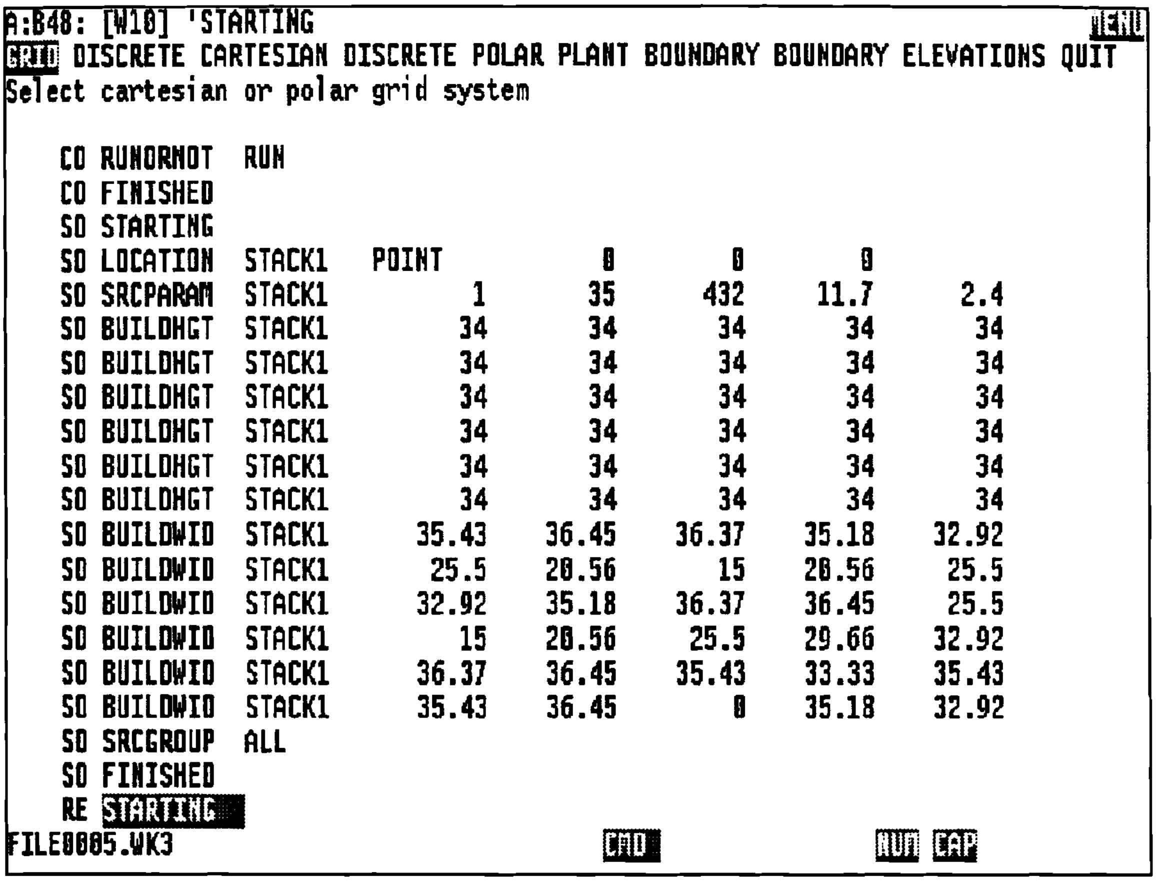
```
A:A2: [W3]                                                              MENU
RATE HEIGHT  TEMP  VELOCITY  DIAMETER  QUIT
POINT EMISSION RATE IN G/S

   THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.



FILE0005.WK3                          CMD              NUM CAP
```

Figure 28. Screen display of point source parameters menu

The final selection from the "SO" menu for the example problem is GROUP which allows the user to combine multiple sources into a group for modeling their combined affect. This selection also gives the user a prompt and some help on the comments screen. The input of "ALL" in the example problem combines all sources into one group.

The "RE" pathway specifies keywords and parameters associated with the receptor array. The main "RE" menu as shown in Figure 29 is accessed by selecting RE from the main PREPROCESSOR menu. The first required input for this pathway is to specify whether these receptors are on a Cartesian or Polar grid. Selection of GRID from the "RE" menu accesses a menu (not shown) with CARTESIAN and POLAR options. Once the grid type is selected (POLAR in the example problem), the program prompts the user for a grid ID or name and displays the menu of Polar options shown in Figure 30. The ORIGIN selection from this menu prompts the user for the X-Y coordinates of the origin of the receptor grid which is 0,0 for the example problem. The next selection, DISTANCES, prompts the operator for a series distances from the origin to each "ring" of receptors. This series of prompts is structured such that the operator can enter as many rings as necessary to define the receptor array.

The GENERATED DIR selection from the menu shown in Figure 30



A:B48: [W10] 'STARTING MENU
GRID DISCRETE CARTESIAN DISCRETE POLAR PLANT BOUNDARY BOUNDARY ELEVATIONS QUIT
Select cartesian or polar grid system

CO	RUNORNOT	RUN					
CO	FINISHED						
SO	STARTING						
SO	LOCATION	STACK1	POINT	0	0	0	
SO	SRCPARAM	STACK1	1	35	432	11.7	2.4
SO	BUILDHGT	STACK1	34	34	34	34	34
SO	BUILDHGT	STACK1	34	34	34	34	34
SO	BUILDHGT	STACK1	34	34	34	34	34
SO	BUILDHGT	STACK1	34	34	34	34	34
SO	BUILDHGT	STACK1	34	34	34	34	34
SO	BUILDHGT	STACK1	34	34	34	34	34
SO	BUILDWID	STACK1	35.43	36.45	36.37	35.18	32.92
SO	BUILDWID	STACK1	25.5	20.56	15	20.56	25.5
SO	BUILDWID	STACK1	32.92	35.18	36.37	36.45	25.5
SO	BUILDWID	STACK1	15	20.56	25.5	29.66	32.92
SO	BUILDWID	STACK1	36.37	36.45	35.43	33.33	35.43
SO	BUILDWID	STACK1	35.43	36.45	0	35.18	32.92
SO	SRCGROUP	ALL					
SO	FINISHED						
RE	STARTING						

FILE0005.WK3 CMD NUM CAP

Figure 29. Screen display of the main menu for the "RE" pathway

```
A:D49: 'STA                                                                MENU
ORIGIN DISTANCES DISCRETE DIR GENERATED DIR ELEVATIONS FLAGPOLE NEW NETWORK END
Specify origin of the Polar network

   CO FINISHED
   SO STARTING
   SO LOCATION  STACK1   POINT          0        0        0
   SO SRCPARAM  STACK1          1      35      432     11.7       2.4
   SO BUILDHGT  STACK1         34      34       34       34        34
   SO BUILDHGT  STACK1         34      34       34       34        34
   SO BUILDHGT  STACK1         34      34       34       34        34
   SO BUILDHGT  STACK1         34      34       34       34        34
   SO BUILDHGT  STACK1         34      34       34       34        34
   SO BUILDHGT  STACK1         34      34       34       34        34
   SO BUILDWID  STACK1      35.43   36.45    36.37    35.18     32.92
   SO BUILDWID  STACK1       25.5   28.56       15    28.56      25.5
   SO BUILDWID  STACK1      32.92   35.18    36.37    36.45      25.5
   SO BUILDWID  STACK1         15   28.56     25.5    29.66     32.92
   SO BUILDWID  STACK1      36.37   36.45    35.43    33.33     35.43
   SO BUILDWID  STACK1      35.43   36.45        0    35.18     32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
FILE0005.WK3                               CMD                NUM CAP
```

Figure 30. Screen display for menu of Polar grid options

causes the program to prompt the user for the parameters necessary to generate the set of polar directions to be used with the ring distances specified earlier. The program prompts the user for the number of directions (thirty- six in the example problem), followed by the starting direction and the increment, both of which are ten in the example. This completes the parameter input on this grid and since there is only one grid in the example problem, the "RE" pathway input is also completed.

The "ME" pathway selection from the main PREPROCESSOR menu (Figure 21) accesses the meteorological file menu shown in Figure 31. The selections from this menu cause the program to prompt the user for the required information associated with each option. The selections required for the example problem are FILENAME to enter the INPUTFIL file information, HEIGHT to enter the ANEMHGT parameters, and STATION for the SURFDATA and UAIRDATA station data. The operator selects RETURN to exit the "ME" pathway and return to the main PREPROCESSOR menu.

The final pathway used in the example problem is the "OU" pathway which is accessed by selecting OU from the main PREPROCESSOR menu. The main menu for this pathway is shown in Figure 32 and has three selections, TABULAR, SPECIAL PURPOSE, and QUIT. The RECTABLE and MAXTABLE parameters specified in the example problem are accessed by first selecting TABULAR

```
A:B55: [W10] 'STARTING                                                          MENU
FILENAME  HEIGHT  STATION  PERIOD  DATA  RETURN
Specify filename and format information for input file

   SO BUILDHGT  STACK1          34       34       34       34       34
   SO BUILDHGT  STACK1          34       34       34       34       34
   SO BUILDHGT  STACK1          34       34       34       34       34
   SO BUILDHGT  STACK1          34       34       34       34       34
   SO BUILDWID  STACK1       35.43    36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1        25.5    20.56       15    20.56     25.5
   SO BUILDWID  STACK1       32.92    35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1          15    20.56     25.5    29.66    32.92
   SO BUILDWID  STACK1       36.37    36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1       35.43    36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG              0        0
   RE GRIDPOLR  POL1     DIST            100      200      300      500
   RE GRIDPOLR  POL1     GDIR             36       10       10
   RE GRIDPOLR  POL1     END
   RE FINISHED
   ME STARTING
FILE0005.WK3                                CMD               NUM CAP
```

Figure 31. Screen display of main menu for "ME" pathway.

```
A:B55: [W10] 'STARTING                                                    MENU
FILENAME  HEIGHT  STATION  PERIOD  DATA  RETURN
Specify filename and format information for input file

   SO BUILDHGT  STACK1        34       34       34       34       34
   SO BUILDHGT  STACK1        34       34       34       34       34
   SO BUILDHGT  STACK1        34       34       34       34       34
   SO BUILDHGT  STACK1        34       34       34       34       34
   SO BUILDWID  STACK1     35.43    36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1      25.5    20.56       15    20.56     25.5
   SO BUILDWID  STACK1     32.92    35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1        15    20.56     25.5    29.66    32.92
   SO BUILDWID  STACK1     36.37    36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1     35.43    36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG              0        0
   RE GRIDPOLR  POL1     DIST            100      200      300      500
   RE GRIDPOLR  POL1     GDIR             36       10       10
   RE GRIDPOLR  POL1     END
   RE FINISHED
   ME STARTING
FILE0005.WK3                          CMD                NUM  CAP
```

Figure 32. Screen display of main menu for "OU" pathway

from the menu in Figure 32 then selecting either RECTABLE or MAXTABLE from the subsequent menu of tabular options shown in Figure 33. Both the RECTABLE and MAXTABLE selections cause the program to prompt the operator for the required parameters appropriate to that selection. This concludes the input parameters for the "OU" pathway in the example problem. When QUIT is selected from the "OU" menu shown in Figure 32, the program automatically saves the table as a runstream file for the ISC2 model. This completes the input portion of the model and returns the user to the main menu shown in Figure 20.

The next operation is either to run a deterministic model by selecting MODEL or run the stochastic model with the RISK selection. This example problem assumes the selection of the RISK option from the main menu shown in Figure 20.

Selection of the RISK option accesses the second major module of this program. The various macros associated with this option are contained on a separate worksheet called RISC2A which is automatically called into memory with the RISC2 worksheet automatically removed from memory. The operator is now presented with the main RISK menu shown in Figure 34.

This menu allows the user to select options to: (1) load the @RISK® ADD-IN into memory (LOAD), (2) select the variable to be sampled and define the distribution function for the

```
A:B61: [W10] 'STARTING                                                          MENU
TABULAR  SPECIAL PURPOSE  QUIT
Select tabular output options

   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45    35.43
   SO BUILDWID  STACK1      35.43    36.45        0    35.18    32.92
   SO BUILDWID  STACK1       25.5    20.56       15    20.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45    35.43
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG           0        0
   RE GRIDPOLR  POL1     DIST         100      200      300      500
   RE GRIDPOLR  POL1     GDIR          36       10       10
   RE GRIDPOLR  POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL  PREPIT.ASC
   ME ANEMHGHT        20 FEET
   ME SURFDATA     94823     1964 PITTSBURG
   ME UAIRDATA     94823     1964 PITTSBURG
   ME FINISHED
   OU STARTING
RISEX.WK3                                   CMD       CALC      RUN CAP
```

Figure 33. Screen display for menu of "OU" tabular options

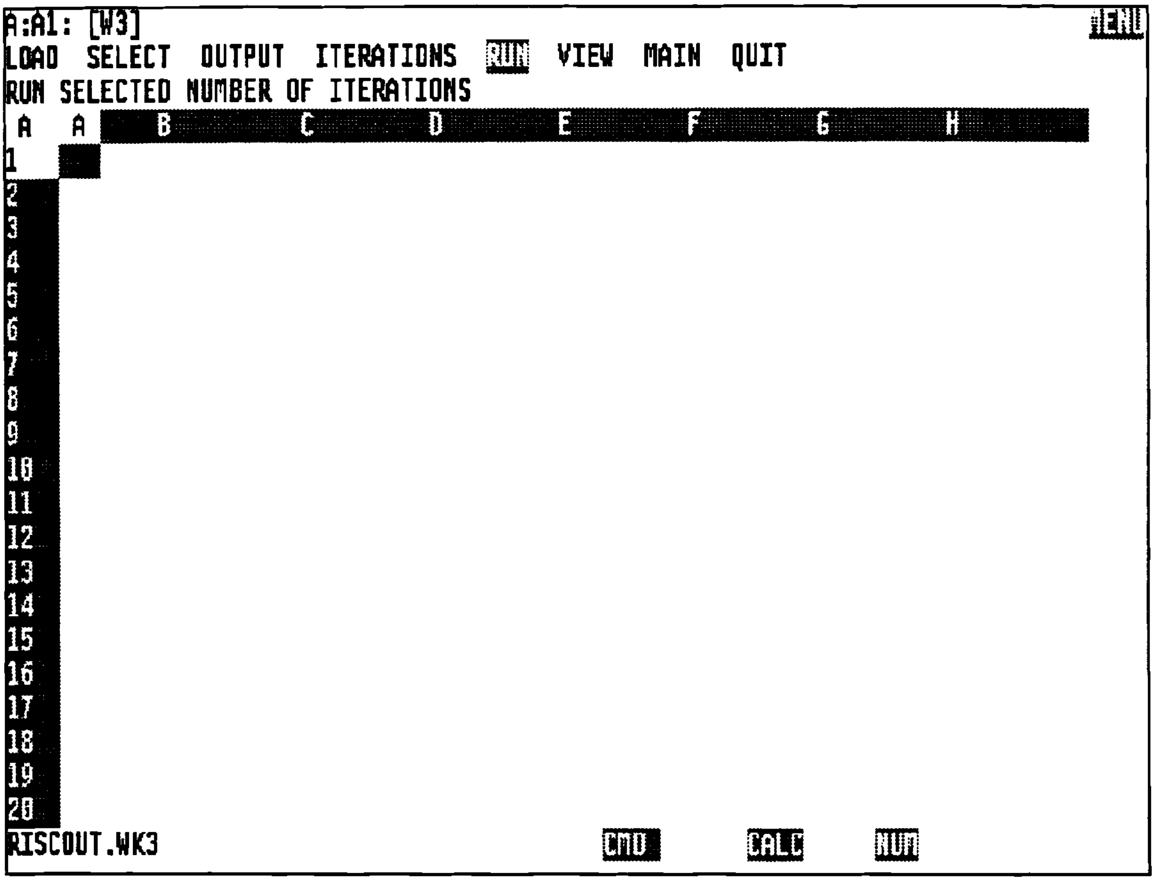


Figure 34. Screen display of main menu for RISK module

variable (SELECT), (3) define the area in the worksheet where the results of the modeling are to be stored (OUTPUT), (4) input the number of iterations for which the model is to be run (ITERATIONS), (5) run the stochastic model for the number of iterations specified (RUN), (6) view the results of the stochastic model either as a table of statistical values or as one of several graphs (VIEW), (7) return to the main RISC2 menu (MAIN) and stop macro processing (QUIT). The options for LOAD, OUTPUT, and ITERATIONS must be specified prior to running the stochastic model since these supply vital information to the modeling program.

Selection of the LOAD option from the menu in Figure 34 automatically loads the @RISK® ADD-IN into memory and sets certain parameters within @RISK®. The program automatically returns to the menu in Figure 34 once @RISK® has been properly loaded.

The next option from this menu is SELECT which, when accessed, prompts the user to move the cursor to the variable to be sampled and press [ENTER]. Once the variable has been selected, the user is prompted to enter the distribution function for that variable in the form recognized and supported by @RISK®. Multiple variables may be used in the same model by accessing the SELECT option repeatedly. In the example problem the source emission rate was selected as the parameter to be sampled in the model. The original ISC2 example problem used an emission rate of 1 g/s. This rate was arbitrarily modified to be a normal distribution with a mean of 1 g/s and a standard deviation of 0.5.

The OUPUT selection in the main RISK menu allows the operator to specify in what area of the worksheet the results of the model are to be stored. The area normally used is approximately ten rows below the bottom of the runstream table and starting in column B. Although this position is normally used the position is arbitrary.

The ITERATIONS option prompts the user to enter the number of iterations used in the stochastic model. This number is stored in the worksheet and can be updated if necessary.

The RUN selection from the RISK menu automatically initiates the Monte Carlo sampling, runs the ISCST2 deterministic model for the number of iterations requested and saves the results of each iteration in a table. The program also saves the worksheet file after each iteration so if the modeling session is interrupted it can be restarted without loss of data.

After the model has been run successfully, the results can be viewed by using the VIEW option. This option accesses another menu, as shown in Figure 35, which has selections for viewing

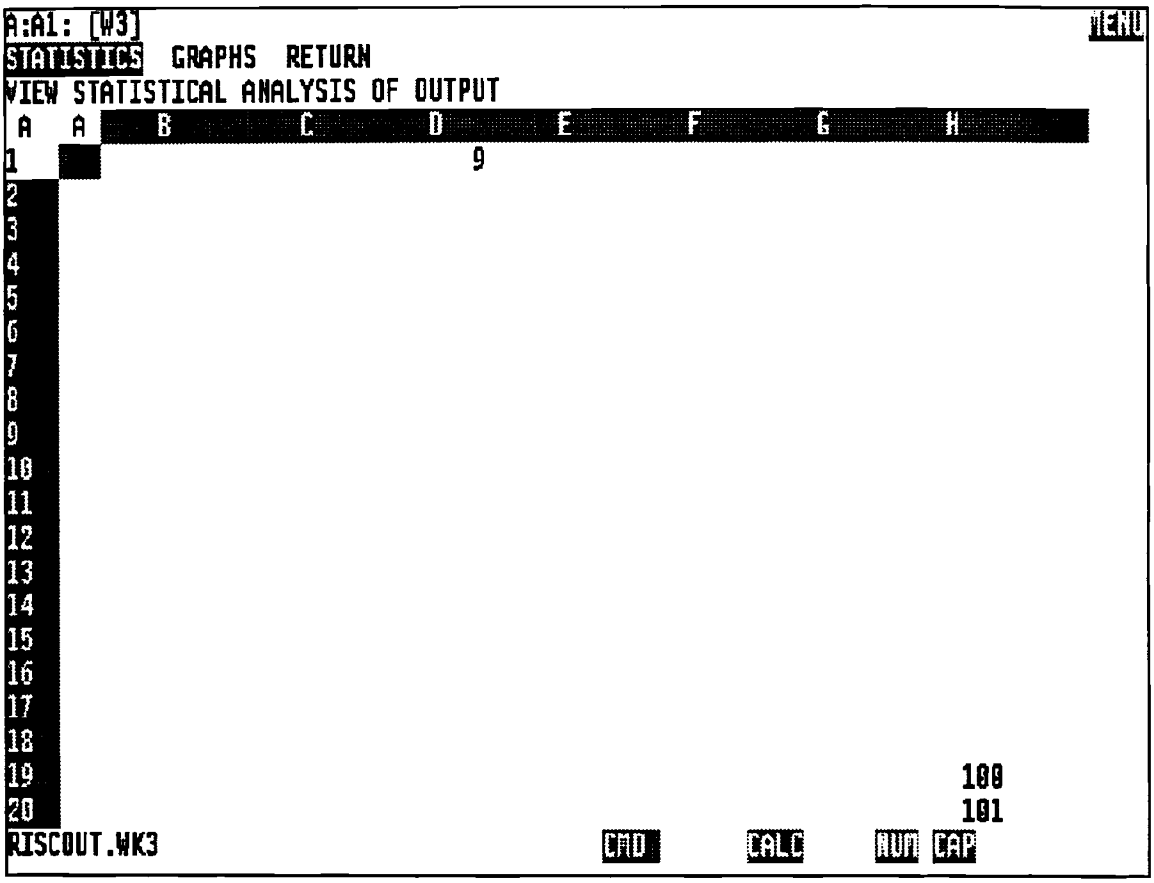


Figure 35. Screen display of menu for selection of statistical or graphic results of model output

the statistical results and various graphs. If the STATISTICS option is selected the table of statistical values shown in Figure 36 is displayed. The GRAPHS option accesses the additional menu of graph options shown in Figure 37. This menu includes options for both three and twenty-four hour graphs for (1) mean vs number of iterations, (2) standard deviation vs number of iterations and (3) concentration vs probability. Figure 38 presents the graph of the three (3) hour mean vs number of iterations and Figure 39 displays the graph of probability for the three (3) hour maximum concentrations in the example problem. The QUIT selection returns the user to the main program menu.

The table of statistics and the probability graphs provide the environmental decision maker with a powerful tool for analyzing the potential contaminant concentrations at receptor sites and for addressing the uncertainties associated with model parameters.

A:B345: [W10] READY

	A	B	C	D	E	F	G	H
345			STATISICAL ANALYSIS OF MODEL OUTPUT					
346								
347								
348	MEAN (AVERGE) VALUE OF 3 HR MAXIMUM VALUES							58.36115
349								
350	STANDARD DEVIATION OF 3 HR MAXIMUM VALUES							26.74411
351								
352	POPULATION VARIANCE OF 3 HR MAXIMUM VALUES							715.2475
353								
354	MEAN (AVERGE) VALUE OF 24 HR MAXIMUM VALUES							24.54494
355								
356	STANDARD DEVIATION OF 24 HR MAXIMUM VALUES							11.24777
357								
358	POPULATION VARIANCE OF 24 HR MAXIMUM VALUES							126.5123
359								
360								
361	NUMBER OF MODEL ITERATIONS PERFORMED							100
362								
363								
364				PRESS ENTER TO CONTINUE				

RISCOUT1.WK3 CMD CALC NUM

Figure 36. Screen display of statisical output table

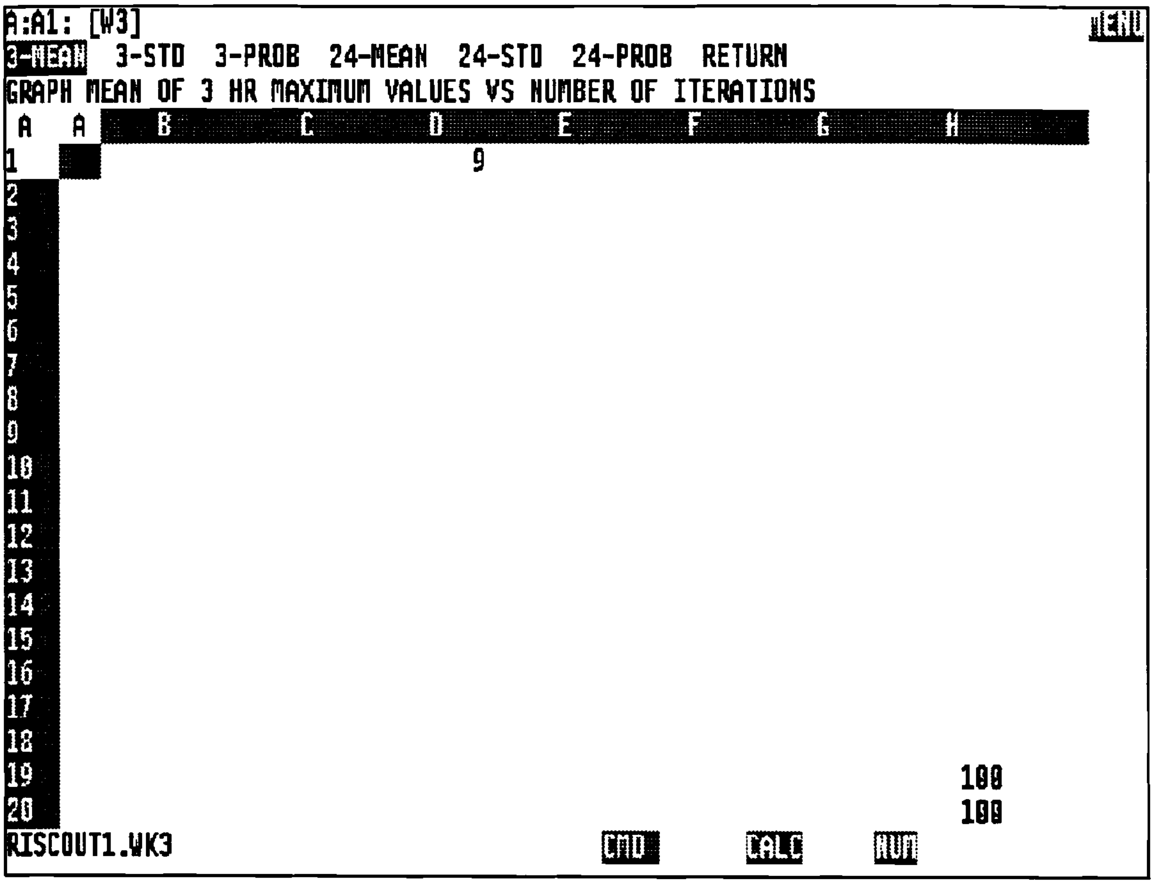


Figure 37. Screen display of menu for selecting RISC2 output graphs

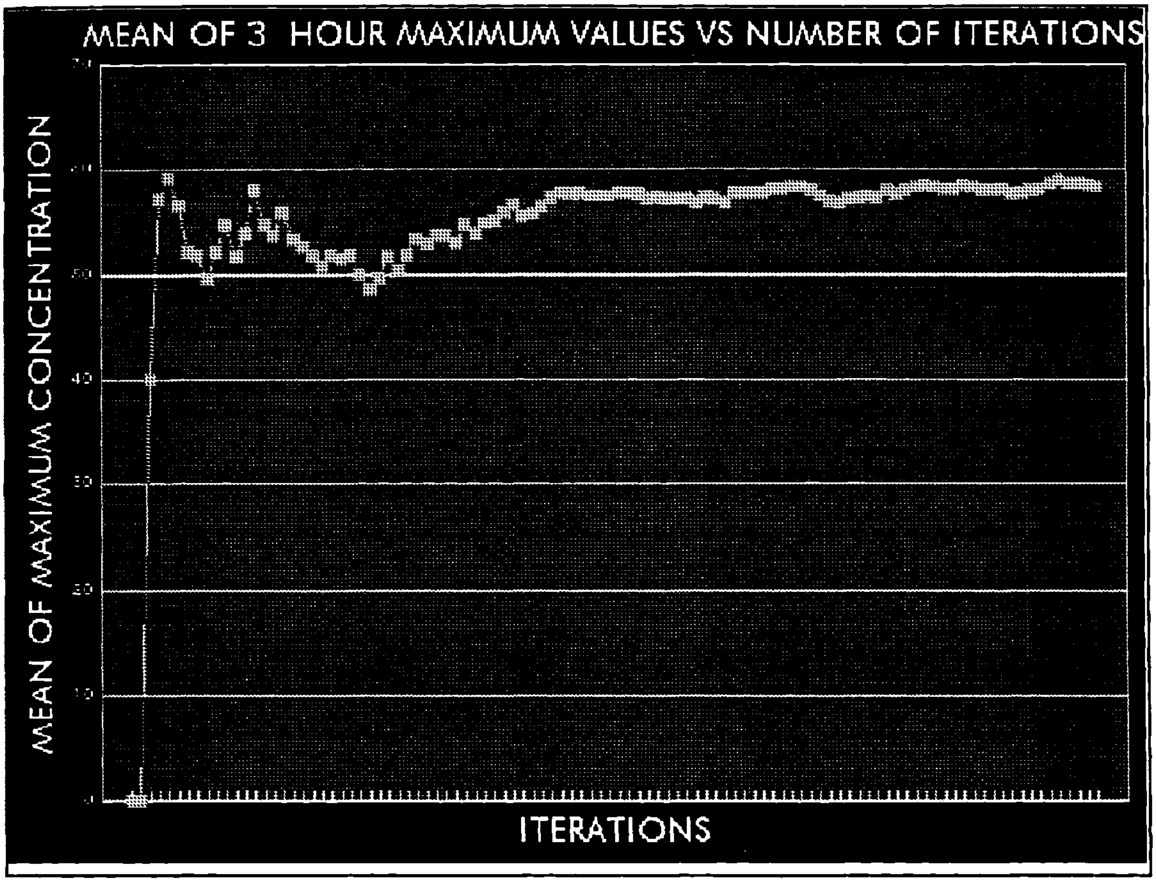


Figure 38. Graph of 3 Hour Mean Results vs number of Iterations

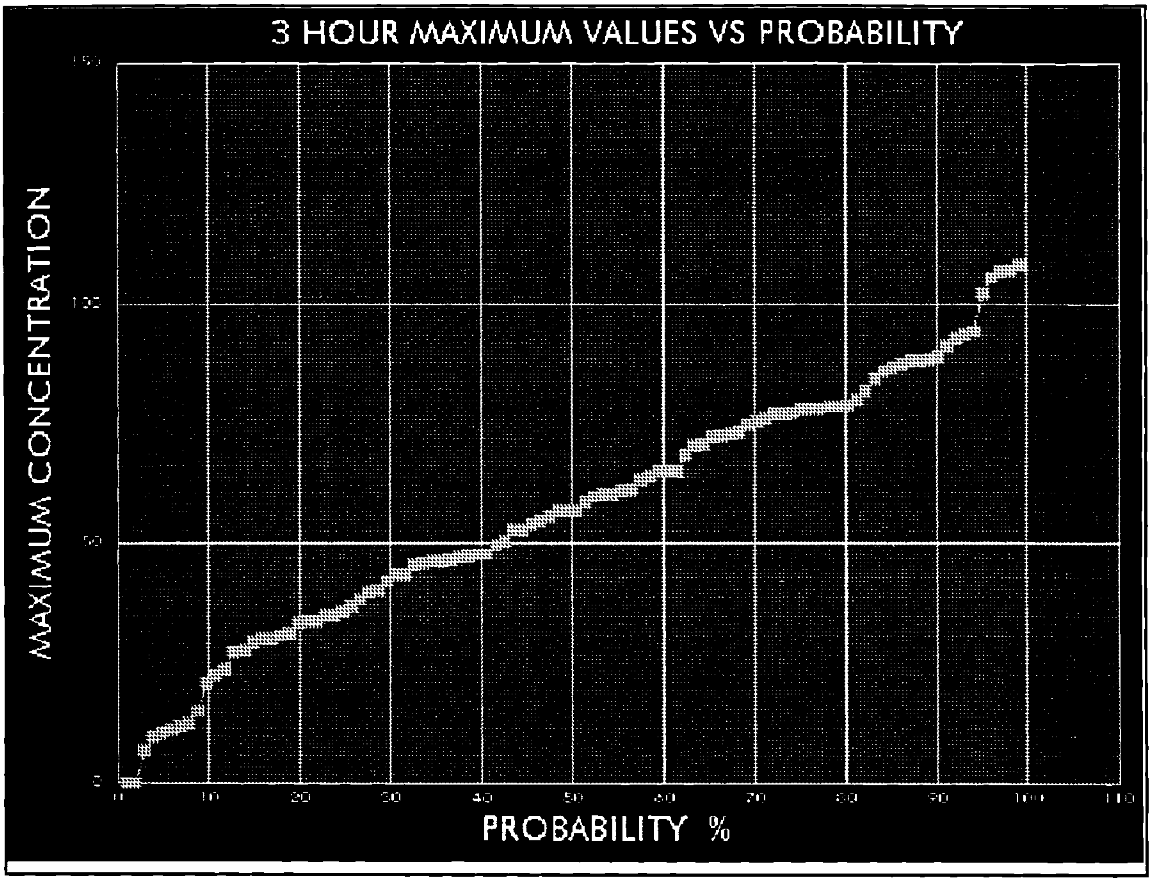


Figure 39. Graph of Probability percent for Maximum 3 Hour Concentrations

COGMOD:

The COGMOD program is initiated automatically by retrieving the COGMOD.WK3 file from the disk into the worksheet with the Lotus® menu FILE RETRIEVE command. Once the file is retrieved the user is greeted with the program title screen shown in Figure 39. A second title screen identical to the RISC2 screen in Figure 17 follows the title screen. The user is presented a menu (not shown) with the option of changing directories and file names. Once any changes have been made, the operator automatically calls the main program file into memory and initiates the macro program by selecting continue from the menu.

An example problem with the associated display screens and major prompts is used to illustrate the results of this programming effort. The example problem uses hydraulic conductivity data from a 1991 report by Geraghty and Miller, Inc. on the 3M site in weatherford, Oklahoma. This report did not have reference locations so a point was arbitrarily selected (in the southwest corner of the plat) from which to physically measure the distances to the sample (well) locations. A table of the measured X and Y coordinates from a the southwest corner of the field as well as the reported hydraulic conductivities at each sample point is included in Table 13. These values were used to define the semivariogram

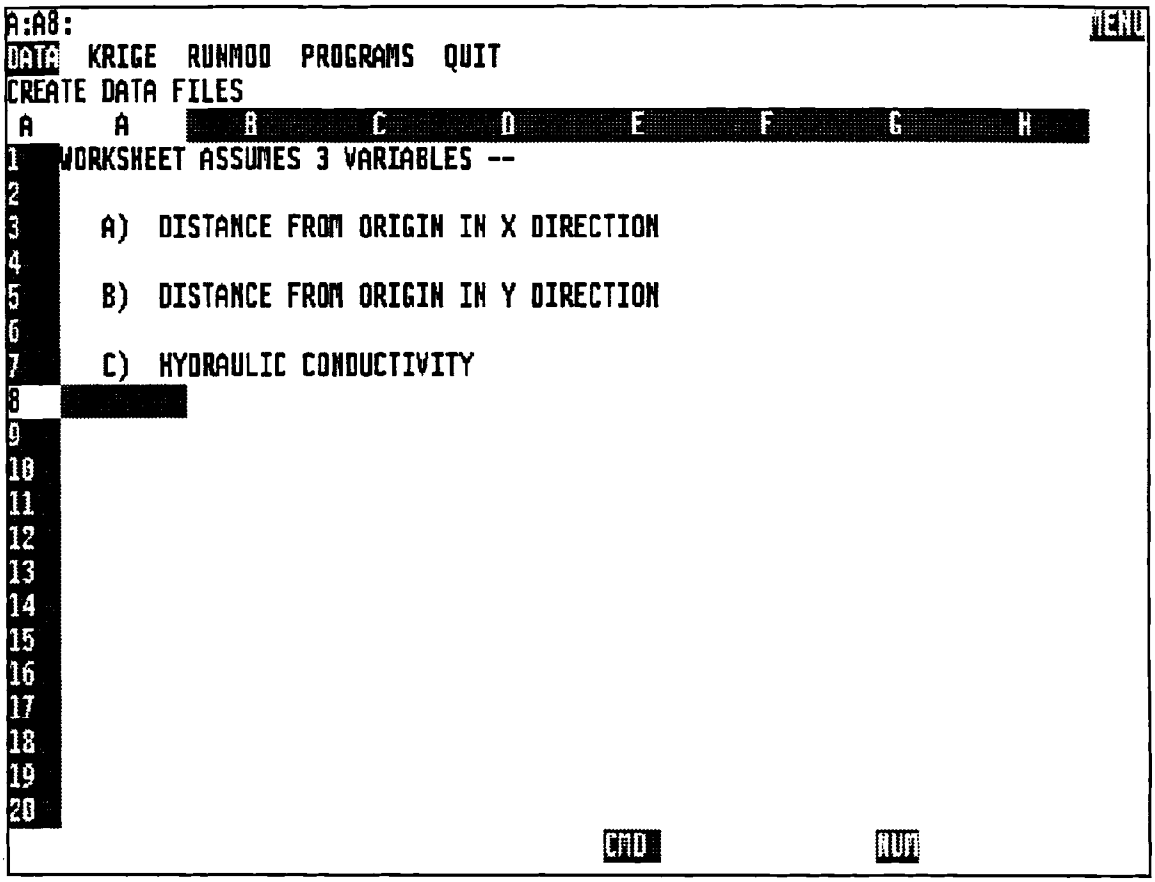


Figure 40. COGMOD main menu for module selection

first prompts (asks) the user for a Y (yes) or N (no) response to determine if a conditional simulation is desired. It is assumed that the example problem is a conditional simulation. A Yes response to the above question results in another prompt which asks the user if a raw data file is to be created. A Yes response to this question causes the macro to temporarily exit the worksheet and automatically call up the STATPAC input file named TERFIL. This and the other STATPAC programs are discussed fully in the STATPAC users manual (Grundy and Miesch, 1987). An example of the TERFIL screen display is shown in Figure 41. Once the raw data file has been created in TERFIL, the program automatically returns to the spreadsheet and asks the operator if an ASCII data file is desired. This question is also answered Yes and the program again exits the spreadsheet and automatically calls up the interactive STATPAC program named FILTER. An example of the screen display for this program is shown in Figure 42. Once the ASCII file is created the program returns to the spreadsheet and asks the user if any changes to the raw data are desired. A No response causes the program to ask the user if basic statistical calculations are to be made at this point which is answered Yes for the example. The program automatically exits the spreadsheet and calls the STATPAC program BASTAT. Figure 43 shows some of the interactive questions and responses as well as some of the results of the basic statistical calculations for the example problem. After

```
C:\ENVIR\STATPAK>terfil
GIVE A ROOT NAME FOR THE STATPAC OUTPUT FILE
DO NOT ADD AN EXTENSION TO THE ROOT NAME: test
DOES THE INPUT DATA CONTAIN INTEGER LAT/LONG DEGREES-MINUTES-SECONDS? Y/N: N
DOES THE INPUT DATA CONTAIN QUALIFYING CODES? Y/N: N
HOW MANY ROWS IN THE DATA SET ? 17
HOW MANY VARIABLES IN THE DATA SET? 3
GIVE   3 VARIABLE ID S - END EACH WITH CR

X
Y
COND
```

Figure 41. Screen display of STATPAC TERFIL interactive program

```
C:\ENVIR\STATPAK>FILTER
ENTER THE NAME OF STATPAC INPUT FILE: test.stp
DATA SET ID =ABCDEFGH
            N =    7
            M =    3
      X             Y              COND
DO YOU WANT TO SEE THE DATA OF THE FIRST ROW OF THE FILE? Y/N: n
DO YOU WANT TO CREATE AN ASCII OUTPUT FILE OF SELECTED ROWS? Y/N: y

GIVE A NAME FOR THE OUTPUT FILE
PRN WILL GO TO PRINTER; CON WILL GO TO SCREEN; filespec  WILL GO TO DISK FILE
ENTER NAME: test.dat
DO YOU WANT THE OUTPUT FILE TO CONTAIN:
     1) ALL THE INFORMATION FOR EACH SELECTED ROW, OR
     2) ONLY THE ROWID, LAT-LONG, AND ROW NUMBER FOR EACH SELECTED ROW?
        ANSWER 1 OR 2: 1
GIVE NUMBERS OF FIRST AND LAST ROWS TO BE TYPED (XX,XXX): 01,07
    7 ROWS WILL BE WRITTEN.
    7......READING DATA
TYPE PRINTER FILE TEST.DAT
NORMAL END OF PROGRAM

C:\ENVIR\STATPAK>
```

Figure 42. Screen display of STATPAC FILTER program

```
Fri. 03/24/95
12:17:28am
NO OF ROWS    =      7
NO OF COLUMNS=       3

DO YOU WANT SELECTED ROWS ? n

DO YOU WANT SELECTED COLUMNS ? n

WHAT DO YOU WANT INCLUDED IN BASIC STATISTICS ?
        1-ONLY UNQUALIFIED DATA
        2-ONLY QUALIFIED DATA
        3-ALL DATA(IGNORING QUALIFYING CODES)
TYPE 1, 2, OR 3 : 3
   7    READING DATA...


                          UNIVARIATE STATISTICS

VAR  COLUMN   MINIMUM   MAXIMUM    MEAN     DEVIATION  VALID B   L   N   G OTHER
  1 X        6.000E+01 4.800E+02 2.243E+02 1.6979E+02   7   0   0   0   0   0
  2 Y        6.000E+01 4.800E+02 3.000E+02 1.5588E+02   7   0   0   0   0   0
  3 COND     1.220E+01 4.017E+01 2.529E+01 1.1581E+01   7   0   0   0   0   0

DO YOU WANT TO SEE THE CORRELATIONS ?
```

Figure 43. Screen display of basic statistics results in BASTAT

the program returns to the spreadsheet it asks the user if the raw data file is to be converted at that point in the processing. The raw data must be converted prior to processing the semivariogram or kriging the data. This prompt and the accompanying comments screen are displayed in Figure 44. A Yes response to this prompt is assumed for the example problem. Following the Yes response, the user is given a series of prompts which create a control file for the STATPAC program SS2DPREP. After the control file is created the program temporarily exits the spreadsheet, automatically runs the SS2DPREP program and returns to the spreadsheet.

The program next asks the user if a semivariogram analysis is to be performed. A Yes response causes the program to prompt the operator for a series of parameters necessary to create a control file for the STATPAC semivariogram analysis program SS2DGAMH. These prompts include parameters for type of variogram, normal or lognormal analysis, class distances and angle among others. The screen displays for these prompts can be found in the appendix C. Once the control file is completed the program again automatically calls the semivariogram analysis program, runs it and returns to the spreadsheet. The semivariogram used for the example problem is shown in Figure 45. The model parameters used for kriging are displayed below the curve in the same figure.

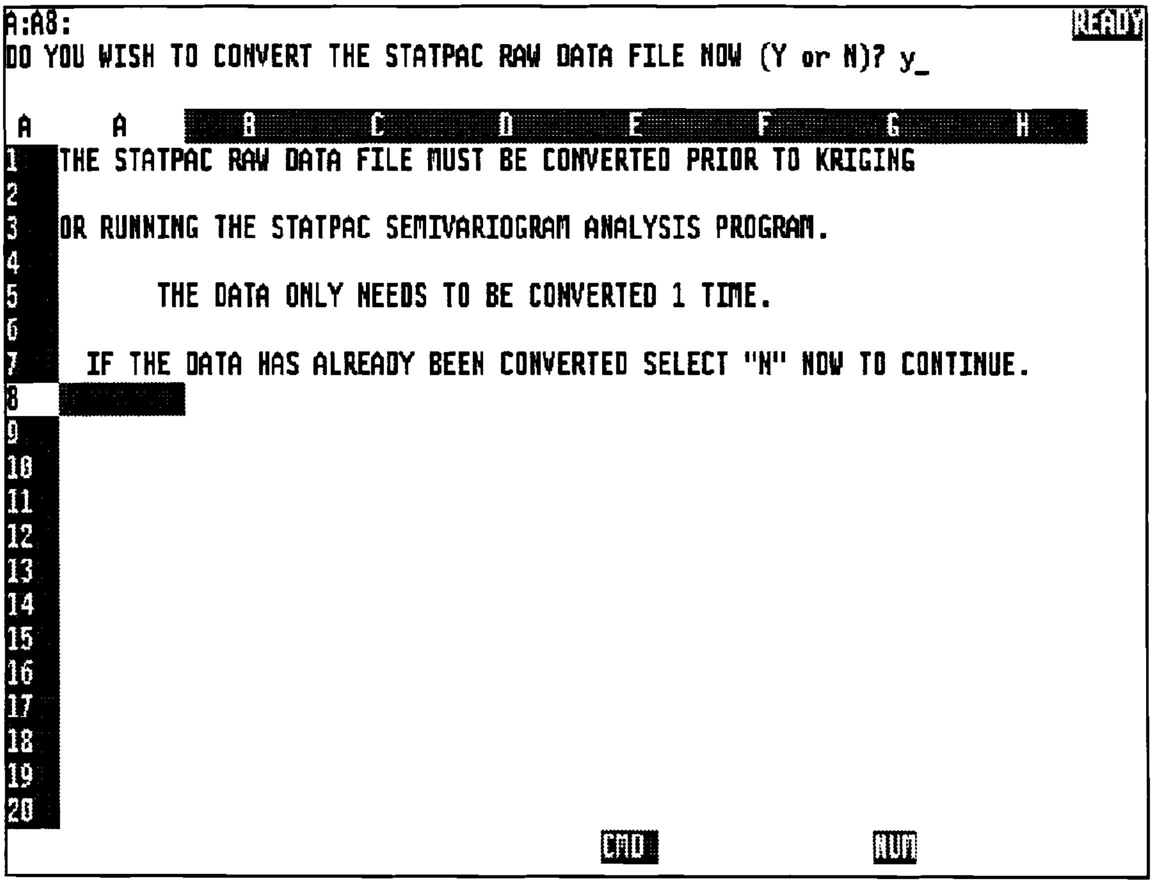
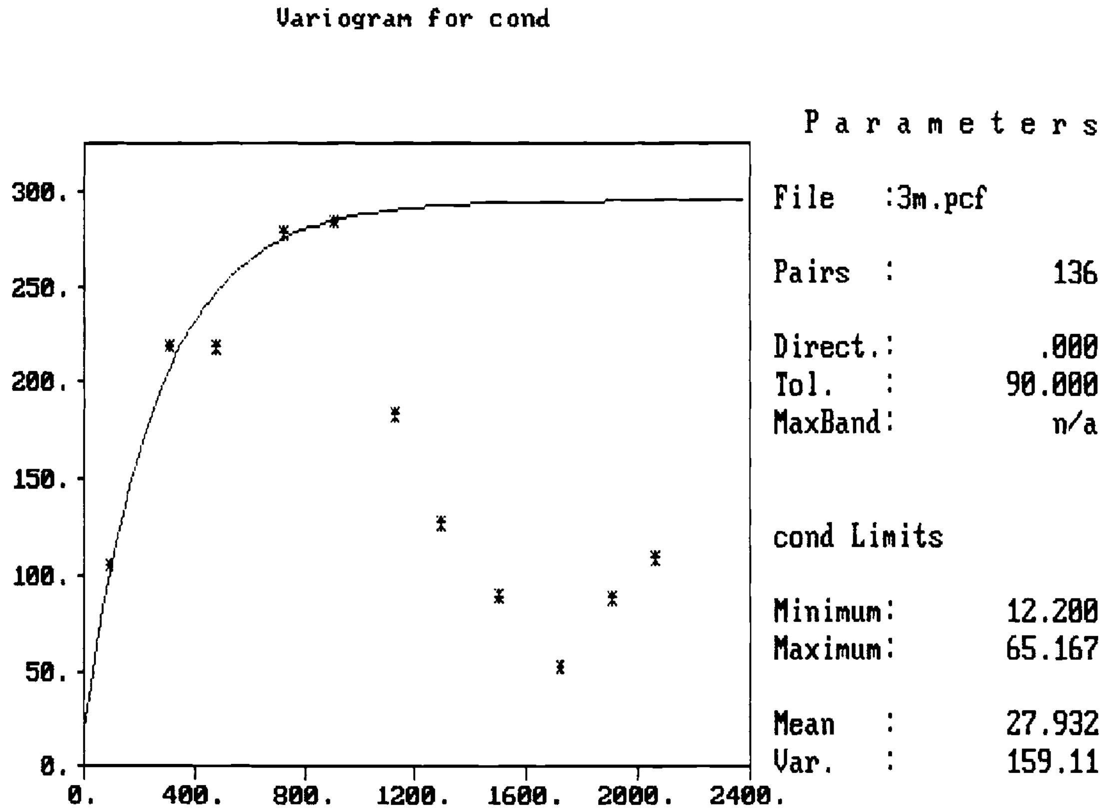


Figure 44. Screen display of prompt and comments for converting raw data to form acceptable for kriging.



Nugget = 20 Sill = 275 Range = 825′ Lag = 200′

Exponential

Figure 45. Display of semivariogram and model parameters for example problem

Once the semivariogram option is completed the program asks if a COVAR input file is to be created. This file is a table of X-Y coordinates that comprise the grid area to be kriged. Since in the example problem the grid is a 20x20 or 400 points it is not practical to input them manually. If the option to create a COVAR input file is selected the program prompts the user for the distance between grid points in both the X and Y direction along with the minimum X and Y values. It then generates the input file and saves it in the proper format for COVAR. Following the creation of the input file the program exits the spreadsheet and activates COVAR, which is interactive. Once COVAR is complete the program returns to the spreadsheet and the main program menu shown in Figure 40.

If the KRIGE option is selected from the main module menu (Figure 40) the program prompts the user for a series of parameters necessary to create a krige control file similar to the semivariogram control file. The individual screen displays for this process are included in the appendix. Once the control file has been created the program exits the spreadsheet, runs the STATPAC kriging program called SS2DGRID and returns to the main module menu. Figure 46 shows some of kriged input parameters and the output message for the example data. The program returns to the menu in Figure 40 following a successful kriging operation.

The final module to select is RUNMOD which generates the conditional simulation from the various components as discussed in the COGMOD structure section. The module has only a limited number of prompts for the operator since most of the manipulation is performed by Lotus® within the spreadsheet and by accessing the various programs automatically. The user is asked to select an area in the spreadsheet to store data and if an ASCII file has been created yet. It then displays a comment screen and asks the operator if the macro should continue with the simulation, i.e. if all the conditions necessary have been met. Following this screen the program prompts the user for the number of iterations desired, followed by two screens for the maximum and minimum output values allowed. The program then automatically runs the conditional simulation for the number of iterations specified by the user and returns to the main menu when completed. Figures 47 through 51 show the screen displays for the first five conditional simulation iterations of the example problem. A total of four hundred points are calculated and output for each iteration. Once the initial geostatisical information is gathered and processed the conditional simulation requires very little input from the user and generates multiple sets of statistically valid hydraulic conductivity values to be input into other modeling programs.

```
 1  EXPO  275.      .000         1.00         825.       .000

SEARCH RADIUS = .40E+03
MAXIMUM NUMBER OF HOLES USED =     5


NUMBER OF POINTS IN NORTH-SOUTH DIRECTION =    20
DISTANCE BETWEEN POINTS IN NORTH-SOUTH DIRECTION =   30.00
NUMBER OF POINTS IN  EAST-WEST  DIRECTION =    20
DISTANCE BETWEEN POINTS IN  EAST-WEST  DIRECTION =   30.00
NORTHING OF SOUTHWEST CORNER OF GRID OF POINTS =     .00
EASTING  OF SOUTHWEST CORNER OF GRID OF POINTS =     .00
SEARCH RADIUS =  400.00
MAXIMUM NUMBER OF HOLES USED =     5

 400    NOW KRIGING GRID POINTS
THE DISK FILES HAVE BEEN WRITTEN
THE INPUT FILE WAS test.UPR
THE STATPAC OUTPUT FILE IS test.UGR
THE CHARACTER OUTPUT FILE IS test.FGR
RUN TIME WAS    .12 MINUTES
NORMAL END OF PROGRAM


C:\ENVIR\STATPAK>
```

Figure 46. Screen display of results after kriging in the SS2DGRID STATPAK program

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT	VALUE	
1385								
1386	0	0	16.54	38.04	27.2267	6	6	
1387	0	30	16.41	37.56	33.9714	13	13	
1388	0	60	16.89	37.8	14.2956	-7	0.01	
1389	0	90	16.52	37.8	37.2675	16	16	
1390	0	120	17.21	38.01	22.0271	1	1	
1391	0	150	17.93	38.21	25.2611	5	5	
1392	0	180	18.59	38.41	13.4242	-6	0.01	
1393	0	210	19.14	38.55	16.5413	-3	0.01	
1394	0	240	19.48	38.58	28.0707	9	9	
1395	0	270	19.56	38.32	31.3999	13	13	
1396	0	300	19.34	37.58	26.3724	8	8	
1397	0	330	18.83	36.29	16.6489	-1	0.01	
1398	0	360	18.07	34.65	29.1839	13	13	
1399	0	390	17.15	32.93	15.3124	0	0.01	
1400	0	420	16.16	31.34	32.9624	18	18	
1401	0	450	16.02	29.77	30.3131	17	17	
1402	0	480	15.27	28.71	29.0617	16	16	
1403	0	510	14.93	27.9	21.0718	8	8	

CMD NUM CAP

Figure 47. Screen display of 18 grid values from the first iteration of the example problem

A:A1403: 0 READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT VALUE		
1385								
1386	0	0	16.54	20.96	20.2256	16	16	
1387	0	30	16.41	20.84	19.09	15	15	
1388	0	60	16.89	20.75	8.9877	5	5	
1389	0	90	16.52	19.85	25.4058	22	22	
1390	0	120	17.21	19.71	15.5848	13	13	
1391	0	150	17.93	19.52	26.0462	24	24	
1392	0	180	18.59	19.26	19.8672	19	19	
1393	0	210	19.14	18.91	22.3392	23	23	
1394	0	240	19.48	18.5	10.0407	11	11	
1395	0	270	19.56	18.06	31.601	33	33	
1396	0	300	19.34	17.67	36.8184	38	38	
1397	0	330	18.83	17.38	22.6456	24	24	
1398	0	360	18.07	17.13	13.313	14	14	
1399	0	390	17.15	16.86	16.3616	17	17	
1400	0	420	16.16	16.55	23.544	23	23	
1401	0	450	16.02	16.37	21.8686	22	22	
1402	0	480	15.27	16.18	25.8671	25	25	
1403	0	510	14.93	16.21	24.7419	23	23	

CMD NUM CAP

Figure 48. Screen display of same grid points as Figure 47. with values from second iteration.

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT VALUE		
1385								
1386	0	0	16.54	25.51	24.8556	16	16	
1387	0	30	16.41	25.13	19.263	11	11	
1388	0	60	16.89	24.75	30.2329	22	22	
1389	0	90	16.52	25.35	24.8744	16	16	
1390	0	120	17.21	24.84	7.4563	0	0.1	
1391	0	150	17.93	24.27	17.7948	11	11	
1392	0	180	18.59	23.65	25.4269	20	20	
1393	0	210	19.14	23.02	32.9584	29	29	
1394	0	240	19.48	22.46	17.803	15	15	
1395	0	270	19.56	22.12	24.7256	22	22	
1396	0	300	19.34	22.23	13.3136	10	10	
1397	0	330	18.83	22.91	18.0528	14	14	
1398	0	360	18.07	24.04	43.8435	38	38	
1399	0	390	17.15	25.42	15.9137	8	8	
1400	0	420	16.16	26.87	22.3206	12	12	
1401	0	450	16.02	28.13	18.52	6	6	
1402	0	480	15.27	29.2	27.6258	14	14	
1403	0	510	14.93	29.88	21.4471	6	6	

CMD NUM CAP

Figure 49. Screen display of values from third iteration for same grid points as previous figures

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT VALUE		
1385								
1386	0	0	16.54	20.35	11.1602	7	7	
1387	0	30	16.41	20.23	23.8897	20	20	
1388	0	60	16.89	20.27	27.3818	24	24	
1389	0	90	16.52	21.53	37.08	32	32	
1390	0	120	17.21	21.66	15.806	11	11	
1391	0	150	17.93	21.82	26.4424	23	23	
1392	0	180	18.59	21.99	34.9262	32	32	
1393	0	210	19.14	22.19	33.0945	30	30	
1394	0	240	19.48	22.44	26.1596	23	23	
1395	0	270	19.56	22.79	20.0654	17	17	
1396	0	300	19.34	23.33	17.2138	13	13	
1397	0	330	18.83	24.1	34.9868	30	30	
1398	0	360	18.07	25.09	36.2375	29	29	
1399	0	390	17.15	26.2	18.1074	9	9	
1400	0	420	16.16	27.35	24.3053	13	13	
1401	0	450	16.02	28.66	40.7588	28	28	
1402	0	480	15.27	29.44	47.4005	33	33	
1403	0	510	14.93	29.84	14.538	0	0.1	

CMD NUM CAP

Figure 50 Screen display of values from fourth iteration of same grid points in example problem

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT	VALUE	
1385								
1386	0	0	16.54	19.3	34.985	32	32	
1387	0	30	16.41	20.19	25.0321	21	21	
1388	0	60	16.89	20.86	22.0726	18	18	
1389	0	90	16.52	19.87	29.5084	26	26	
1390	0	120	17.21	20.84	34.9664	31	31	
1391	0	150	17.93	21.93	20.1503	16	16	
1392	0	180	18.59	23.11	39.6803	35	35	
1393	0	210	19.14	24.33	28.7705	24	24	
1394	0	240	19.48	25.45	19.7935	14	14	
1395	0	270	19.56	26.25	35.8601	29	29	
1396	0	300	19.34	26.46	29.7287	23	23	
1397	0	330	18.83	25.9	33.2322	26	26	
1398	0	360	18.07	24.67	34.3565	28	28	
1399	0	390	17.15	23	33.7652	28	28	
1400	0	420	16.16	21.14	19.9305	15	15	
1401	0	450	16.02	19.81	27.7752	24	24	
1402	0	480	15.27	18.35	25.3081	22	22	
1403	0	510	14.93	17.52	30.2614	28	28	

CMD NUM CAP

Figure 51. Screen display of fifth iteration for same grid points as previous figures

CHAPTER IV

DISCUSSION AND SUMMARY

This study addresses the problem of uncertainty in computer modeling input parameters by using a spreadsheet platform to control readily available or public domain deterministic software in a stochastic simulation. Spreadsheets are commonly used and understood by engineers so they provide a familiar framework in which to create a program without having to learn a new programming language. In addition recent advances in stochastic spreadsheet "ADD-IN"s significantly increase the modeling capabilities of spreadsheets.

Two programs were developed for this effort. The first program (RISC2) was designed to satisfy the criteria of a decision support system by using macro menus to control the processing. This program used a series of Lotus 1-2-3® macros to control the generation of a Monte Carlo (random) realization of the variable parameters within the spreadsheet platform. The U. S. Environmental Protection Agency's Industrial Source Complex (ISC2) Diffusion deterministic model for air pollution was then accessed repeatedly with these random entries with the results recorded for subsequent probability determinations. In this way a stochastic air pollution model was automatically repeated many times and the results created which offered ease of use and rigor of computation with an additional feature of uncertainty analysis.

The second application program used the spreadsheet platform to manipulate data within the spreadsheet and to interface with several different DOS programs to generate a conditioned two-dimensional geostatisical simulation of hydraulic conductivity values. In this way, multiple, randomly selected two dimensional hydraulic conductivity fields can be generated which maintain the spatial correlation structure defined by the original field data while simultaneously addressing measurement and estimation uncertainty in this critical variable. Specific findings and/or achievements include:

RISC2

- Development of a useful and inexpensive decision support system which enhances the capability of the ISC2 model.
- The spreadsheet platform can effectively control a sophisticated model.
- The @RISK® ADD-IN can address uncertainty parameters in DOS models by using the Lotus® spreadsheet platform to control both @RISK® and the model.
- Lotus® macros can be developed into sophisticated programming tools capable of emulating many of the functions attributed to much more complex programming languages.

COGMOD

- The Lotus spreadsheet platform can control and automatically access multiple DOS programs to generate a conditional simulation of geostatistical data (hydraulic conductivity).
- Spreadsheet macros can be used to prompt the user for input parameters, provide helpful comments and reduce the input volume.
- The Lotus® spreadsheet platform can transform data from an ASCII tabular output to ASCII columnar input without user intervention.

The primary applications for this technique are models which use a single DOS deterministic model and where the deterministic input file has already been created. In these applications the stochastic model can be created much quicker and easier than either finding and learning how to run another model or converting the deterministic model to a stochastic model by using conventional programming techniques. The technique is also useful for stochastic modeling where resources or access to programming personnel are limited. Applications such as the examples in this paper require a significant amount of time to develop and approach the point where conventional computer programming may be more efficient. This technique has limited resale potential since it is not a stand alone program, i.e. it requires additional commercial programs such as Lotus® and/or @RISK® to run and requires modification for specific applications.

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APPENDIXES

APPENDIX A

LOTUS® ADVANCED MACRO COMMANDS

(AS DESCRIBED IN THE

LOTUS® HELP SCREENS)

{subroutine [arg1],[arg2],...[argn]}

Calls a subroutine, which is discrete unit of macro instructions. When 1-2-3 encounters a {subroutine} command, it:

1. Shift macro control from the current column of macro instructions to the subroutine whose range name or address is in the braces.

2. Passes any arguments included in the {subroutine} command to the subroutine's **{DEFINE}** command for evaluation and storage.

3. Executes the instructions in the subroutine.

4. When 1-2-3 reaches either a {RETURN} command in the subroutine or a blank or numeric cell, it returns to the original macro location and continues the macro at the instruction immediately following the {subroutine} command.

{?} Suspends macro execution to let you move the cell pointer, complete part of a command or enter data. When you press ENTER the macro continues. To have the macro enter what you typed while the macro was suspended, follow{?} with a~(tilde).

{APPENDBELOW target-location, source-location}

Copies the contents of source-location to the rows immediately below target-location. Expands a defined range that begins or ends in the last row of target-location to include the rows that contain the appended data.

{APPENDRIGHT target-location, source-location}

Copies the contents of source-location to the columns immediately to the right of target-location. Expands any defined range that begins or ends in the rightmost column of target-location to include the columns of appended data.

{BEEP [tone-number]}

Sounds the computer's bell. The optional tone-number argument (1, 2, 3, or 4) specifies the bell's tone. Use {BEEP} to signal the end of a macro or the presence of an on-screen message.

{BLANK location}

Erases the contents of location.

{BRANCH location}

Transfers macro control from the current column of macro instructions to the specified location. Use {BRANCH} with {IF} to have the macro do different things depending on the current data, or us it to crate a looping (repeating) macro. {BRANCH} differs from {subroutine} on that 1-2-3 does not automatically return to the original macro location when it completes the instructions in the

{BRANCH} location.

{BREAK}

During data entry or selection of a 1-2-3 command, returns 1-2-3 to Ready mode.

{BREAKOFF}

Disables CTRL-BREAK, preventing interruption of a macro until the macro ends or reaches {BREAKON}.

{BREAKON}

Restores use of CTRL-BREAK while macro is running, undoing a {BREAKOFF} command.

{CLOSE}

Closes the open text file, if one is open. After executing a {CLOSE} command, 1-2-3 goes directly to the next cell in the macro. Do not include any further macro instructions in the same cell as the {CLOSE} command because 1-2-3 will not execute them.

{CONTENTS target-location, source-location,[width],[cell-format]}

Copies the contents of source-location to target-location as a label. Use {CONTENTS} to store a numeric value as a string for use in a string formula.

Code number for [cell-format]:

0 - 15	Fixed, 0-15 decimals
16 - 31	Scientific, 0-15 decimals
32 - 47	Currency, 1-15 decimals
48 - 63	Percent, 0-15 decimals
64 - 79	Comma, 0-15 decimals
112	+/-
113	General
114	D1 (DD-MMM-YY)
115	D2 (DD-MMM)
116	D3 (MMM-YY)
117	Text
118	Hidden
119	D6 (HH:MM:SS AM/PM)
120	D7 (HH:MM AM/PM)
121	D4 (Long Intn'l Date)
122	D5 (Short Intn'l Date)
123	D8 (Long Intn'l Time)
124	D9 (Short Intn'l Time)
127	Worksheet's global cell format

{DEFINE location1, location2, ...locationn}

Used in a subroutine to store any arguments a **{subroutine}** command passes to the subroutine so those arguments can be used later in the subroutine. {DEFINE} must have the same number of arguments as the corresponding {subroutine} command. By default, {DEFINE} stores {subroutine} arguments as labels. To have {DEFINE} evaluate a {subroutine} argument as a number, formula, or cell reference, add the suffix :v to the corresponding {DEFINE} location argument.

{DEPATCH location}

Performs an indirect branch by transferring macro control to the cell whose name or address is entered in location. You must specify a single cell as the location argument.

{FILESIZE location}

Enter in location the number of bytes is the open text file.

{FOR counter, start-number, stop-number, step-number, subroutine}

Creates a for loop that repeats the specified subroutine. The start, stop and step (increment) numbers determine the total number of repetitions to be performed. The counter cell keeps a running count of the repetitions performed so far.

{FORBREAK}

Ends a for loop created by a {FOR} command. Macro execution continues at the macro instruction that immediately follows the {FOR} command.

CAUTION Use {FORBREAK} only within a for loop. Using it anywhere else causes the macro to terminate with an error.

{FORM input-location,[call-table],[include-list],[exclude list]}

Suspends macro execution so you can enter and edit data in the unprotected cells in input-location. Macro execution resumes when you press ENTER or ESC while the mode indicator displays READY.

* Input location is a range that includes unprotected cells.

* Call-table is a two-column range. The first column contains a list of macro key names; the second contains subroutines that 1-2-3- executes when you press the keys listed in the first column.

* Include-list and exclude-list are ranges that contain list of allowable keystrokes and keystrokes to ignore, respectively. (Use one or the other of these arguments; if you use both, 1-2-3 ignores the exclude-list argument.)

{FORMBREAK}

Ends a {FORM} command. Macro execution continues at the macro instructions that immediately follow the {FORM} command.

CAUTION Use {FORMBREAK} only in a call-table subroutine. Using it anywhere else causes the macro to terminate with an error.

{FRAMEOFF}

Suppresses display of the worksheet frame (worksheet, letter, column letters, and row numbers.)

{FRAMEON}

Redisplays the worksheet frame hidden by {FRAMEOFF}.

{GET location}

Suspends macro execution until you press a key, then records your keystrokes as a left-aligned label in location and continues the macro. You can press any key except CTRL-BREAK.

{GETLABEL prompt, location}

Displays prompt in the control panel and suspends macro execution while you type a response. When you press ENTER, stores your response as a left-aligned label in location and continues the macro.

{GETNUMBER prompt, location}

Displays prompt in the control panel and suspends macro execution while you type a response, which must be a number or numeric formula. When you press ENTER, evaluates your response, stores the resulting number in location, and continues the macro.

{GETPOS location}

Enters a number in location. This number reports the current byte-pointer position (position at which data is read from or written to) in the open text file. After executing a {GETPOS} command, 1-2-3 skips any further macro instructions in the same cell and goes directly to the next cell in the macro. If no text file is open, 1-

2-3 ignores {GETPOS} and executes the instructions that follow it in the same cell.

{GRAPHOFF}

Removes a graph displayed by a {GRAPHON} command from the screen and redisplays the worksheet.

{GRAPHON [named-graph],[nodisplay]}

Has three possible results, depending on the arguments you use. In all cases, the macro continues to run while {GRAPHON} is in effect.

* {GRAPHON} with no arguments displays the current graph.
* {GRAPHON named-graph} makes the named-graph settings current and displays the graph.
* {GRAPH named-graph, nodisplay} makes the named-graph settings current but does not display the graph.

1-2-3 clears a graph displayed by {GRAPHON} from the screen when it reaches a {GRAPHON} command, another {GRAPHON} command, or the end of the macro. 1-2-3 also clears a graph displayed by {GRAPHON} then it reaches a {?} or {INDICATE} command or a command that displays a prompt or menu in the control panel.

{IF condition}

Evaluates condition as true or false. If condition is true, 1-2-3 executes the macro instructions that follow the {IF} command in the same cell. If condition is false, 1-2-3 skips to the cell above the {IF} command and executes the macro instructions there.

Condition is typically a logical formula (a formula that uses one of the logical operators < > = <> >= <= #NOT# #AND# and #OR#), or a reference to a cell that contains a logical formula.

{INDICATE [string]}

Displays string as the **mode indicator** in the upper right corner of the screen. {INDICATE} with no argument restores standard operation of the mode indicator.

{LET location, entry}

Enters a number or label in location. For the entry argument, you can use a number, literal string, formula, or reference to cell containing a number, label or formula. If you use a formula, 1-2-3 enters the result in location. You can add the suffix :s or :v to the entry argument to tell 1-2-3 whether to treat the argument as a literal string or to evaluate the argument before entering it.

{LOOK location}

Records in location the first keystroke in the typeahead buffer. If the buffer is empty, 1-2-3 enters an apostrophe in location.

{MENUBRANCH location}

Displays in the control panel the macro menu found at location and waits for you to select an item from the menu. Then executes the macro instructions associated with the new item.

A macro menu usually consists of at least three rows. The first row indicates the menu items (up to eight), the second row includes descriptions for each menu, and the third row (and any consecutive rows) includes macro instructions for each menu item.

{MENUCALL location}

Like {MENUBRANCH} except that when you select a menu item, 1-2-3 performs the associated macro instructions as a subroutine. 1-2-3 then performs the macro instructions immediately following the {MENUCALL} command.

{ONERROR branch-location, [message-location]}

Traps errors that occur while a macro is running. If an error occurs during a macro after an {ONERROR} command, 1-2-3 branches to the macro instructions in branch-location (optionally recording the error message in message-location) instead of terminating the macro.

{OPEN file-name, access-type}

Opens a new text file with write access (w), or opens an existing text file with either read (r), modify (m), or append access (a).

{PANELOFF [clear]}

Freezes the control panel and status line until 1-2-3 encounters a {PANELON} command or the macro ends. The optional clear argument clears the control panel and status line before freezing them.

{PANELON}

Unfreezes the control panel and status line after {PANELOFF}.

{PUT location, column-offset, row-offset, entry}

Within the range specified as location, enters a number or label in the cell specified with the column and row offset numbers.

{QUIT}

Ends a macro, returning keyboard control to the user.

{READ byte-count, location}

Copies the specified number of bytes (byte-count) from the open text file to location and advances the byte pointer the same number of bytes in the text file.

{READLN location}

Copies the remainder of the current line form the open text file to location and advances the byte pointer to the beginning of the next line in the file.

{RECALC location,[condition],[iterations]}

Recalculates the values in location row by row. The optional condition argument tells 1-2-3 to repeat the recalculation until condition is true. The optional iterations arguments tell 1-2-3 to perform the specified number of recalculation passes.

{RECALCCOL location, [condition],[iterations]}

Like {RECALC} except recalculation proceeds column by column.

{RESTART}

Used in a subroutine to clear the subroutine stack. When 1-2-3 encounters {RESTART}, it finishes the current subroutine, clears the subroutine stack, and ends the macro.

{RETURN}

Ends a subroutine called by a {subroutine}, {MENUCALL}, OR /XC command and returns macro control to the location from which the command was issued. In a subroutine called by a {FOR} command, {RETURN} starts the next repetition of the for loop.

{SETPOS offset-number}

Positions the byte pointer offset-number of bytes after the first byte in the open text file.

{SYSTEM command}

Temporarily suspends 1-2-3 and executes the specified operating system command. When the command is completed, the macro continues.

{WAIT time-number}

Suspends the macro, displays the WAIT mode indicator until the time specified by time-number, for example, {WAIT @NOW+@TIME(0,0,10)}.

{WINDOWSOFF}

Freezes the worksheet area of the screen during a macro until 1-2-3 reaches a {WINDOWSON} command or the macro ends.

{WINDOWSON}

Unfreezes the worksheet area of the screen after {WINDOWSOFF}.

{WRITE string}

Copies string to the open text file, starting at the current byte-pointer position in the open text file.

{WRITELN string}

Same as {WRITE} except that it adds a carriage-return and line-feed sequence to the string it writes to the open file.

APPENDIX B

COMPLETE SERIES OF GUIDANCE

SCREENS FOR RISC2

(ISC2) EXAMPLE PROBLEM

A:P1: READY

```
* * * * *    *    * * * *    * * * *     * * * *
*       *    *    *         *           *       *
* * * * *    *    * * * *   *                 *
*      *     *          *   *              *
*       *    *    * * * *    * * * *    * * * * *
```

RISK-BASED INDUSTRIAL SOURCE COMPLEX (ISC2) DISPERSION MODEL

WELCOME TO RISC2

A STOCHASTIC AIR POLLUTION MODELING PROGRAM

DESIGNED TO GENERATE A MONTE CARLO SIMULATION USING @RISK AND ISC2

IN A LOTUS VERSION 3.1 SHELL

PRESS {ENTER} TO CONTINUE

RISC2.WK3 CMD RUN

A:P21: READY

THIS PROGRAM HAS BEEN DEVELOPED AT

OKLAHOMA STATE UNIVERSITY

STILLWATER , OKLAHOMA 74078

BY

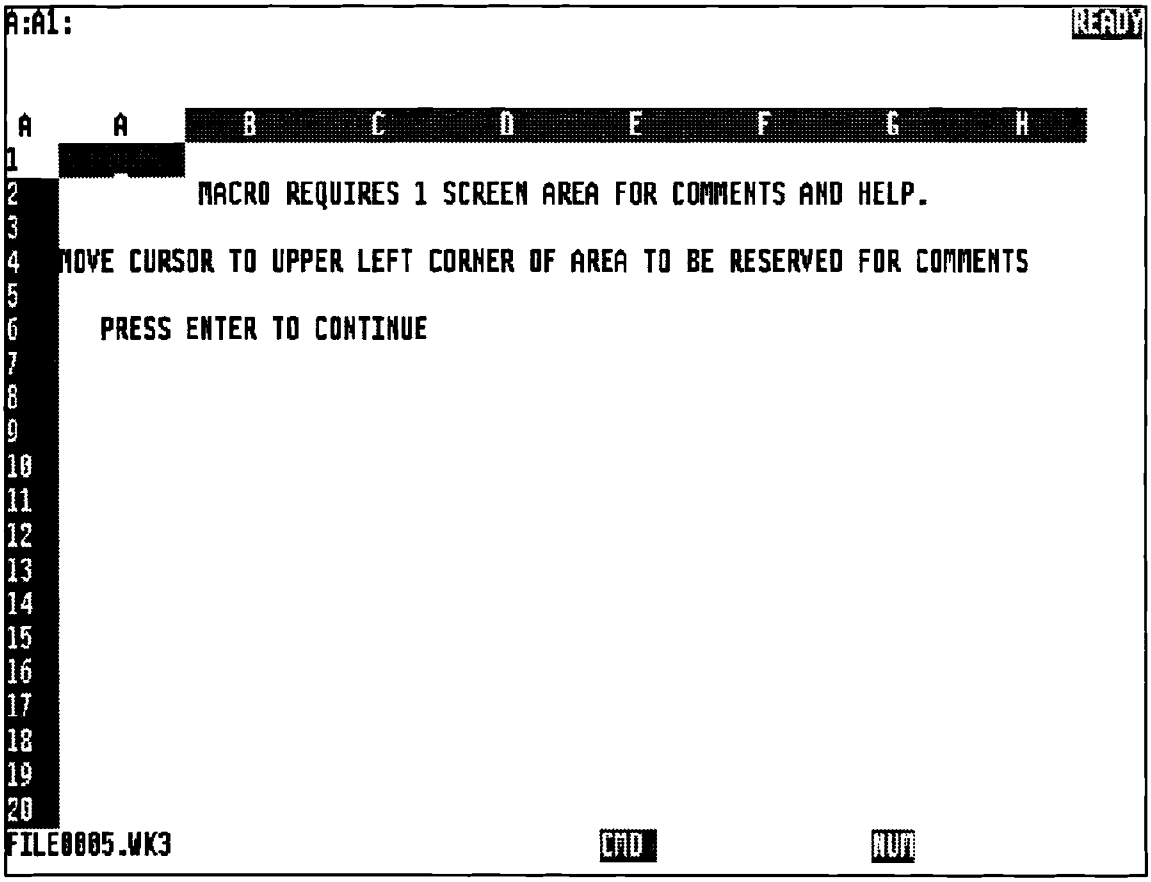
LARRY E LOCKWOOD

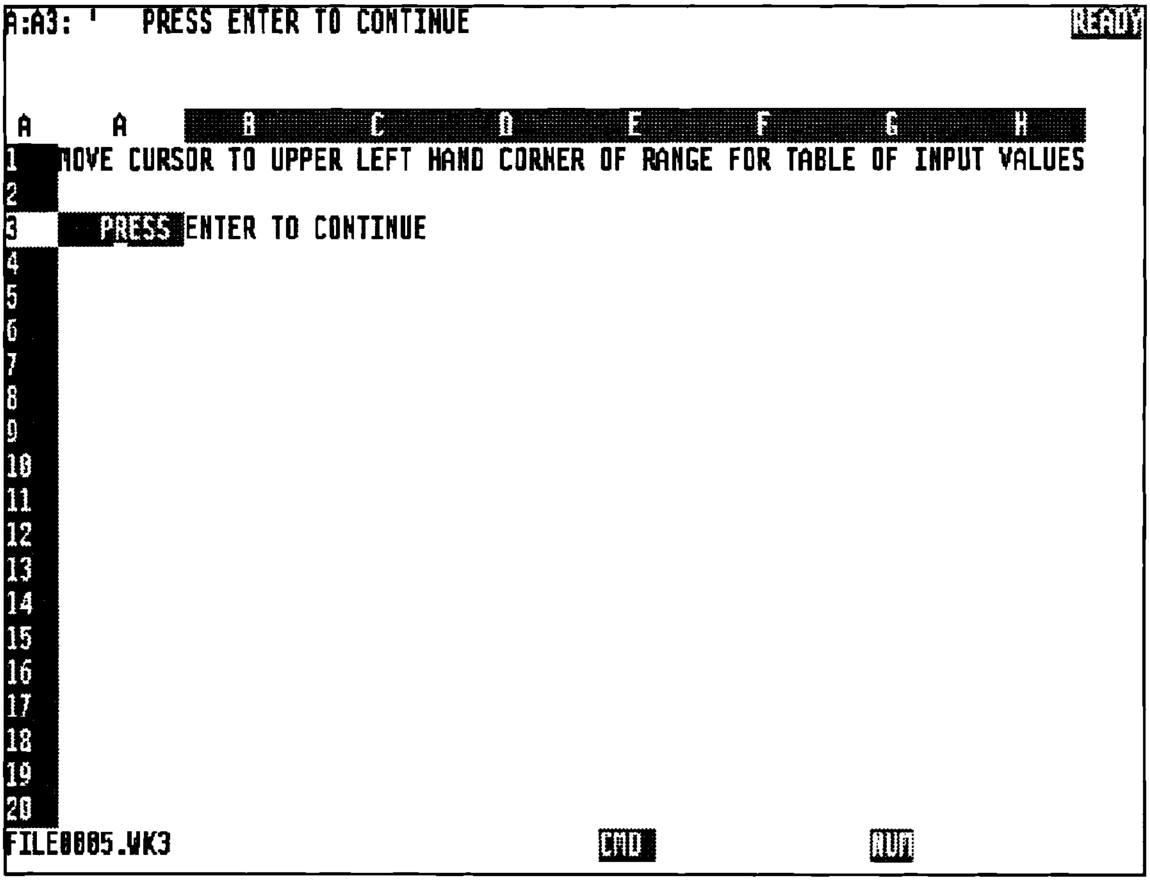
AND

WILLIAM F. McTERNAN

PRESS {ENTER} TO CONTINUE

RISC2.WK3 CMD NUM


A:A1:
READY
A A B C D E F G H
MACRO REQUIRES 1 SCREEN AREA FOR COMMENTS AND HELP.
MOVE CURSOR TO UPPER LEFT CORNER OF AREA TO BE RESERVED FOR COMMENTS
PRESS ENTER TO CONTINUE
FILE0005.WK3
CMD
NUM


A:A3: ' PRESS ENTER TO CONTINUE
READY
A A B C D E F G H
1 MOVE CURSOR TO UPPER LEFT HAND CORNER OF RANGE FOR TABLE OF INPUT VALUES
2
3 PRESS ENTER TO CONTINUE
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
FILE0005.WK3
CMD
NUM

A:A3: [W3] MENU

PREPROCESSOR RISK MODEL FILE QUIT

RUN LOTUS PREPROCESSOR OPTION FOR MODEL

Select Job control functions from menu"

FILE0005.WK3 CMD RUN

```
A:A3: [W3]                                                    MENU
CO  SO  RE  ME  EV  OU  QUIT
OVERALL JOB CONTROL


   Select Job control functions from menu"











FILE0005.WK3                        CMD            NUM
```

```
A:B23: [W10] 'STARTING                                                   MENU
TITLES MODEL OPTS INTERVALS POLLUTION ID RUN OR NOT TERRAIN HEIGHTS MORE QUIT
UP TO 2 LINES OF TITLES MAY BE INPUT

   CO STARTING
















FILE0005.WK3                         CMD              RUN
```

```
A:A1: [W3]                                                        READY
TYPE TITLE 1 (UP TO 80 CHARACTERS) AND PRESS ENTER:  _

   Select Job control functions from menu"

FILE0005.WK3                            CMD            RUN
```

```
A:A19: [W3]                                                              MENU
DFAULT  CONC  DEPOS  RURAL  URBAN  NON-DEFAULT OPTIONS  QUIT
Specifies that the regulatory default options will be used.


   DFAULT -- Specifies that the regulatory default options will be used.

   CONC -- Specifies that CONCentration values will be calculated.

   DEPOS -- Specifies that dry DEPOSition values will be calculated.

   RURAL -- Specifies that RURAL dispersion parameters will be used.

   URBAN -- Specifies that URBAN dispersion parameters will be used.

   GRDRIS -- Use non-default option for gradual plume rise.

   NOSTD -- Use non-default option for no stack-tip downwash.

   NOBID -- Use non-default option for no buoyancy-induced dispersion.

   NOCALM -- Use non-default option to bypass the calms processing routine.

   MSGPRO -- Use non-default option for the missing data processing routine
FILE0005.WK3                                CMD                NUM  CAP
```

```
A:A3: [W3]                                                      MENU
SHORT TERM  LONG TERM  QUIT
Short Term AVERTIME keywords~


   Select short term or long term time interval from menu.















FILE0005.WK3                            CMD             NUM CAP
```

```
A:A3: [W3]                                                                  MENU
TIME1  TIME2  TIME3  TIME4  MONTH  PERIOD  QUIT
AVERAGING PERIOD #1


   Select short term or long term time interval from menu.


FILE0005.WK3                            CMD               NUM CAP
```

```
A:A19: [W3]                                                          READY
ENTER SHORT TERM AVERAGING PERIOD IN HOURS:  _


   Select from the following short term averaging periods:
   Select short term or long term time interval from menu.
     1  (hr)

     2  (hrs)

     3  (hrs)

     4  (hrs)

     6  (hrs)

     8  (hrs)

    12  (hrs)

    24  (hrs)


FILE0005.WK3                         CMD               NUM CAP
```

```
A:A1: [W3]                                                              READY
TYPE NAME OF POLLUTANT (8 CHARACTERS MAX) & PRESS ENTER: _





FILE0005.WK3                          CMD                NUM CAP
```

```
A:A1: [W3]                                                  MENU
RUN  NOT-RUN
RUN MODEL & PERFORM ALL CALCULATIONS





FILE0005.WK3                      CMD            RUN  CAP
```

```
A:B31: [W10] 'STARTING                                                  MENU
LOCATION  DOWNWASH  EMISSIONS  UNITS  VARIABLES  GROUPS  QUIT


   CO STARTING
   CO TITLEONE  TEST TITLE
   CO TITLETWO  TEST
   CO MODELOPT  DFAULT   RURAL    CONC
   CO AVERTIME         3       24 PERIOD
   CO POLLUTID  SO2
   CO RUNORNOT  RUN
   CO FINISHED
   SO STARTING







RISEX.WK3                                  CMD      CALC     NUM
```

A:A5: [W3] READY

ENTER UNIQUE SOURCE ID AND PRESS ENTER : _

ENTER SOURCE ID (UP TO 8 CHARACTERS) AND PRESS ENTER:

SOURCE TYPE, Xs AND Ys COORDINATES MUST BE ENTERED AFTER EACH ID.
THE Zs COORDINATE IS OPTIONAL

FILE0005.WK3 CMD NUM CAP

```
A:A5: [W3]                                                              MENU
Xs  Ys  Zs  SOURCE TYPE
X (EAST-WEST) COORDINATE OF SOURCE LOCATION (IN METERS)

   ENTER SOURCE ID (UP TO 8 CHARACTERS) AND PRESS ENTER:

   SOURCE TYPE, Xs AND Ys COORDINATES MUST BE ENTERED AFTER EACH ID.
   THE Zs COORDINATE IS OPTIONAL

FILE0005.WK3                        CMD              NUM CAP
```

```
A:A6: [W3]                                                          READY
ENTER X COORDINATE (IN METERS) :  _


   THE X (EAST-WEST) AND Y (NORTH-SOUTH) COORDINATES ARE

   THE CENTER OF THE SOURCE FOR POINT AND VOLUME SOURCES AND

   THE SOUTHWEST CORNER OF THE SOURCE FOR AREA SOUCES















FILE0005.WK3                          CMD              RUN  CAP
```

```
A:A6: [W3]                                                        READY
ENTER Y COORDINATE (IN METERS) :  _

   THE X (EAST-WEST) AND Y (NORTH-SOUTH) COORDINATES ARE

   THE CENTER OF THE SOURCE FOR POINT AND VOLUME SOURCES AND

   THE SOUTHWEST CORNER OF THE SOURCE FOR AREA SOUCES

FILE0005.WK3                         CMD           NUM  CAP
```

A:A6: [W3] READY

ENTER THE SOURCE ELEVATION AND PRESS ENTER : _

THE X (EAST-WEST) AND Y (NORTH-SOUTH) COORDINATES ARE

THE CENTER OF THE SOURCE FOR POINT AND VOLUME SOURCES AND

THE SOUTHWEST CORNER OF THE SOURCE FOR AREA SOUCES

FILE0005.WK3 CMD NUM CAP

```
A:A6: [W3]                                                          MENU
POINT  VOLUME  AREA  QUIT
POINT TYPE SOURCE

   THE X (EAST-WEST) AND Y (NORTH-SOUTH) COORDINATES ARE

   THE CENTER OF THE SOURCE FOR POINT AND VOLUME SOURCES AND

   THE SOUTHWEST CORNER OF THE SOURCE FOR AREA SOUCES

FILE0005.WK3                               CMD               NUM CAP
```

```
A:A2: [W3]                                                                    MENU
RATE  HEIGHT  TEMP  VELOCITY  DIAMETER  QUIT
POINT EMISSION RATE IN G/S

    THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.






















FILE0005.WK3                                 CMD                NUM CAP
```

```
A:A1: [W3] 'THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.      READY
ENTER POINT EMISSION RATE IN G/S :  _


   THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.




FILE0005.WK3                         CMD              NUM CAP
```

```
A:A1: [W3] 'THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.       READY
ENTER RELEASE HEIGHT ABOVE GROUND (IN METERS) :  _


   THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.











FILE0005.WK3                               CMD            NUM CAP
```

```
A:A1: [W3] 'THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.        READY
ENTER STACK GAS EXIT TEMPERATURE (DEGREES K) : _


    THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.











FILE0005.WK3                                CMD                NUM CAP
```

```
A:A1: [W3] 'THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.     READY
ENTER STACK GAS EXIT VELOCITY (M/S) :  _

   THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.

FILE0005.WK3                          CMD              NUM CAP
```

```
A:A1: [W3] 'THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.      READY
ENTER STACK INSIDE DIAMETER (IN METERS) : _

   THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES.

FILE0005.WK3                              CMD               NUM CAP
```

```
A:A2: [W3]                                                          MENU
HEIGHT  WIDTH  LOWBOUND  RETURN
BUILDING HEIGHTS (IN METERS)

   BUILDING DOWNWASH ALGORITHMS DO NOT APLY TO VOLUME OR AREA SOURCES.




FILE0005.WK3                      CMD              NUM CAP
```

```
A:A7: [W3]                                                            READY
ENTER SOURCE ID FOR SELECTED SOURCE :  _


   SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION

   USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY

   A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED
   BY A DASH,  i.e.  STACK1-STACK10.  (NOTE NO SPACES BETWEEN ID'S)















FILE0005.WK3                          CMD              NUM CAP
```

A:A10: [W3] READY

ENTER BUILDING HEIGHT (METERS) FOR 10 DEGREES :_

FOR THE SHORT TERM MODEL --

USER INPUTS 36 DIRECTION-SPECIFIC BUILDING HEIGHTS (IN METERS)

BEGINNING WITH THE 10 DEGREE FLOW VECTOR (WIND BLOWING TOWARD 10

DEGREES FROM NORTH) AND INCREMENTING BY 10 DEGREES

IN A CLOCKWISE DIRECTION

FILE0005.WK3 CMD NUM CAP

```
A:A7: [W3]                                                               READY
ENTER SOURCE ID FOR SELECTED SOURCE :  _


   SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION

   USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING WIDTHS APPLY.

   A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED
   BY A DASH, i.e.  STACK1-STACK10.  (NOTE NO SPACES BETWEEN ID'S)




FILE0005.WK3                              CMD              NUM CAP
```

```
A:A10: [W3]                                                              READY
ENTER BUILDING WIDTH (METERS) FOR 10 DEGREES :_


   FOR THE SHORT TERM MODEL --

   USER INPUTS 36 DIRECTION-SPECIFIC BUILDING WIDTHS (IN METERS)

   BEGINNING WITH THE 10 DEGREE FLOW VECTOR (WIND BLOWING TOWARD 10

   DEGREES FROM NORTH) AND INCREMENTING BY 10 DEGREES

   IN A CLOCKWISE DIRECTION


FILE0005.WK3                        CMD                 NUM CAP
```

```
A:A5: [W3] 'THAT INCLUDES ALL SOURCES MODELED FOR A PARTICULAR RUN.          READY
ENTER GROUP ID (UP TO 8 CHARACTERS) FOR SELECTED GROUP : _


   THE GROUP ID IS A UNIQUE IDENTIFIER FOR EACH GROUP OF SOURCES

   THE GROUP ID "ALL" IS USED TO AUTOMATICALLY SETUP A SOURCE GROUP CALL "A

   THAT INCLUDES ALL SOURCES MODELED FOR A PARTICULAR RUN.



FILE0005.WK3                              CMD              NUM CAP
```

```
A:B40: [W10] 'STARTING                                                      MENU
GRID DISCRETE CARTESIAN DISCRETE POLAR PLANT BOUNDARY BOUNDARY ELEVATIONS QUIT
Select cartesian or polar grid system

   CO RUNORNOT  RUN
   CO FINISHED
   SO STARTING
   SO LOCATION  STACK1   POINT         0        0        0
   SO SRCPARAM  STACK1       1        35      432     11.7      2.4
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDWID  STACK1   35.43     36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1    25.5     20.56       15    20.56     25.5
   SO BUILDWID  STACK1   32.92     35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1      15     20.56     25.5    29.66    32.92
   SO BUILDWID  STACK1   36.37     36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1   35.43     36.45        0    35.18    32.92
   SO SRCGROUP ALL
   SO FINISHED
   RE STARTING
FILE0005.WK3                        CMD                 NUM CAP
```

A:A4: [W3] MENU
CARTESIAN POLAR
Select cartesian grid system

PROGRAM WILL ALLOW 5 GRIDDED RECEPTOR NETWORKS OF EITHER (OR BOTH)

TYPES IN A SINGLE RUN, PLUS DISCRETE RECEPTORS OF EITHER TYPE.

FILE0005.WK3 CMD NUM CAP

```
A:D49: 'STA                                                                          READY
ENTER GRID ID (UP TO 8 ALPHANUMERIC CHARACTERS:   POL1_


    CO FINISHED
    SO STARTING
    SO LOCATION  STACK1   POINT            0        0        0
    SO SRCPARAM  STACK1        1          35      432     11.7      2.4
    SO BUILDHGT  STACK1       34          34       34       34       34
    SO BUILDHGT  STACK1       34          34       34       34       34
    SO BUILDHGT  STACK1       34          34       34       34       34
    SO BUILDHGT  STACK1       34          34       34       34       34
    SO BUILDHGT  STACK1       34          34       34       34       34
    SO BUILDHGT  STACK1       34          34       34       34       34
    SO BUILDWID  STACK1    35.43       36.45    36.37    35.18    32.92
    SO BUILDWID  STACK1     25.5       20.56       15    20.56     25.5
    SO BUILDWID  STACK1    32.92       35.18    36.37    36.45     25.5
    SO BUILDWID  STACK1       15       20.56     25.5    29.66    32.92
    SO BUILDWID  STACK1    36.37       36.45    35.43    33.33    35.43
    SO BUILDWID  STACK1    35.43       36.45        0    35.18    32.92
    SO SRCGROUP  ALL
    SO FINISHED
    RE STARTING
    RE GRIDPOLR           STA
FILE0005.WK3                                   CMD                 NUM CAP
```

```
A:D49: 'STA                                                                          MENU
ORIGIN DISTANCES DISCRETE DIR GENERATED DIR ELEVATIONS FLAGPOLE NEW NETWORK END
Specify origin of the Polar network

   CO FINISHED
   SO STARTING
   SO LOCATION  STACK1   POINT         0        0        0
   SO SRCPARAM  STACK1       1        35      432     11.7      2.4
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDHGT  STACK1      34        34       34       34       34
   SO BUILDWID  STACK1   35.43     36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1    25.5     20.56       15    20.56     25.5
   SO BUILDWID  STACK1   32.92     35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1      15     20.56     25.5    29.66    32.92
   SO BUILDWID  STACK1   36.37     36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1   35.43     36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
FILE0005.WK3                            CMD                  NUM CAP
```

```
A:F50:                                                                    READY
ENTER X COORDINATE FOR ORIGIN OF POLAR NETWORK:   _


    SO STARTING
    SO LOCATION  STACK1   POINT         0        0        0
    SO SRCPARAM  STACK1       1        35      432     11.7      2.4
    SO BUILDHGT  STACK1      34        34       34       34       34
    SO BUILDHGT  STACK1      34        34       34       34       34
    SO BUILDHGT  STACK1      34        34       34       34       34
    SO BUILDHGT  STACK1      34        34       34       34       34
    SO BUILDHGT  STACK1      34        34       34       34       34
    SO BUILDHGT  STACK1      34        34       34       34       34
    SO BUILDWID  STACK1   35.43     36.45    36.37    35.18    32.92
    SO BUILDWID  STACK1    25.5     20.56       15    20.56     25.5
    SO BUILDWID  STACK1   32.92     35.18    36.37    36.45     25.5
    SO BUILDWID  STACK1      15     20.56     25.5    29.66    32.92
    SO BUILDWID  STACK1   36.37     36.45    35.43    33.33    35.43
    SO BUILDWID  STACK1   35.43     36.45        0    35.18    32.92
    SO SRCGROUP  ALL
    SO FINISHED
    RE STARTING
    RE GRIDPOLR  POL1     STA
    RE GRIDPOLR  POL1     ORIG
FILE0005.WK3                           CMD               NUM CAP
```

```
A:E51:                                                                   READY
ENTER DISTANCE TO FIRST RING OF POLAR COORDINATES (IN METERS):  _


   SO LOCATION  STACK1   POINT           0        0        0
   SO SRCPARAM  STACK1          1       35      432     11.7      2.4
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDWID  STACK1      35.43    36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1       25.5    28.56       15    28.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1         15    28.56     25.5    29.66    32.92
   SO BUILDWID  STACK1      36.37    36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1      35.43    36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG            0        0
   RE GRIDPOLR  POL1     DIST
FILE0005.WK3                                 CMD               NUM CAP
```

```
A:F51: 200                                                        READY
DO YOU WANT TO CONTINUE WITH ANOTHER RING (Y or N) ? _


   SO LOCATION  STACK1   POINT          0        0        0
   SO SRCPARAM  STACK1          1      35      432     11.7      2.4
   SO BUILDHGT  STACK1         34      34       34       34       34
   SO BUILDHGT  STACK1         34      34       34       34       34
   SO BUILDHGT  STACK1         34      34       34       34       34
   SO BUILDHGT  STACK1         34      34       34       34       34
   SO BUILDHGT  STACK1         34      34       34       34       34
   SO BUILDHGT  STACK1         34      34       34       34       34
   SO BUILDWID  STACK1      35.43   36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1       25.5   20.56       15    20.56     25.5
   SO BUILDWID  STACK1      32.92   35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1         15   20.56     25.5    29.66    32.92
   SO BUILDWID  STACK1      36.37   36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1      35.43   36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG           0        0
   RE GRIDPOLR  POL1     DIST         100      200
FILE0005.WK3                          CMD                 NUM CAP
```

```
A:G52:                                                                        READY
ENTER NUMBER OF DIRECTIONS USED TO DEFINE POLAR GRID:  _


   SO SRCPARAM  STACK1           1      35     432    11.7     2.4
   SO BUILDHGT  STACK1          34      34      34      34      34
   SO BUILDHGT  STACK1          34      34      34      34      34
   SO BUILDHGT  STACK1          34      34      34      34      34
   SO BUILDHGT  STACK1          34      34      34      34      34
   SO BUILDHGT  STACK1          34      34      34      34      34
   SO BUILDHGT  STACK1          34      34      34      34      34
   SO BUILDWID  STACK1       35.43   36.45   36.37   35.18   32.92
   SO BUILDWID  STACK1        25.5   20.56      15   20.56    25.5
   SO BUILDWID  STACK1       32.92   35.18   36.37   36.45    25.5
   SO BUILDWID  STACK1          15   20.56    25.5   29.66   32.92
   SO BUILDWID  STACK1       36.37   36.45   35.43   33.33   35.43
   SO BUILDWID  STACK1       35.43   36.45       0   35.18   32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1    STA
   RE GRIDPOLR  POL1    ORIG             0       0
   RE GRIDPOLR  POL1    DIST           100     200     300     500
   RE GRIDPOLR  POL1    GDIR
FILE0005.WK3                            CMD                 NUM CAP
```

```
A:G52:                                                                   READY
ENTER STARTING DIRECTION OF THE POLAR GRID:  _


   SO SRCPARAM  STACK1          1       35      432     11.7      2.4
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDWID  STACK1      35.43    36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1       25.5    28.56       15    28.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1         15    28.56     25.5    29.66    32.92
   SO BUILDWID  STACK1      36.37    36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1      35.43    36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG           0        0
   RE GRIDPOLR  POL1     DIST         100      200      300      500
   RE GRIDPOLR  POL1     GDIR          36
FILE0005.WK3                           CMD                 NUM  CAP
```

A:G52:

ENTER INCREMENT (IN DEGREES) FOR DEFINING DIRECTIONS: _

READY

SO	SRCPARAM	STACK1		1	35	432	11.7	2.4
SO	BUILDHGT	STACK1		34	34	34	34	34
SO	BUILDHGT	STACK1		34	34	34	34	34
SO	BUILDHGT	STACK1		34	34	34	34	34
SO	BUILDHGT	STACK1		34	34	34	34	34
SO	BUILDHGT	STACK1		34	34	34	34	34
SO	BUILDHGT	STACK1		34	34	34	34	34
SO	BUILDWID	STACK1		35.43	36.45	36.37	35.18	32.92
SO	BUILDWID	STACK1		25.5	20.56	15	20.56	25.5
SO	BUILDWID	STACK1		32.92	35.18	36.37	36.45	25.5
SO	BUILDWID	STACK1		15	20.56	25.5	29.66	32.92
SO	BUILDWID	STACK1		36.37	36.45	35.43	33.33	35.43
SO	BUILDWID	STACK1		35.43	36.45	0	35.18	32.92
SO	SRCGROUP	ALL						
SO	FINISHED							
RE	STARTING							
RE	GRIDPOLR	POL1	STA					
RE	GRIDPOLR	POL1	ORIG	0	0			
RE	GRIDPOLR	POL1	DIST	100	200	300	500	
RE	GRIDPOLR	POL1	GDIR	36	10			

FILE0005.WK3 CMD NUM CAP

```
A:B55: [W10] 'STARTING                                                   MENU
FILENAME  HEIGHT  STATION  PERIOD  DATA  RETURN
Specify filename and format information for input file

    SO BUILDHGT  STACK1          34       34       34       34       34
    SO BUILDHGT  STACK1          34       34       34       34       34
    SO BUILDHGT  STACK1          34       34       34       34       34
    SO BUILDHGT  STACK1          34       34       34       34       34
    SO BUILDWID  STACK1       35.43    36.45    36.37    35.18    32.92
    SO BUILDWID  STACK1        25.5    20.56       15    20.56     25.5
    SO BUILDWID  STACK1       32.92    35.18    36.37    36.45     25.5
    SO BUILDWID  STACK1          15    20.56     25.5    29.66    32.92
    SO BUILDWID  STACK1       36.37    36.45    35.43    33.33    35.43
    SO BUILDWID  STACK1       35.43    36.45        0    35.18    32.92
    SO SRCGROUP  ALL
    SO FINISHED
    RE STARTING
    RE GRIDPOLR  POL1     STA
    RE GRIDPOLR  POL1     ORIG          0        0
    RE GRIDPOLR  POL1     DIST        100      200      300      500
    RE GRIDPOLR  POL1     GDIR         36       10       10
    RE GRIDPOLR  POL1     END
    RE FINISHED
    ME STARTING
FILE0005.WK3                                    CMD                NUM CAP
```

```
A:E56:                                                                        READY
ENTER FILE NAME (INCLUDE DOS PATH IF FILE IS NOT IN CURRENT DIRECTORY):     _


   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDHGT  STACK1         34       34       34       34       34
   SO BUILDWID  STACK1      35.43    36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1       25.5    20.56       15    20.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1         15    20.56     25.5    29.66    32.92
   SO BUILDWID  STACK1      36.37    36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1      35.43    36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG               0        0
   RE GRIDPOLR  POL1     DIST             100      200      300      500
   RE GRIDPOLR  POL1     GDIR              36       10       10
   RE GRIDPOLR  POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL
FILE0005.WK3                                CMD                 NUM CAP
```

```
A:A20: [W3] 'See Page 3-51 through 3-55 for details                    MENU
BLANK  READ  FREE  UNFORM  CARD  RETURN
Specifies default format

                  OPTIONAL FILE FORMATS


    BLANK  -- Specifies the default ASCII format for sequential hourly file.

    READ   -- Specifies the Fortran READ format for an ASCII sequential
              hourly file  (See page 3-53 in manual).

    FREE   -- Specifies free-formated READs for an ASCII sequential hourly
              file.

    UNFORM -- Specifies an unformatted file generated by the RAMMET or MPRM
              preprocessors.

    CARD   -- Specifies use of "card image" data using a default ASCII forma
                This option differs from option 1 (blank) by addition of
                hourly wind profile exponents and hourly vertical potential
                temperature gradients in the input file.
                                                                    N
    See Page 3-51 through 3-55 for details
FILE0005.WK3                                        CMD                NUM  CAP
```

```
A:D57:                                                                    READY
ENTER HEIGHT OF ANEMOMETER ABOVE GROUND IN METERS OR FEET:   _


   SO BUILDHGT   STACK1          34       34       34       34       34
   SO BUILDHGT   STACK1          34       34       34       34       34
   SO BUILDWID   STACK1       35.43    36.45    36.37    35.18    32.92
   SO BUILDWID   STACK1        25.5    28.56       15    28.56     25.5
   SO BUILDWID   STACK1       32.92    35.18    36.37    36.45    35.43
   SO BUILDWID   STACK1       35.43    36.45        0    35.18    32.92
   SO BUILDWID   STACK1        25.5    28.56       15    28.56     25.5
   SO BUILDWID   STACK1       32.92    35.18    36.37    36.45    35.43
   SO SRCGROUP   ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR   POL1     STA
   RE GRIDPOLR   POL1     ORIG             0        0
   RE GRIDPOLR   POL1     DIST           100      200      300      500
   RE GRIDPOLR   POL1     GDIR            36       10       10
   RE GRIDPOLR   POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL   prepit.asc
   ME ANEMHGHT
RISEX.WK3                                    CMD      CALC      NUM
```

```
A:D57:                                                                    READY
ENTER UNITS OF MEASUREMENT FOR ANEMOMETER HEIGHT (METERS OR FEET):  _


   SO            STACK1           34       34       34       34       34
   SO            STACK1           34       34       34       34       34
   SO BUILDWID   STACK1        35.43    36.45    36.37    35.18    32.92
   SO BUILDWID   STACK1         25.5    28.56       15    28.56     25.5
   SO BUILDWID   STACK1        32.92    35.18    36.37    36.45     25.5
   SO BUILDWID   STACK1           15    28.56     25.5    29.66    32.92
   SO BUILDWID   STACK1        36.37    36.45    35.43    33.33    35.43
   SO BUILDWID   STACK1        35.43    36.45        0    35.18    32.92
   SO SRCGROUP   ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR   POL1     STA
   RE GRIDPOLR   POL1     ORIG             0        0
   RE GRIDPOLR   POL1     DIST           100      200      300      500
   RE GRIDPOLR   POL1     GDIR            36       10       10
   RE GRIDPOLR   POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL   PREPIT.ASC
   ME ANEMHGHT         20
FILE0005.WK3                          CMD                NUM CAP
```

```
A:G50:                                                                                    MENU
SURFDATA  UAIRDATA
Specifies surface meteorological station

    SO           STACK1          34        34        34        34        34
    SO BUILDWID  STACK1       35.43     36.45     36.37     35.10     32.92
    SO BUILDWID  STACK1        25.5     20.56        15     20.56      25.5
    SO BUILDWID  STACK1       32.92     35.10     36.37     36.45      25.5
    SO BUILDWID  STACK1          15     20.56      25.5     29.66     32.92
    SO BUILDWID  STACK1       36.37     36.45     35.43     33.33     35.43
    SO BUILDWID  STACK1       35.43     36.45         0     35.10     32.92
    SO SRCGROUP  ALL
    SO FINISHED
    RE STARTING
    RE GRIDPOLR  POL1     STA
    RE GRIDPOLR  POL1     ORIG                0         0
    RE GRIDPOLR  POL1     DIST              100       200       300       500
    RE GRIDPOLR  POL1     GDIR               36        10        10
    RE GRIDPOLR  POL1     END
    RE FINISHED
    ME STARTING
    ME INPUTFIL  PREPIT.ASC
    ME ANEMHGHT        20 FEET
    ME
FILE0005.WK3                                        CMD                  NUM CAP
```

```
A:G58:                                                                  READY
ENTER 5 DIGIT  WBAN  NUMBER FOR NWS STATIONS:  _


   SO          STACK1          34      34      34      34      34
   SO BUILDWID STACK1       35.43   36.45   36.37   35.18   32.92
   SO BUILDWID STACK1        25.5   28.56      15   28.56    25.5
   SO BUILDWID STACK1       32.92   35.18   36.37   36.45    25.5
   SO BUILDWID STACK1          15   28.56    25.5   29.66   32.92
   SO BUILDWID STACK1       36.37   36.45   35.43   33.33   35.43
   SO BUILDWID STACK1       35.43   36.45       8   35.18   32.92
   SO SRCGROUP ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR POL1    STA
   RE GRIDPOLR POL1    ORIG            8       8
   RE GRIDPOLR POL1    DIST          100     200     300     500
   RE GRIDPOLR POL1    GDIR           36      10      10
   RE GRIDPOLR POL1    END
   RE FINISHED
   ME STARTING
   ME INPUTFIL PREPIT.ASC
   ME ANEMHGHT      20 FEET
   ME SURFDATA
FILE0005.WK3                            CMD            NUM CAP
```

```
A:G50:                                                                    READY
ENTER YEAR FOR WHICH DATA IS BEING PROCESSED (2 OR 4 DIGITS):  _


   SO           STACK1         34       34       34       34       34
   SO BUILDWID  STACK1      35.43    36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1       25.5    20.56       15    20.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45     25.5
   SO BUILDWID  STACK1         15    20.56     25.5    29.66    32.92
   SO BUILDWID  STACK1      36.37    36.45    35.43    33.33    35.43
   SO BUILDWID  STACK1      35.43    36.45        0    35.18    32.92
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG              0        0
   RE GRIDPOLR  POL1     DIST            100      200      300      500
   RE GRIDPOLR  POL1     GDIR             36       10       10
   RE GRIDPOLR  POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL  PREPIT.ASC
   ME ANEMHGHT        20 FEET
   ME SURFDATA     94823
FILE0005.WK3                                 CMD               NUM  CAP
```

```
A:G58:                                                                    READY
ENTER NAME OF STATION (OPTIONAL - UP TO 40 CHARACTERS):  _


   SO          STACK1          34        34        34        34        34
   SO BUILDWID STACK1       35.43     36.45     36.37     35.18     32.92
   SO BUILDWID STACK1        25.5     20.56        15     20.56      25.5
   SO BUILDWID STACK1       32.92     35.18     36.37     36.45      25.5
   SO BUILDWID STACK1          15     20.56      25.5     29.66     32.92
   SO BUILDWID STACK1       36.37     36.45     35.43     33.33     35.43
   SO BUILDWID STACK1       35.43     36.45         0     35.18     32.92
   SO SRCGROUP ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR POL1     STA
   RE GRIDPOLR POL1     ORIG              0         0
   RE GRIDPOLR POL1     DIST            100       200       300       500
   RE GRIDPOLR POL1     GDIR             36        10        10
   RE GRIDPOLR POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL PREPIT.ASC
   ME ANEMHGHT       20 FEET
   ME SURFDATA    94823     1964
FILE0005.WK3                                CMD                    NUM CAP
```

```
A:G59: "                                                                    MENU
SURFDATA  UAIRDATA
Specifies upper air station

   SO BUILDWID  STACK1      35.43    36.45    36.37    35.18    32.92
   SO BUILDWID  STACK1       25.5    20.56       15    20.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45    35.43
   SO BUILDWID  STACK1      35.43    36.45        0    35.18    32.92
   SO BUILDWID  STACK1       25.5    20.56       15    20.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45    35.43
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG             0        0
   RE GRIDPOLR  POL1     DIST           100      200      300      500
   RE GRIDPOLR  POL1     GDIR            36       10       10
   RE GRIDPOLR  POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL  PREPIT.ASC
   ME ANEMHGHT        20 FEET
   ME SURFDATA     94823     1964 PITTSBURG
   ME
RISEX.WK3                                  CMD      CALC      NUM CAP
```

```
A:B61: [W10] 'STARTING                                                      MENU
TABULAR  SPECIAL PURPOSE  QUIT
Select tabular output options

   SO BUILDWID  STACK1       32.92     35.18     36.37     36.45     35.43
   SO BUILDWID  STACK1       35.43     36.45         0     35.18     32.92
   SO BUILDWID  STACK1        25.5     20.56        15     20.56      25.5
   SO BUILDWID  STACK1       32.92     35.18     36.37     36.45     35.43
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1      STA
   RE GRIDPOLR  POL1      ORIG             0         0
   RE GRIDPOLR  POL1      DIST           100       200       300       500
   RE GRIDPOLR  POL1      GDIR            36        10        10
   RE GRIDPOLR  POL1      END
   RE FINISHED
   ME STARTING
   ME INPUTFIL  PREPIT.ASC
   ME ANEMHGHT        20 FEET
   ME SURFDATA     94823     1964 PITTSBURG
   ME UAIRDATA     94823     1964 PITTSBURG
   ME FINISHED
   OU STARTING
RISEX.WK3                                  CMD       CALC      NUM CAP
```

```
A:B61: [W10] 'STARTING                                                    MENU
RECEPTOR TABLE  MAXIMUM VALUE TABLE  CONCURRENT VALUES  RETURN
Specify output options for high value summary tables by receptor

   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45    35.43
   SO BUILDWID  STACK1      35.43    36.45        0    35.18    32.92
   SO BUILDWID  STACK1       25.5    28.56       15    28.56     25.5
   SO BUILDWID  STACK1      32.92    35.18    36.37    36.45    35.43
   SO SRCGROUP  ALL
   SO FINISHED
   RE STARTING
   RE GRIDPOLR  POL1     STA
   RE GRIDPOLR  POL1     ORIG             0        0
   RE GRIDPOLR  POL1     DIST           100      200      300      500
   RE GRIDPOLR  POL1     GDIR            36       10       10
   RE GRIDPOLR  POL1     END
   RE FINISHED
   ME STARTING
   ME INPUTFIL  PREPIT.ASC
   ME ANEMHGHT        20 FEET
   ME SURFDATA     94823     1964 PITTSBURG
   ME UAIRDATA     94823     1964 PITTSBURG
   ME FINISHED
   OU STARTING
RISEX.WK3                                  CMD      CALC     NUM CAP
```

```
A:A16: [W3] 'WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PE READY
ENTER THE SHORT TERM AVERAGING PERIOD :  _


   THE SHORT TERM AVERAGING PERIOD IS THE PERIOD

            (i.e. 1, 3, 8, or 24 hrs OR MONTH)

   FOR WHICH THE RECEPTOR TABLE IS SELECTED.

   THE SECONDARY KEYWORDS "FIRST", "SECOND", "THIRD", "FOURTH"

   FIFTH", & "SIXTH" (OR "1ST", "2ND", "3RD" ETC) SPECIFY WHICH HIGH

   VALUES ARE TO BE SUMMARIZED BY RECEPTOR FOR THAT AVERAGING PERIOD.


   ENTERING THE KEYWORD "ALLAVE" FOR THE SHORT TERM AVARAGING PERIOD

   WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS



RISEX.WK3                          CMD      CALC     NUM CAP
```

```
A:A16: [W3] 'WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PER MENU
FIRST  SECOND  THIRD  FOURTH  FIFTH  SIXTH  RETURN
HIGH VALUES TO BE SUMMARIES

    THE SHORT TERM AVERAGING PERIOD IS THE PERIOD

              (i.e. 1, 3, 8, or 24 hrs OR MONTH)

    FOR WHICH THE RECEPTOR TABLE IS SELECTED.

    THE SECONDARY KEYWORDS "FIRST", "SECOND", "THIRD", "FOURTH"

    FIFTH", & "SIXTH" (OR "1ST", "2ND", "3RD" ETC) SPECIFY WHICH HIGH

    VALUES ARE TO BE SUMMARIZED BY RECEPTOR FOR THAT AVERAGING PERIOD.

    ENTERING THE KEYWORD "ALLAVE" FOR THE SHORT TERM AVARAGING PERIOD

    WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS



RISEX.WK3                                 CMD        CALC      NUM CAP
```

```
A:A14: [W3] 'WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PEREADY
ENTER THE NUMBER OF OVERALL MAXIMUM VALUES TO BE SUMMARIZED: _

   THE SHORT TERM AVERAGING PERIOD IS THE PERIOD

           (i.e. 1, 3, 8, or 24 hrs OR MONTH)

   FOR WHICH THE RECEPTOR TABLE IS SELECTED

   THE SECONDARY KEYWORD SPECIFIES THE NUMBER OF OVERALL MAXIMUM VALUES

   TO BE SUMMARIZED FOR EACH AVERAGING PERIOD.

   ENTERING THE KEYWORD "ALLAVE" FOR THE SHORT TERM AVARAGING PERIOD

   WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS

RISEX.WK3                                   CMD      CALC     NUM CAP
```

```
A:A3: [W3]                                                        READY
IS THIS A NEW (N) OR EXISTING (E) FILE? (ENTER N OR E): _



    INCLUDE DOS PATH IN EACH FILENAME












                                                          EXAMPLE.DAT

RISEX.WK3                                  CMD       CALC      NUM CAP
```

A:A24: [W3] "CO MENU

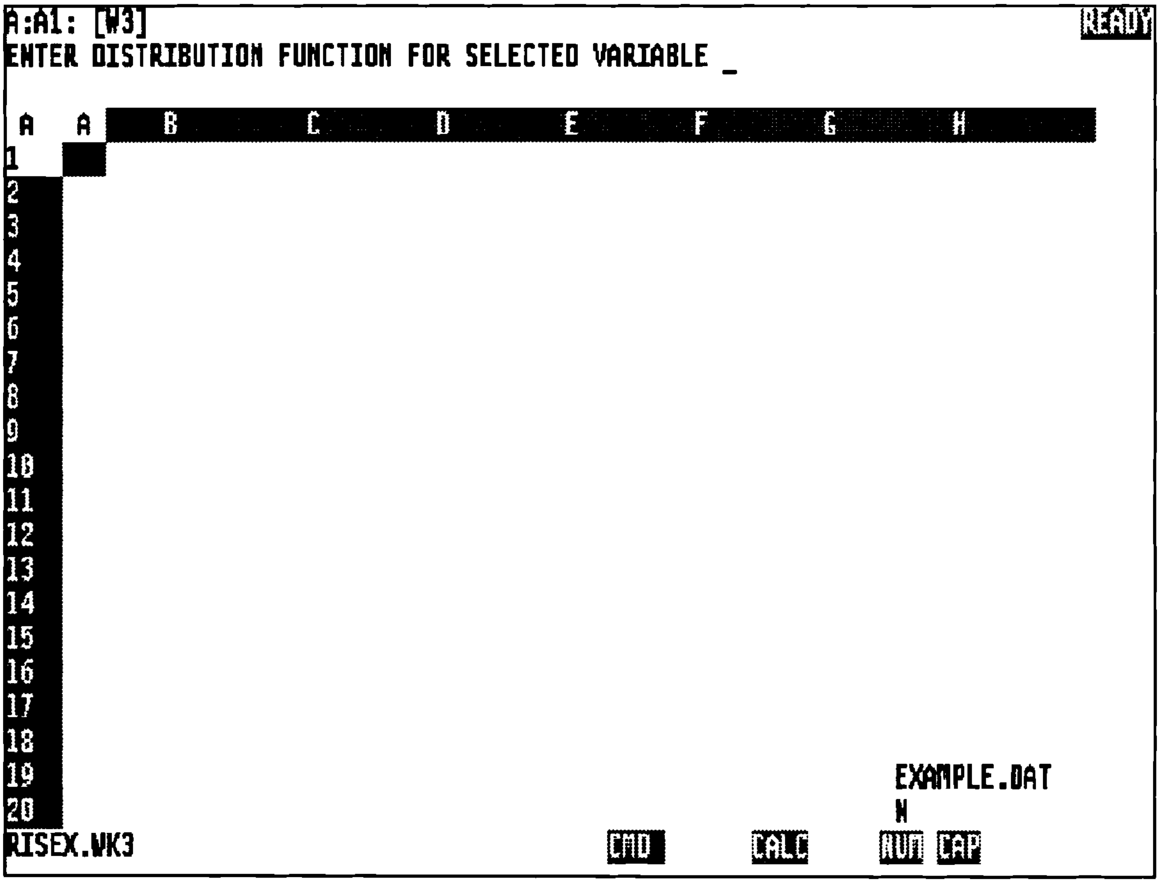
LOAD SELECT OUTPUT ITERATIONS RUN VIEW MAIN QUIT

LOAD @RISK ADDIN

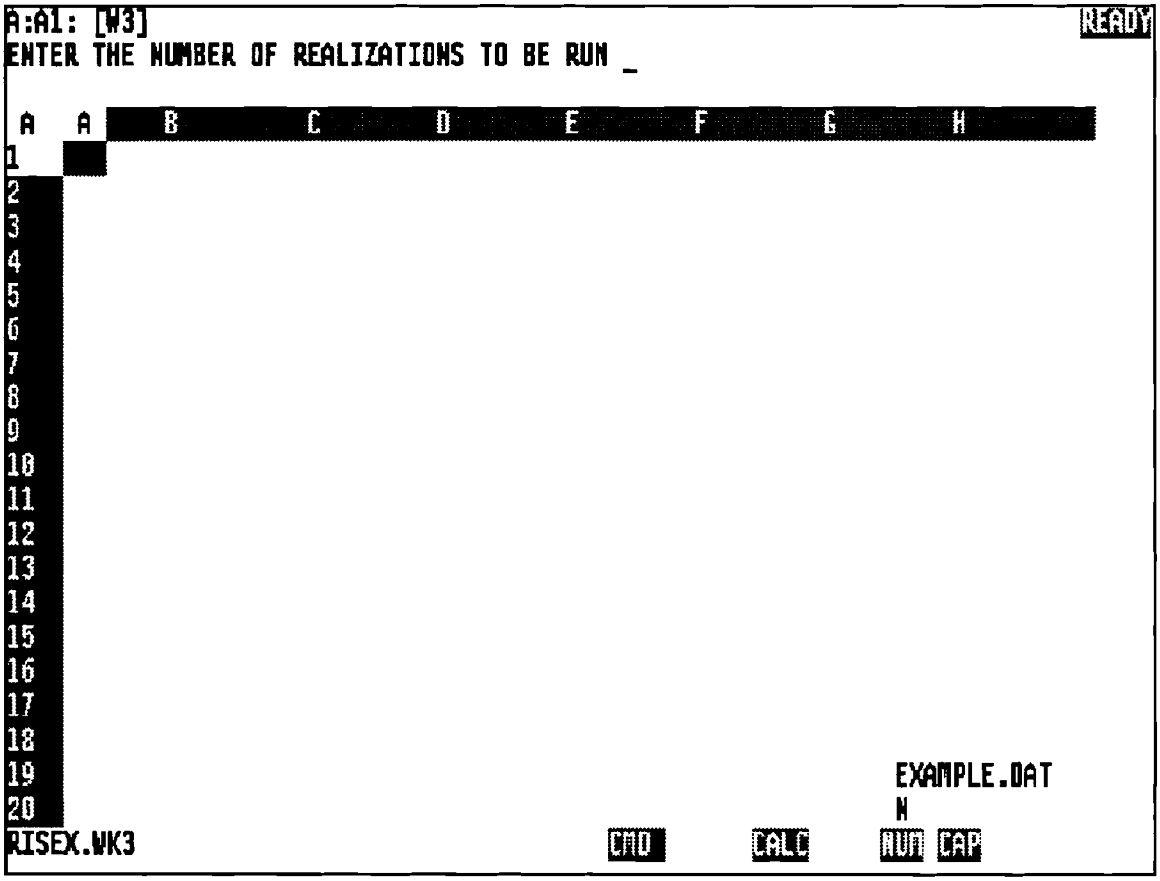
A	A	B	C	D	E	F	G	H
23	CO	STARTING						
24	CO	TITLEONE	TEST TITLE					
25	CO	TITLETWO	TEST					
26	CO	MODELOPT	DFAULT	RURAL	CONC			
27	CO	AVERTIME	3	24	PERIOD			
28	CO	POLLUTID	SO2					
29	CO	RUNORNOT	RUN					
30	CO	FINISHED						
31	SO	STARTING						
32	SO	LOCATION	STACK1	POINT	0	0	0	
33	SO	SRCPARAM	STACK1	1	35	432	11.7	2.4
34	SO	BUILDHGT	STACK1	34	34	34	34	34
35	SO	BUILDHGT	STACK1	34	34	34	34	34
36	SO	BUILDHGT	STACK1	34	34	34	34	34
37	SO	BUILDHGT	STACK1	34	34	34	34	34
38	SO	BUILDHGT	STACK1	34	34	34	34	34
39	SO	BUILDHGT	STACK1	34	34	34	34	34
40	SO	BUILDWID	STACK1	35.43	36.45	36.37	35.18	32.92
41	SO	BUILDWID	STACK1	25.5	20.56	15	20.56	25.5
42	SO	BUILDWID	STACK1	32.92	35.18	36.37	36.45	35.43

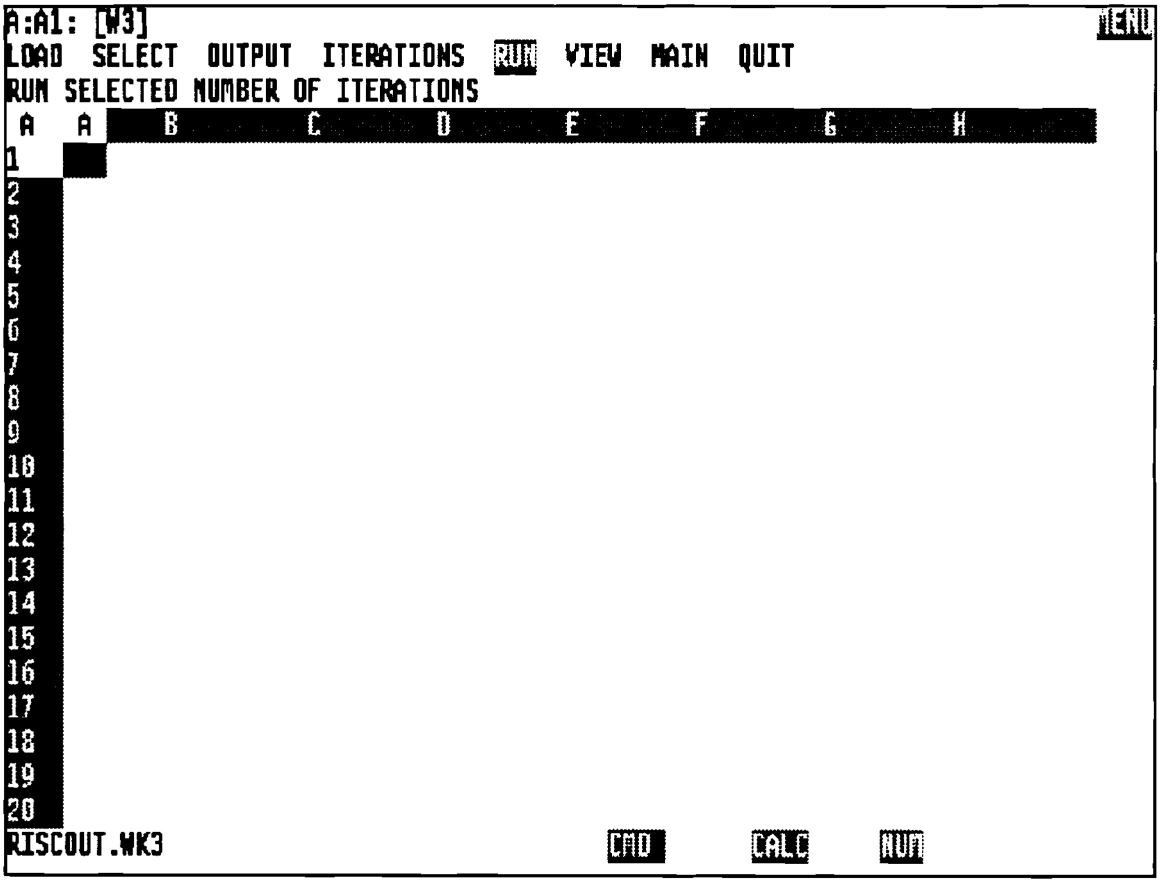
RISEX.WK3 CMD CALC NUM CAP

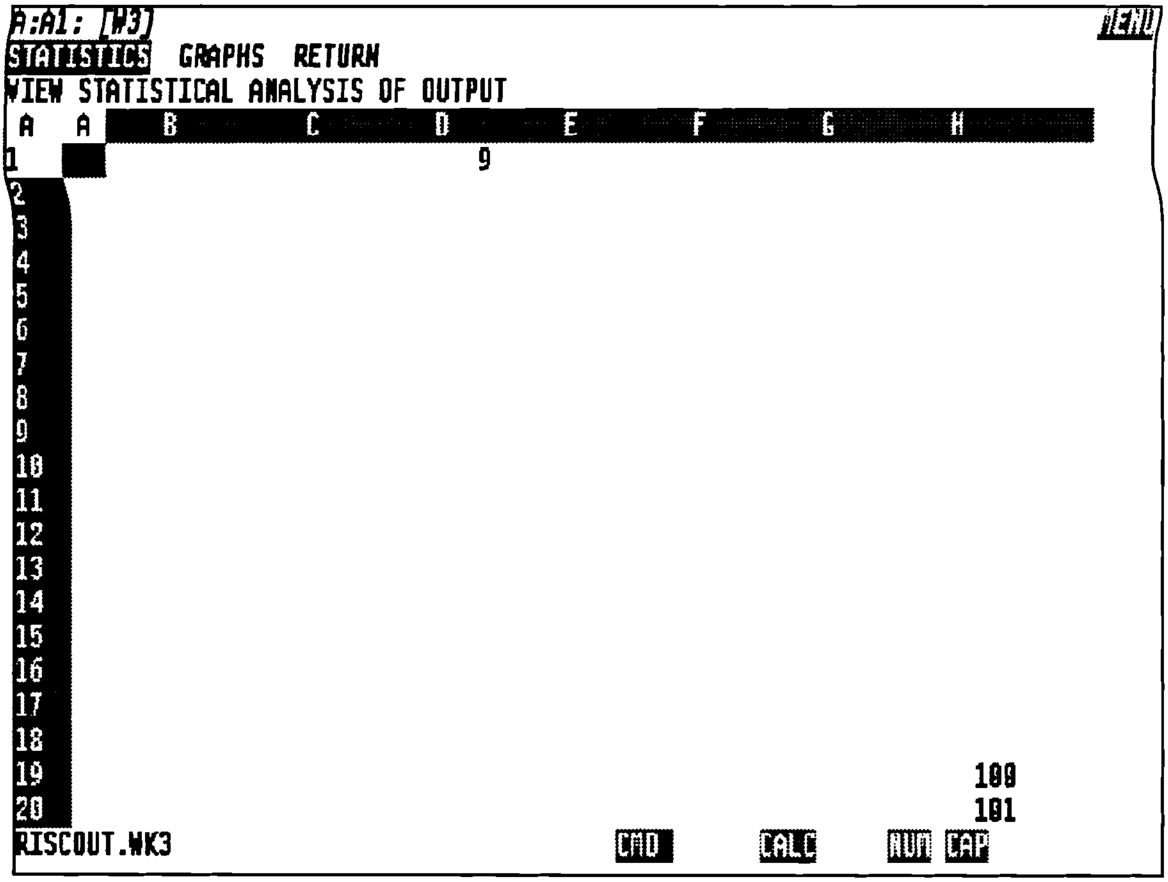
```
A:A3: [W3] 'MOVE CURSER TO THE SELECTED VARIABLE AND PRESS ENTER                READY

 A   A     B         C         D         E         F         G         H
1   TO SELECTED VARIABLE FOR WHICH DISTRIBUTION FUNCTION IS TO BE SUBSTITUTE
2
3   MOVE CURSER TO THE SELECTED VARIABLE AND PRESS ENTER
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19                                                                EXAMPLE.DAT
20                                                                N
RISEX.WK3                                          CMD       CALC     NUM CAP
```


A:A1: [W3]
READY
ENTER DISTRIBUTION FUNCTION FOR SELECTED VARIABLE _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
EXAMPLE.DAT
N
RISEX.WK3
CMD
CALC
NUM
CAP

```
A:A2: [W3]                                                        READY

 A  A     B        C        D        E        F        G        H
1  MOVE CURSER TO UPPER LEFT CORNER OF OUTPUT RANGE AND PRESS ENTER
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19                                                   EXAMPLE.DAT
20                                                   N
RISEX.WK3                          CMD       CALC      NUM  CAP
```


A:A1: [W3]
READY
ENTER THE NUMBER OF REALIZATIONS TO BE RUN _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
EXAMPLE.DAT
N
RISEX.WK3
CMD
CALC
NUM
CAP


A:A1: [W3]
MENU
LOAD SELECT OUTPUT ITERATIONS RUN VIEW MAIN QUIT
RUN SELECTED NUMBER OF ITERATIONS
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
RISCOUT.WK3
CMD
CALC
NUM


A:A1: [W3]
MENU
STATISTICS GRAPHS RETURN
VIEW STATISTICAL ANALYSIS OF OUTPUT
A A B C D E F G H
9
100
101
RISCOUT.WK3
CMD
CALC
NUM
CAP

```
A:B345: [W10]                                                          READY

 A      B       C       D       E       F       G       H
345          STATISICAL ANALYSIS OF MODEL OUTPUT
346
347
348 MEAN (AVERGE) VALUE OF 3 HR MAXIMUM VALUES            58.36115
349
350 STANDARD DEVIATION OF 3 HR MAXIMUM VALUES             26.74411
351
352 POPULATION VARIANCE OF 3 HR MAXIMUM VALUES            715.2475
353
354 MEAN (AVERGE) VALUE OF 24 HR MAXIMUM VALUES           24.54494
355
356 STANDARD DEVIATION OF 24 HR MAXIMUM VALUES            11.24777
357
358 POPULATION VARIANCE OF 24 HR MAXIMUM VALUES           126.5123
359
360
361 NUMBER OF MODEL ITERATIONS PERFORMED                       100
362
363
364                    PRESS ENTER TO CONTINUE
RISCOUT1.WK3                            CMD        CALC      NUM
```

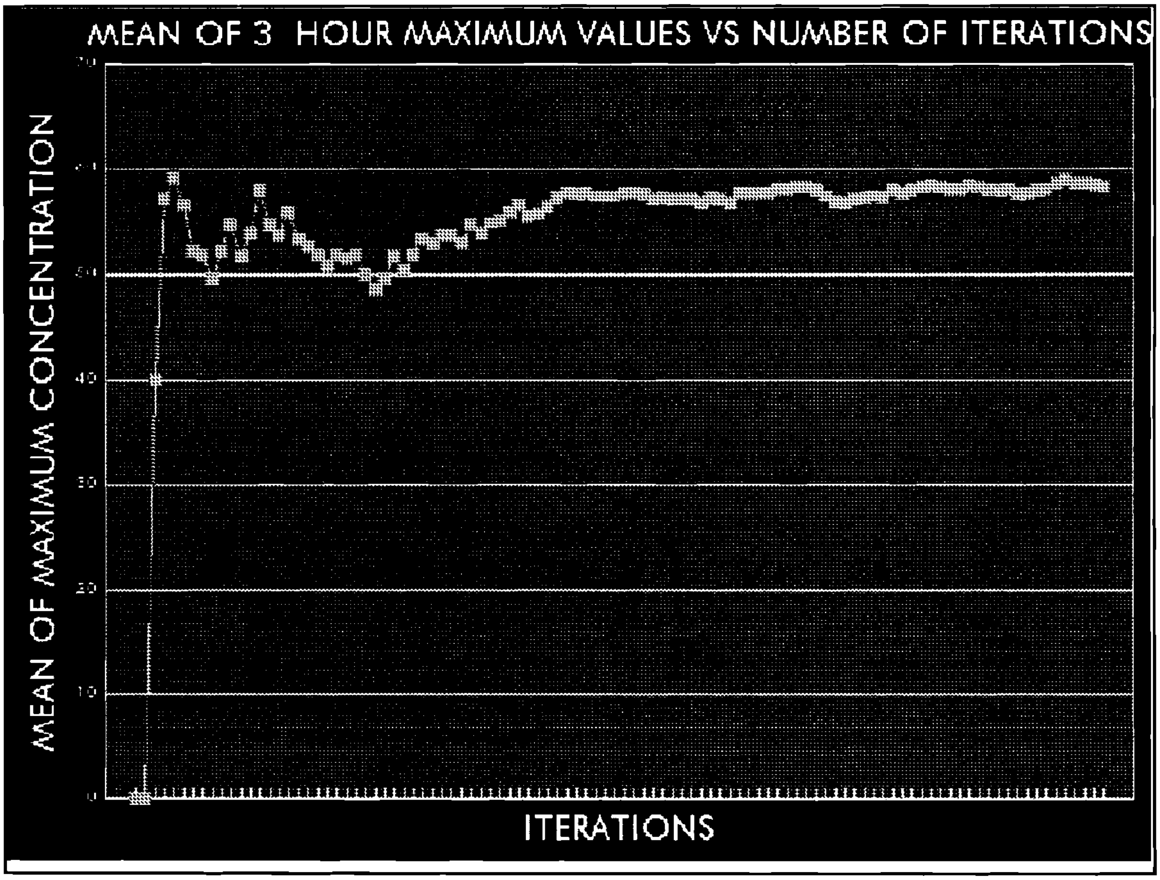
A:A1: [W3]　　MENU

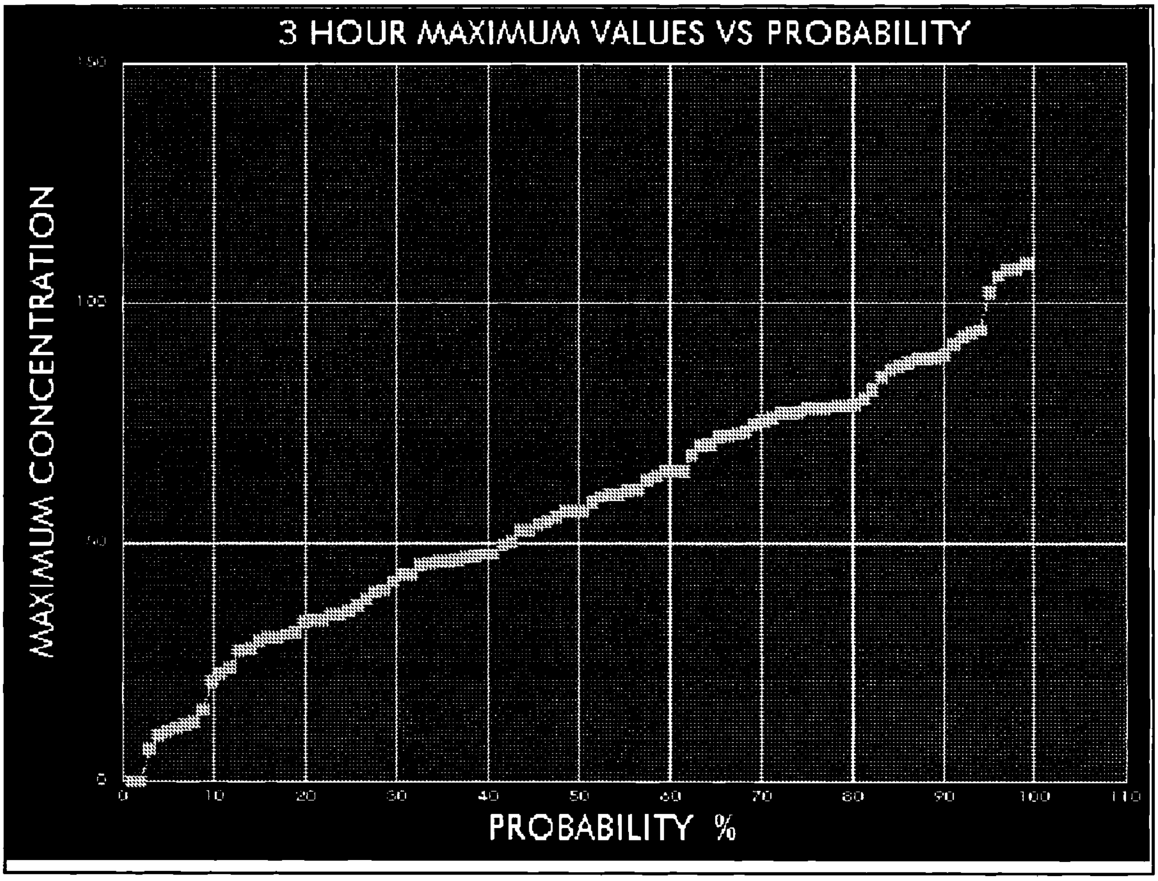
3-MEAN　3-STD　3-PROB　24-MEAN　24-STD　24-PROB　RETURN

GRAPH MEAN OF 3 HR MAXIMUM VALUES VS NUMBER OF ITERATIONS

A	A	B	C	D	E	F	G	H
1				9				
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								100
20								100

RISCOUT1.WK3　CMD　CALC　NUM


MEAN OF 3 HOUR MAXIMUM VALUES VS NUMBER OF ITERATIONS
MEAN OF MAXIMUM CONCENTRATION
ITERATIONS


3 HOUR MAXIMUM VALUES VS PROBABILITY
MAXIMUM CONCENTRATION
PROBABILITY %
150
100
50
0
0
10
20
30
40
50
60
70
80
90
100
110

APPENDIX C

COMPLETE SERIES OF GUIDANCE

SCREENS FOR COGMOD

EXAMPLE PROBLEM FROM 3M SITE

A:A20: [W7] READY

```
* * * *   * * * *   * * * *   *       *   * * * *   * * *
*         *     *   *         **     **   *     *   *     *
*         *     *   *   * *   * *   * *   *     *   *     *
* * * *   * * * *   * * * *   *   *   *   * * * *   * * *
```

CONDITIONED GEOSTATISTICAL MODELING PROGRAM

WELCOME TO COGMOD

A CONDITIONED GEOSTATISTICAL MODELING PROGRAM

DESIGNED TO COMBINE COVAR and STATPAC IN A LOTUS VERSION 3.1 SHELL

PRESS {ENTER} TO CONTINUE

CMD NUM

A:P21: READY

THIS PROGRAM HAS BEEN DEVELOPED AT

OKLAHOMA STATE UNIVERSITY

STILLWATER , OKLAHOMA 74078

BY

LARRY E LOCKWOOD

AND

WILLIAM F. McTERNAN

PRESS {ENTER} TO CONTINUE

RISC2.WK3 CMD NUM

```
A:A41: [W7]                                                    MENU
SETUP  CONTINUE
CHANGE DIRECTORY, FILE NAME, OR VALUES




                                   CMD            NUM
```

```
A:A1:                                                              READY

A     A       B       C       D       E       F       G       H
1
2             MACRO REQUIRES 1 SCREEN AREA FOR COMMENTS AND HELP.
3
4   MOVE CURSOR TO UPPER LEFT CORNER OF AREA TO BE RESERVED FOR COMMENTS
5
6     PRESS ENTER TO CONTINUE
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                     CMD          NUM
```

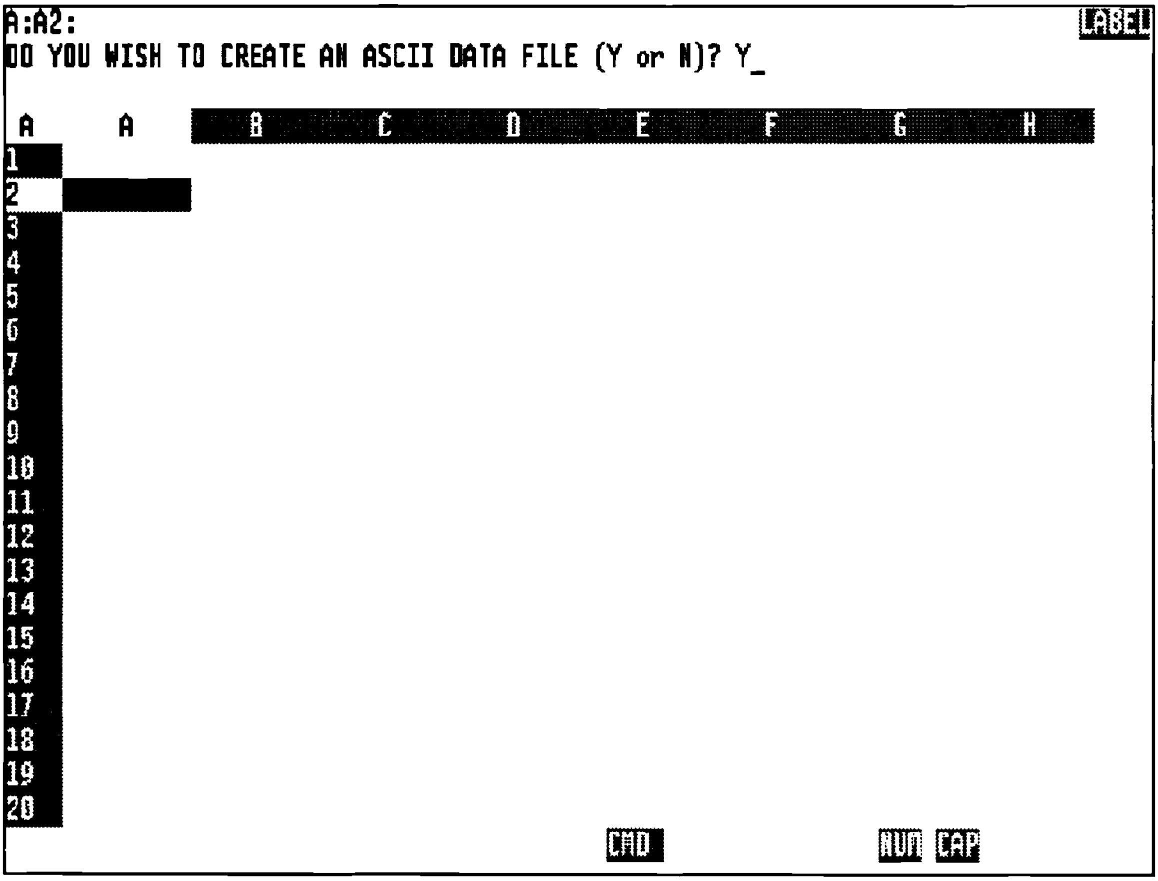
```
A:A8:                                                                  MENU
DATA  KRIGE  RUNMOD  PROGRAMS  QUIT
CREATE DATA FILES
 A     A       B        C        D        E        F        G        H
1  WORKSHEET ASSUMES 3 VARIABLES --
2
3     A)  DISTANCE FROM ORIGIN IN X DIRECTION
4
5     B)  DISTANCE FROM ORIGIN IN Y DIRECTION
6
7     C)  HYDRAULIC CONDUCTIVITY
8
9
10
11
12
13
14
15
16
17
18
19
20
                                          CMD              NUM
```

```
A:A1: 'WORKSHEET ASSUMES 3 VARIABLES --                                    READY
DO YOU WISH TO RUN CONDITIONAL SIMULATION?  (Y or N)  _

 A      A        B        C        D        E        F        G        H
1   WORKSHEET ASSUMES 3 VARIABLES --
2
3      A)  DISTANCE FROM ORIGIN IN X DIRECTION
4
5      B)  DISTANCE FROM ORIGIN IN Y DIRECTION
6
7      C)  HYDRAULIC CONDUCTIVITY
8
9
10
11
12
13
14
15
16
17
18
19
20
                                           CMD              NUM
```

```
A:A6:                                                                    READY
DO YOU WISH TO CREATE A RAW DATA FILE (Y or N) ? _

A     A        B        C        D        E        F        G        H
1      STATPAC DATA WILL BE ENTERED DIRECTLY INTO THE STATPAC PROGRAM
2
3      "TERFIL" WHICH WILL PROMPT THE USER FOR THE NECESSARY INFORMATION.
4
5      FOR MORE INFORMATION ON "TERFIL" SEE STATPAC USER'S INFORMATION.
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                          CMD              NUM CAP
```

```
C:\ENVIR\STATPAK>terfil
GIVE A ROOT NAME FOR THE STATPAC OUTPUT FILE
DO NOT ADD AN EXTENSION TO THE ROOT NAME: test
DOES THE INPUT DATA CONTAIN INTEGER LAT/LONG DEGREES-MINUTES-SECONDS? Y/N: N
DOES THE INPUT DATA CONTAIN QUALIFYING CODES? Y/N: N
HOW MANY ROWS IN THE DATA SET ? 17
HOW MANY VARIABLES IN THE DATA SET? 3
GIVE   3 VARIABLE ID S - END EACH WITH CR

X
Y
COND
```

```
ENTER THE DATA - ROW BY ROW.
ENTER AN ALPHAMERIC SAMPLE IDENTIFIER AS THE FIRST FIELD OF EACH STATPAC ROW.
THE IDENTIFIER MUST BE 1 TO 16 CHARACTERS LONG AND MUST BE ENCLOSED IN SINGLE
QUOTES.  ALL FIELDS IN A STATPAC ROW MUST BE SEPARATED FROM ADJACENT FIELDS
BY AT LEAST ONE SPACE OR BY A COMMA.
AN EXAMPLE OF ENTERING A 3X4 DATA MATRIX FOLLOWS:
ENTER ROW   1:
'DDH 63B-4' 59.7 0.0 450. 7.29
ENTER ROW   2:
'SAMPLE 2' 12.2 33.6 10. 5.
ENTER ROW   3:
'UNKNOWN SAMPLE' 65. 4.E-05 17.2 100


ENTER ROW    1:
'MW1' 1060 470 12.367
ENTER ROW    2:
'MW3' 1170 340 19.0
ENTER ROW    3:
'MW4' 1080 300 23.5
ENTER ROW    4:
'MW5' 1440 480 32.0
ENTER ROW    5:
'MW6' 1150 50 12.2
```


A:A2:
LABEL
DO YOU WISH TO CREATE AN ASCII DATA FILE (Y or N)? Y_
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
CMD
NUM CAP

```
C:\ENVIR\STATPAK>FILTER
ENTER THE NAME OF STATPAC INPUT FILE: test.stp
DATA SET ID =ABCDEFGH
            N =    7
            M =    3
       X             Y             COND
DO YOU WANT TO SEE THE DATA OF THE FIRST ROW OF THE FILE? Y/N: n
DO YOU WANT TO CREATE AN ASCII OUTPUT FILE OF SELECTED ROWS? Y/N: y

GIVE A NAME FOR THE OUTPUT FILE
PRN WILL GO TO PRINTER; CON WILL GO TO SCREEN; filespec  WILL GO TO DISK FILE
ENTER NAME: test.dat
DO YOU WANT THE OUTPUT FILE TO CONTAIN:
     1) ALL THE INFORMATION FOR EACH SELECTED ROW, OR
     2) ONLY THE ROWID, LAT-LONG, AND ROW NUMBER FOR EACH SELECTED ROW?
        ANSWER 1 OR 2: 1
GIVE NUMBERS OF FIRST AND LAST ROWS TO BE TYPED (XX,XXX): 01,07
    7 ROWS WILL BE WRITTEN.
    7......READING DATA
TYPE PRINTER FILE TEST.DAT
NORMAL END OF PROGRAM

C:\ENVIR\STATPAK>
```

```
Fri.  03/24/95
12:17:28am
NO OF ROWS    =      7
NO OF COLUMNS=       3

DO YOU WANT SELECTED ROWS ? n

DO YOU WANT SELECTED COLUMNS ? n

WHAT DO YOU WANT INCLUDED IN BASIC STATISTICS ?
         1-ONLY UNQUALIFIED DATA
         2-ONLY QUALIFIED DATA
         3-ALL DATA(IGNORING QUALIFYING CODES)
TYPE 1, 2, OR 3 : 3
    7     READING DATA...


                           UNIVARIATE STATISTICS

VAR  COLUMN   MINIMUM   MAXIMUM    MEAN     DEVIATION  VALID B   L   N   G OTHER
  1 X        6.000E+01 4.800E+02 2.243E+02 1.6979E+02   7   0   0   0   0   0
  2 Y        6.000E+01 4.800E+02 3.000E+02 1.5588E+02   7   0   0   0   0   0
  3 COND     1.220E+01 4.017E+01 2.529E+01 1.1581E+01   7   0   0   0   0   0

DO YOU WANT TO SEE THE CORRELATIONS ?
```

```
A:A8:                                                                  READY
DO YOU WISH TO CONVERT THE STATPAC RAW DATA FILE NOW (Y or N)? y_

 A     A       B       C       D       E       F       G       H
1   THE STATPAC RAW DATA FILE MUST BE CONVERTED PRIOR TO KRIGING
2
3   OR RUNNING THE STATPAC SEMIVARIOGRAM ANALYSIS PROGRAM.
4
5          THE DATA ONLY NEEDS TO BE CONVERTED 1 TIME.
6
7     IF THE DATA HAS ALREADY BEEN CONVERTED SELECT "N" NOW TO CONTINUE.
8
9
10
11
12
13
14
15
16
17
18
19
20
                                          CMD             NUM
```

```
A:A5:                                                                READY
ENTER ROOT NAME FOR THE STATPAC INPUT FILE : _

 A    A       B       C       D       E       F       G       H
1
2  THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)
3
4  AND MAY NOT INCLUDE THE EXTENSION (.STP).
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                     CMD              NUM CAP
```

```
A:A1:                                                                    READY
ENTER ROOT NAME OF STATPAC OUTPUT FILE : _

 A      A        B       C       D       E       F       G       H
1
2    THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)
3
4    AND MAY NOT INCLUDE THE EXTENSION (.STP).
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                          CMD             NUM CAP
```

```
A:A4:                                                                READY
ENTER COLUMN NUMBER OF NORTH COORDINATE : _

A      A        B        C        D        E        F        G        H
1   ASSUME Y-COORDINATE IS NORTH COORDINATE -- THEN THIS VALUE IS 2
2
3    IF Y IS NOT NORTH -- ENTER APPROPRIATE COLUMN VALUE FROM INPUT FILE.
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                       CMD              NUM CAP
```

```
A:A4:                                                                    READY
ENTER COLUMN NUMBER OF EAST COORDINATE : _

 A     A         B         C         D         E         F         G         H
1  ASSUME X-COORDINATE IS EAST COORDINATE -- THEN THIS VALUE IS 1
2
3   IF X IS NOT EAST -- ENTER APPROPRIATE COLUMN VALUE FROM INPUT FILE.
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                                 CMD               NUM CAP
```

```
A:A1:                                                              READY
DO YOU WISH TO PERFORM SEMIVARIOGRAM ANALYSIS NOW (Y or N)?_

A      A        B        C        D        E        F        G        H
1
2  TO PERFORM SEMIVARIOGRAM ANALYSIS AT THIS POINT ENTER "Y"
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                      CMD            NUM CAP
```

```
A:A1:                                                                    READY
DO YOU WISH TO CREATE COVAR INPUT FILE NOW (Y or N) ? _

 A       A       B       C       D       E       F       G       H
1
2   TO CREATE COVAR INPUT FILE NOW ENTER "Y"
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
                                          CMD              NUM CAP
```

```
A:A8:                                                                    READY

A    A      B       C       D       E       F       G       H
1           INPUT RAW DATA POINTS FROM STATPAC TO COVAR PROGRAM
2
3    MOVE CURSOR TO UPPER LEFT CORNER OF RANGE FOR TABLE OF STATPAC VALUES
4
5    TO AVOID POTENTIAL RANGE OVERLAP (& LOSS OF DATA!)
6
7    NO DATA SHOULD BE BELOW SELECTED RANGE --  PRESS ENTER TO CONTINUE
8
9
10
11
12
13
14
15
16
17
18
19
20
                                          CMD             NUM CAP
```

```
A:A48:                                                          READY
HAS ASCII FILE OF RAW DATA ALREADY BEEN CREATED (Y or N)? _

 A     A        B       C       D       E       F       G       H
41 TEST
42 TEST
43 2
44 1
45 NO
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
                                        CMD            NUM CAP
```

A:B52: 480

ENTER THE MINIMUM VERTICAL (Y) DISTANCE BETWEEN POINTS : 30_

READY

A	A	B	C	D	E	F	G	H
41	TEST							
42	TEST							
43	2							
44	1							
45	NO							
46								
47								
48	DATA SET ID	=ABCDEFGH						
49		N =	7					
50		M =	3					
51	X-COORD	Y-COORD	COND					
52	60	480	12.367					
53	160	330	19					
54	90	300	23.5					
55	450	480	32					
56	150	60	12.2					
57	480	150	40.167					
58	180	300	37.83					
59								
60								

CMD NUM CAP

```
A:A61:                                                              READY
ENTER X-COORDINATE OF 1ST GRID POINT  0_

A     A        B        C        D        E        F        G
42  TEST
43  2
44  1
45  NO
46
47
48   DATA SET ID =ABCDEFGH
49                N =    7
50                M =    3
51   X-COORD      Y-COORD     COND
52        60          400   12.367
53       160          330       19
54        90          300     23.5
55       450          400       32
56       150           60     12.2
57       400          150   40.167
58       180          300    37.83
59
60
61
                                      CMD           NUM  CAP
```

```
A:A80: +A79+HORZ*0.1                                                    READY
ENTER Y-COORDINATE OF 1ST GRID POINT  _
```

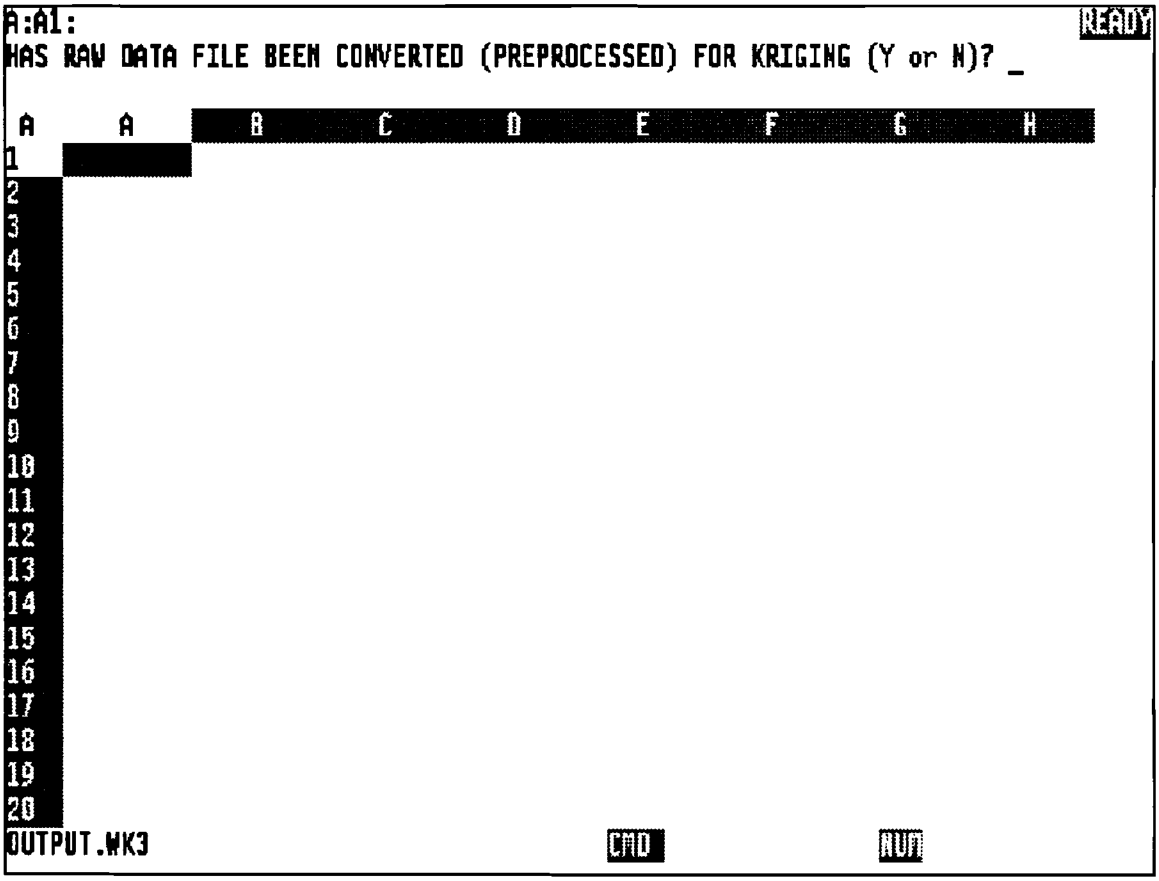
A	A	B	C	D	E	F	G
61	0						
62	3						
63	6						
64	9						
65	12						
66	15						
67	18						
68	21						
69	24						
70	27						
71	30						
72	33						
73	36						
74	39						
75	42						
76	45						
77	48						
78	51						
79	54						
80	57						

CMD NUM CAP

```
                         INPUT INFORMATION
                         -----------------
ENTER TITLE OF THE RUN (80 CHARACTERS OR LESS):
EXAMPLE PROBLEM USING DATA FROM 3M SITE
ENTER NAME OF PARAMETER TO BE GENERATED (80 CHARACTERS OR LESS):
HYDRAULIC CONDUCTIVITY
ENTER 1 FOR NORMALLY DISTRIBUTED OR 0 FOR LOG-NORMALLY DISTRIBUTED
1
ENTER NUMBER OF ROWS IN LOCATION MATRIX (NOT MORE THAN 20):
20
ENTER NUMBER OF COLUMNS IN LOCATION MATRIX (NOT MORE THAN 20):
20
ENTER MEAN:
 25.29
ENTER STANDARD DEVIATION:
9.0621
ENTER CORRELATION LENGTH AL (0<AL<1):
.9
ENTER TOTAL NUMBER OF REALIZATIONS:
5
ENTER NAME OF INPUT DATA FILE (e.g., XY.DAT):
(INPUT FILE WILL CONSIST OF A LISTING OF X,Y-COORDINATE LOCATIONS)
COVAR.DAT
ENTER INPUT FORMAT (e.g., (2F13.4)):
(2F13.4)
```

```
                 OUTPUT INFORMATION
                 ------------------
ENTER NAME OF OUTPUT FILE (e.g., RESULT.OUT):
COVAR.OUT
WOULD YOU LIKE TO HAVE THE LOWER TRIANGLE OF THE COVARIANCE
MATRIX INCLUDED IN THE OUTPUT FILE? (Y/N)
N
WOULD YOU LIKE TO HAVE THE LOWER TRANGLE OF THE DECOMPOSED
COVARIANCE MATRIX INCLUDED IN THE OUTPUT FILE? (Y/N)
N
WOULD YOU LIKE A SEPARATE OUTPUT FILE CREATED FOR ANALYSIS
WITH PROGRAM "STAT1"? (Y/N)
N
ENTER FORMAT FOR OUTPUT FILE(S) (e.g., (6F13.4)):
(20F13.4)
```

```
A:A8:                                                                  MENU
DATA  KRIGE  RUNMOD  PROGRAMS  QUIT
KRIGE DATA
 A      A        B        C        D        E        F        G        H
1   WORKSHEET ASSUMES 3 VARIABLES --
2
3      A)  DISTANCE FROM ORIGIN IN X DIRECTION
4
5      B)  DISTANCE FROM ORIGIN IN Y DIRECTION
6
7      C)  HYDRAULIC CONDUCTIVITY
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                                   CMD              NUM
```


A:A1:
READY
HAS RAW DATA FILE BEEN CONVERTED (PREPROCESSED) FOR KRIGING (Y or N)? _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM

```
A:A1:                                                                  READY

A      A        B        C        D        E        F        G        H
1
2    THIS SERIES OF QUESTIONS WILL CREATE A CONTROL FILE FOR THE KRIGE
3
4    SUBROUTINE - THEN RUN THE KRIGE SUBROUTINE 1 TIME
5
6    MOVE CURSOR TO UPPER LEFT HAND CORNER OF RANGE FOR TABLE OF CONTROL VALU
7
8       PRESS ENTER TO CONTINUE
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                               CMD                NUM
```

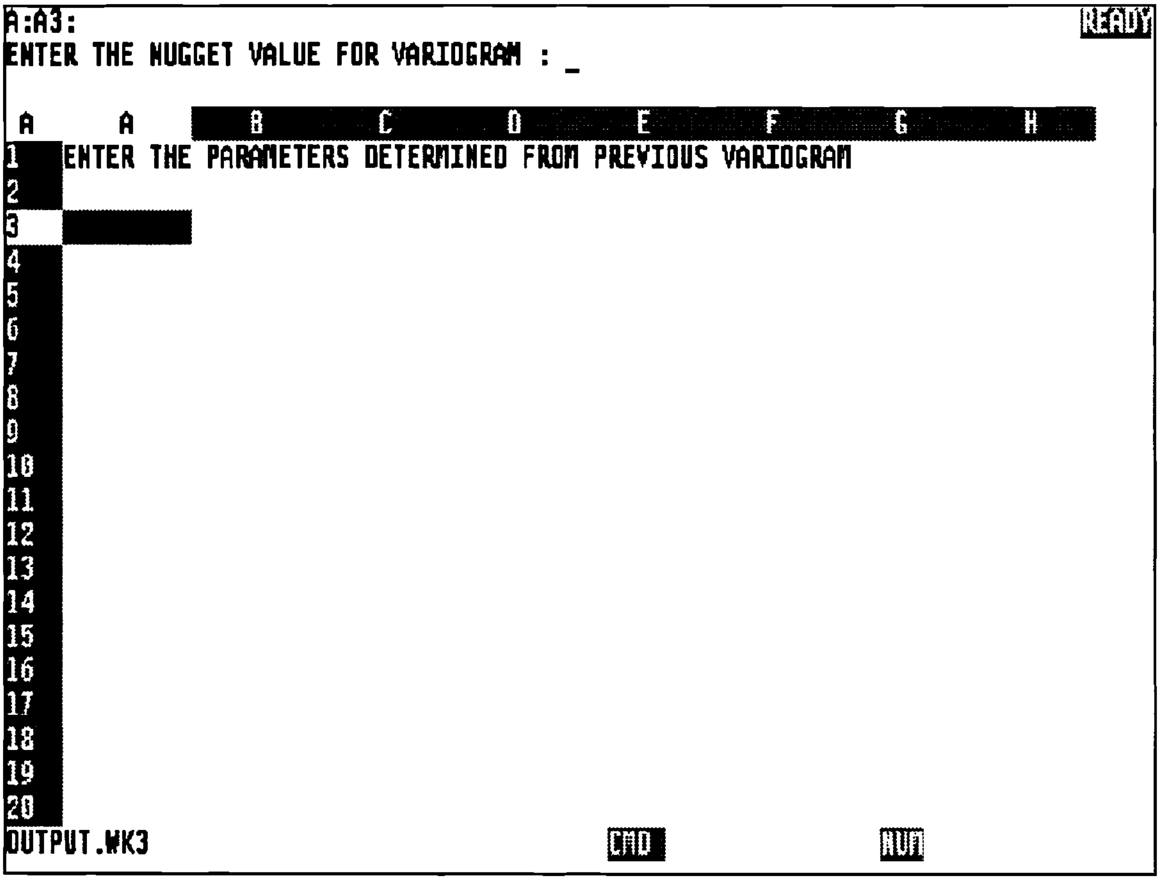
```
A:A5:                                                                   READY
ENTER ROOT NAME FOR THE STATPAC DATA FILE TO BE KRIGED : _

 A     A        B       C       D       E       F       G       H
1
2   THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)
3
4   AND MAY NOT INCLUDE THE EXTENSION .
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                              CMD               NUM
```

```
A:A5:                                                              READY
IS AN ASCII OUTPUT FILE DESIRED (Y or N) ? _

 A     A       B       C       D       E       F       G       H
1   IF THIS IS A CONDITIONAL SIMULATION,  AN ASCII OUTPUT FILE
2
3   WILL BE REQUIRED FOR FURTHER PROCESSING.
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                              CMD             RUN
```

```
A:A1: 'IF THIS IS A CONDITIONAL SIMULATION,  AN ASCII OUTPUT FILE            READY
ENTER ROOT NAME FOR ASCII OUTPUT FILE : _

 A      A         B         C         D         E         F         G         H
1   IF THIS IS A CONDITIONAL SIMULATION,  AN ASCII OUTPUT FILE
2
3   WILL BE REQUIRED FOR FURTHER PROCESSING.
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                          CMD                  NUM
```

```
A:A5:                                                                READY
ENTER ROOT NAME FOR THE KRIGED STATPAC OUTPUT FILE : _

 A     A        B        C        D        E        F        G        H
1
2  THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)
3
4  AND MAY NOT INCLUDE THE EXTENSION .
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                             CMD               NUM
```

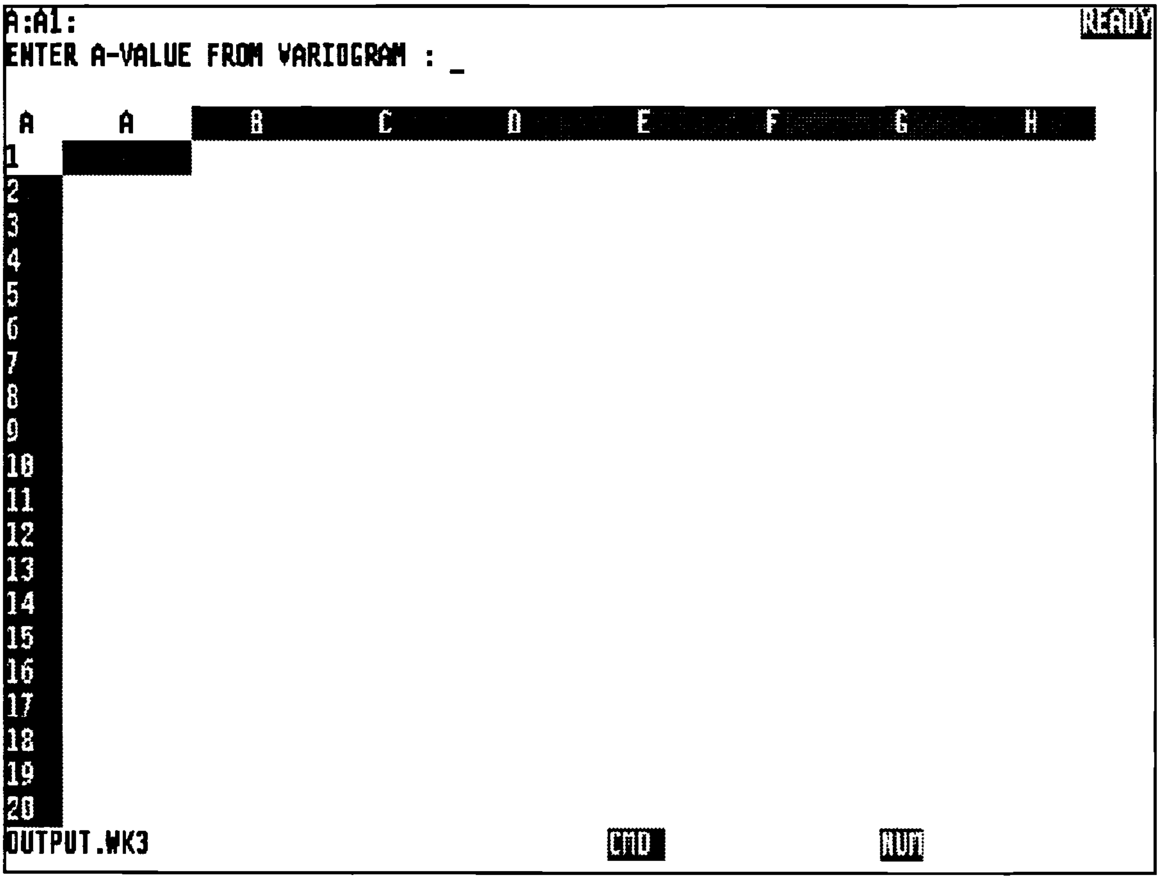
```
A:A6:                                                              READY
ENTER A 1 FOR ORDINARY OR A 2 OR UNIVERSAL KRIGING : _

 A     A        B       C       D       E       F       G       H
1  ENTER A "1" (one) FOR ORDINARY KRIGING OR
2
3        A "2" (two) FOR UNIVERSAL KRIGING
4
5  NORMALLY THIS ANSWER WILL BE 1
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                          CMD               NUM
```


A:A3:
ENTER THE NUGGET VALUE FOR VARIOGRAM : _
READY
A A B C D E F G H
ENTER THE PARAMETERS DETERMINED FROM PREVIOUS VARIOGRAM
OUTPUT.WK3
CMD
NUM

```
A:A4:                                                                      READY
ENTER THE NUMBER OF OTHER VARIOGRAMS (5 MAX) IN THE MODEL : _

 A      A        B        C        D        E        F        G        H
1  THE NUGGET IS CONSIDERED A VARIOGRAM FOR THIS PROGRAM.
2
3  THE NUMBER OF "OTHER VARIOGRAMS" DOES NOT INCLUDE THE NUGGET.
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                              CMD              NUM
```

```
A:A10:                                                                         READY
ENTER NUMBER (1 THRU 5) FOR VARIOGRAM TYPE : _

 A      A        B        C        D        E        F        G        H
1   ENTER THE PARAMETERS DETERMINED FROM PREVIOUS VARIOGRAM
2
3        TYPES OF VARIOGRAMS  -- ENTER NUMBER ONLY
4
5            1  - SPHERICAL
6            2  - EXPONENTIAL
7            3  - LINEAR
8            4  - GAUSSIAN
9            5  - CUBIC
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                                   CMD                NUM
```

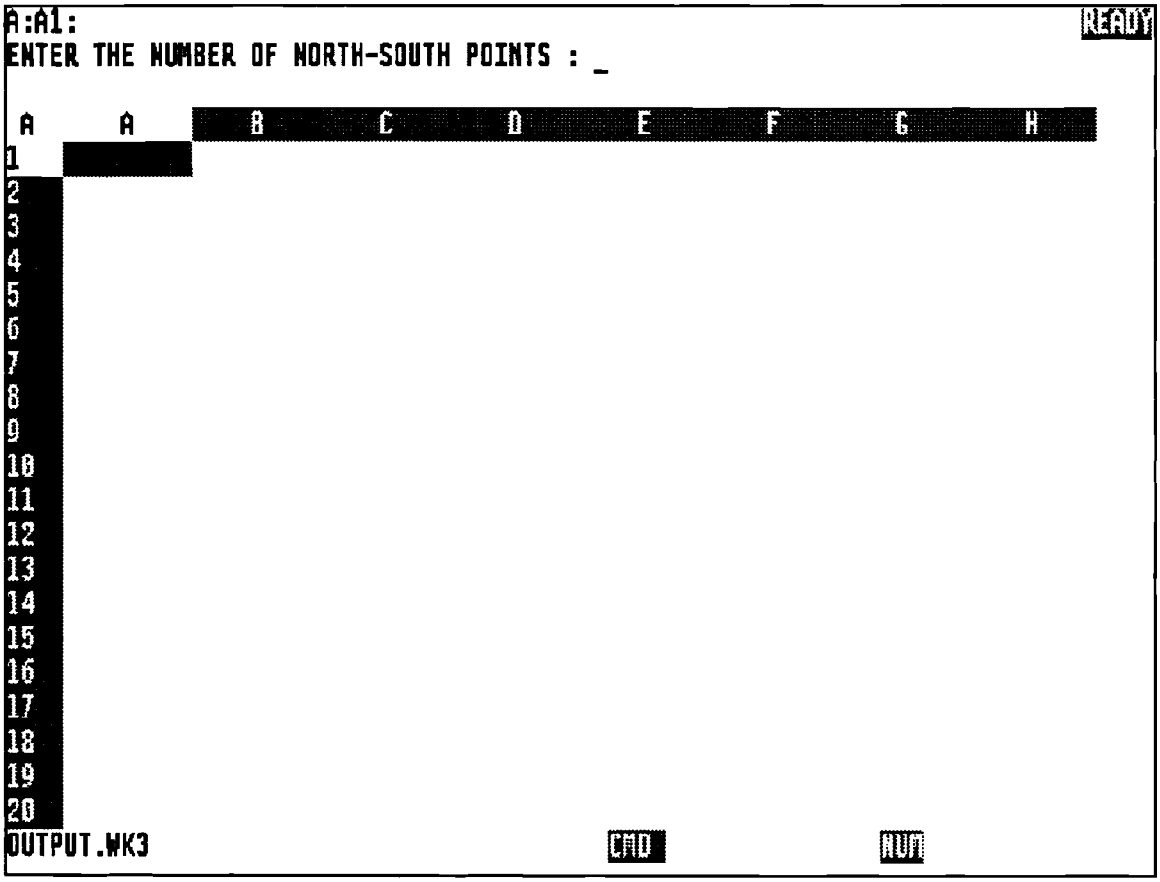
```
A:A1:                                                                    READY
ENTER C-VALUE FROM VARIOGRAM : _

 A      A       B       C       D       E       F       G       H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                                   CMD              NUM
```


A:A1:
READY
ENTER A-VALUE FROM VARIOGRAM : _
A
A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM

```
A:A4:                                                                    READY
IS VARIOGRAM ISOTROPIC (1) OR ANISOTROPIC (2) : _

 A     A         B        C        D        E        F        G        H
1  ENTER THE NUMBER 1 (one) FOR ISOTROPIC OR 2 (two) FOR ANISOTROPIC
2
3       VARIOGRAM
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                                  CMD              NUM
```

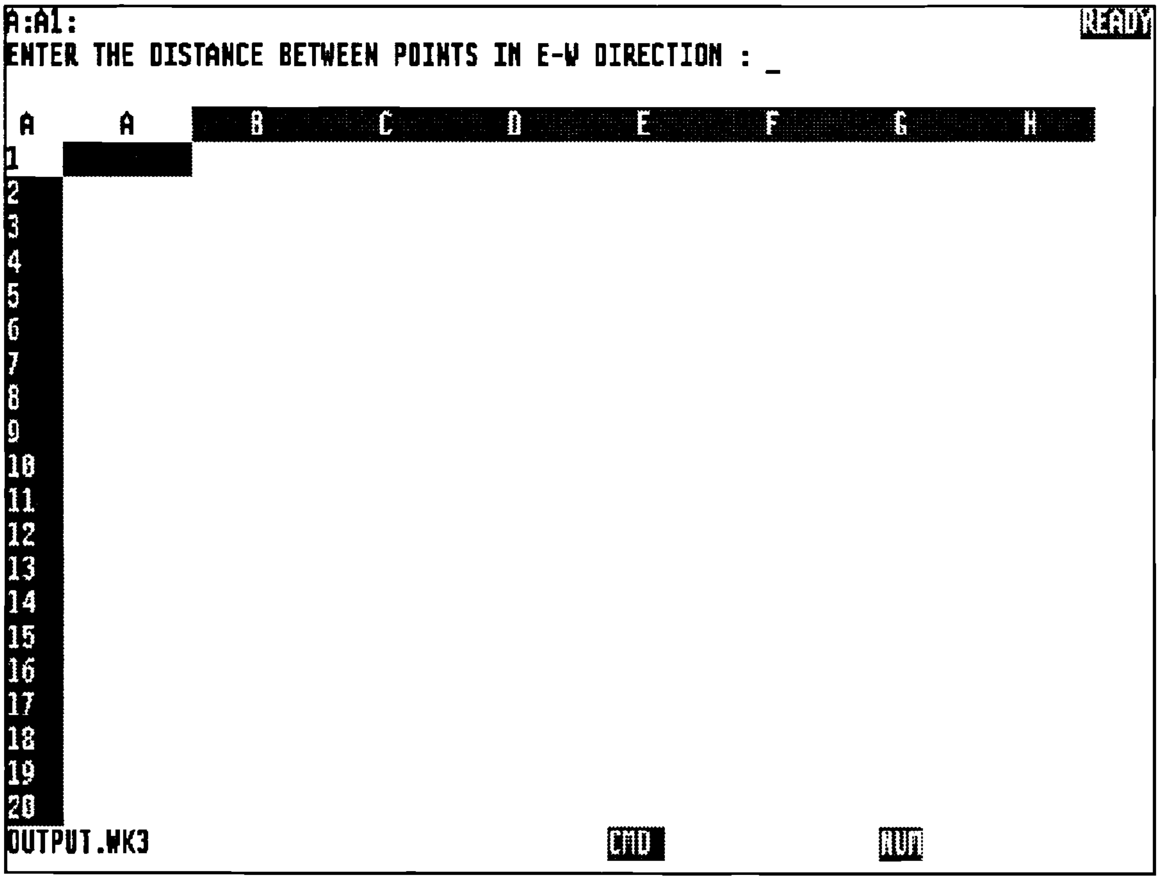
```
A:A4:                                                                    READY
ENTER THE MAXIMUM HOLE DISTANCE FROM THE CENTROID : _

A     A        B        C        D        E        F        G        H
1   ENTER THE MAXIMUM DISTANCE FROM CENTROID FOR A HOLE TO BE
2
3   INCLUDED FOR KRIGING
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                              CMD                NUM
```

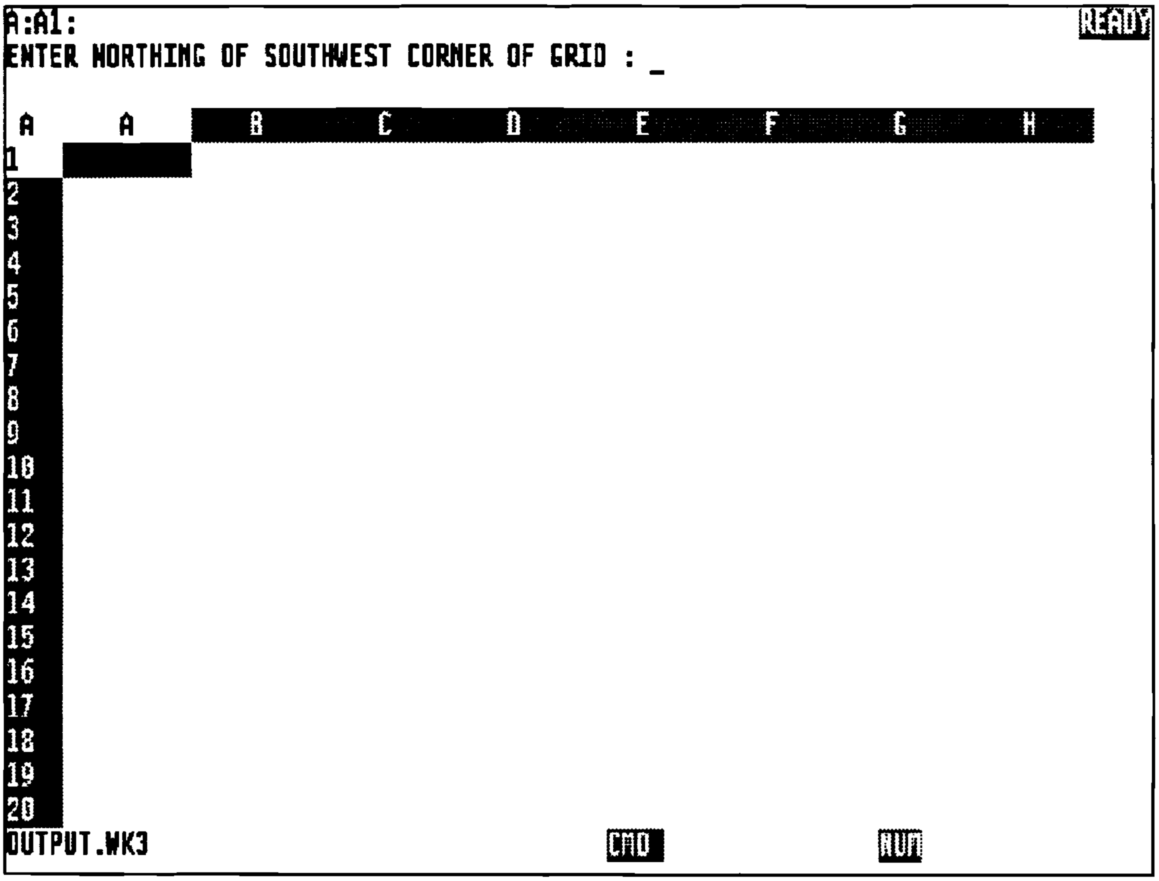
```
A:A1:                                                                  READY
ENTER THE MAXIMUM NUMBER OF HOLES TO BE USED WITHIN NEIGHBORHOOD : _

 A      A       B       C       D       E       F       G       H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                        CMD           NUM
```

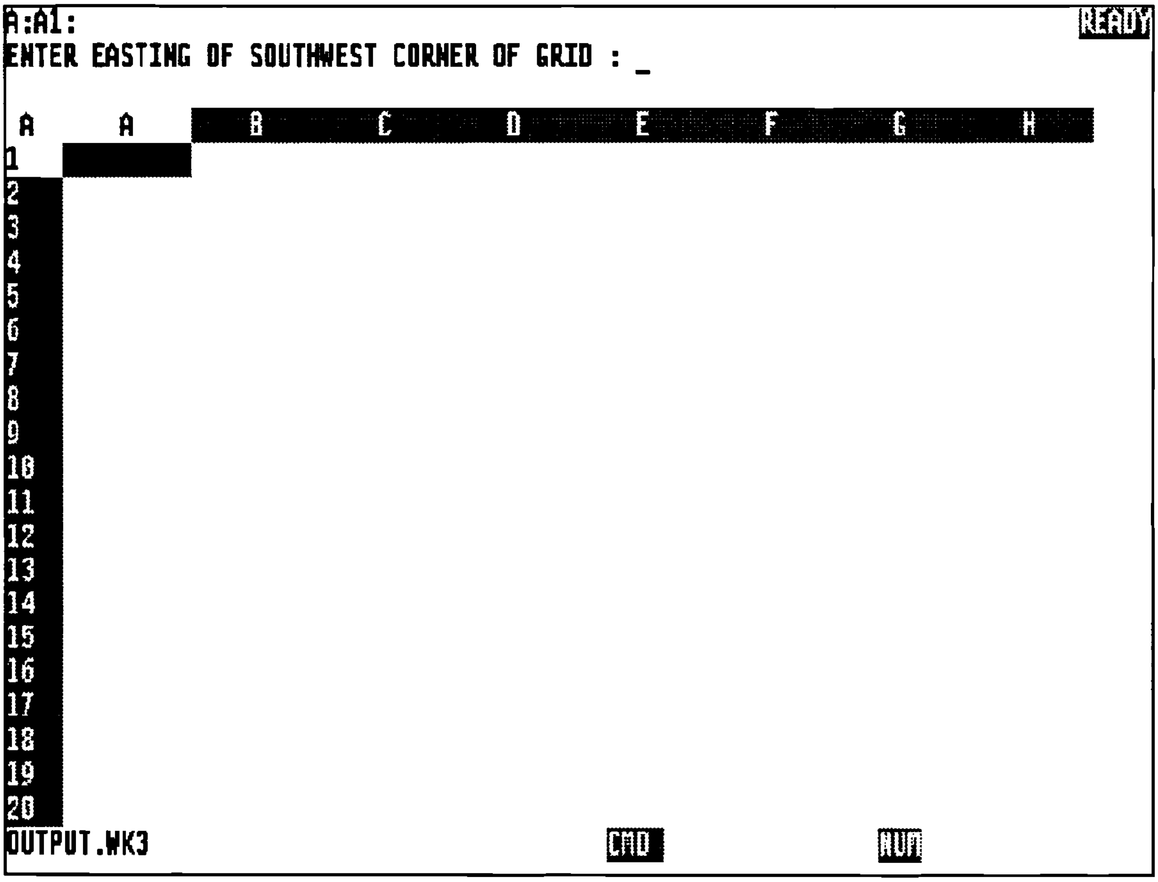

A:A1:
READY
ENTER THE NUMBER OF NORTH-SOUTH POINTS : _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM

```
A:A1:                                                          READY
ENTER THE DISTANCE BETWEEN POINTS IN N-S DIRECTION : _

 A      A      B      C      D      E      F      G      H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                    CMD           RUN
```

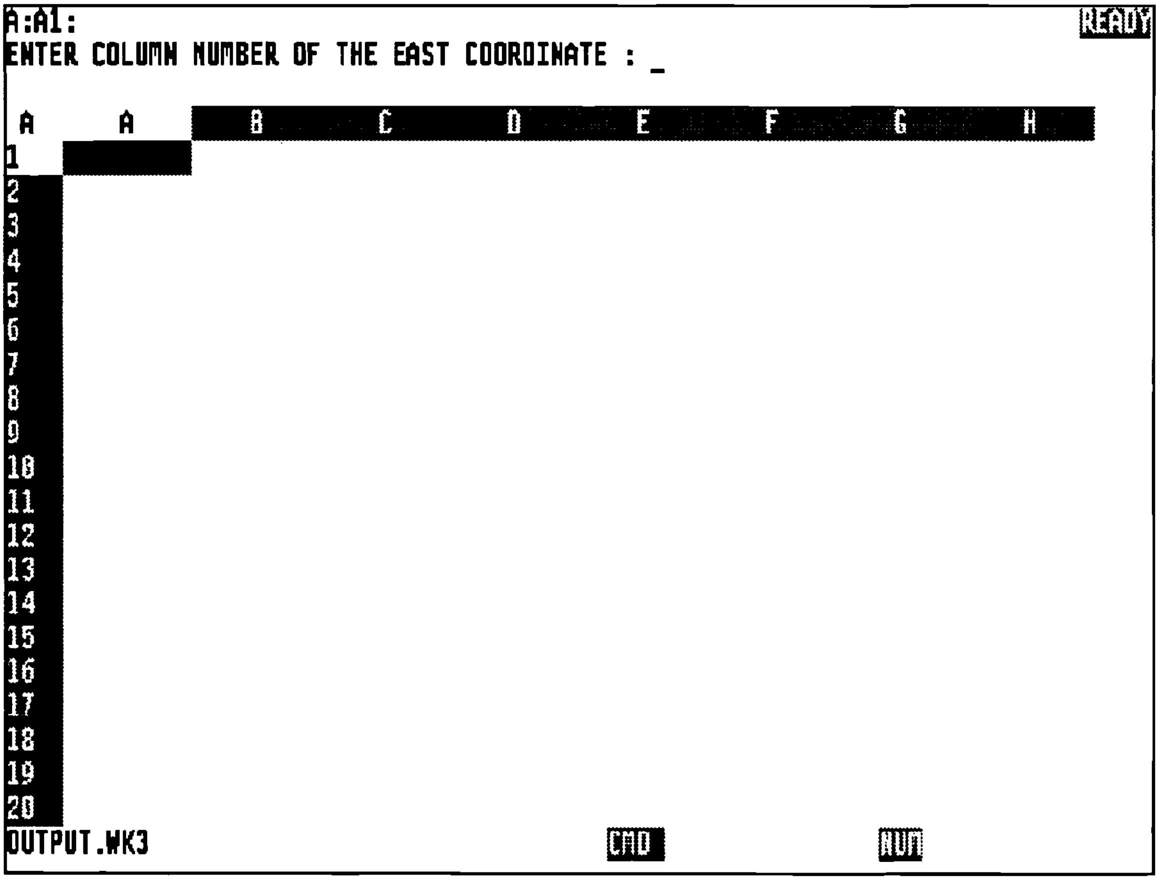
```
A:A1:                                                        READY
ENTER THE NUMBER OF EAST-WEST POINTS : _

A      A       B       C       D       E       F       G       H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                     CMD             NUM
```

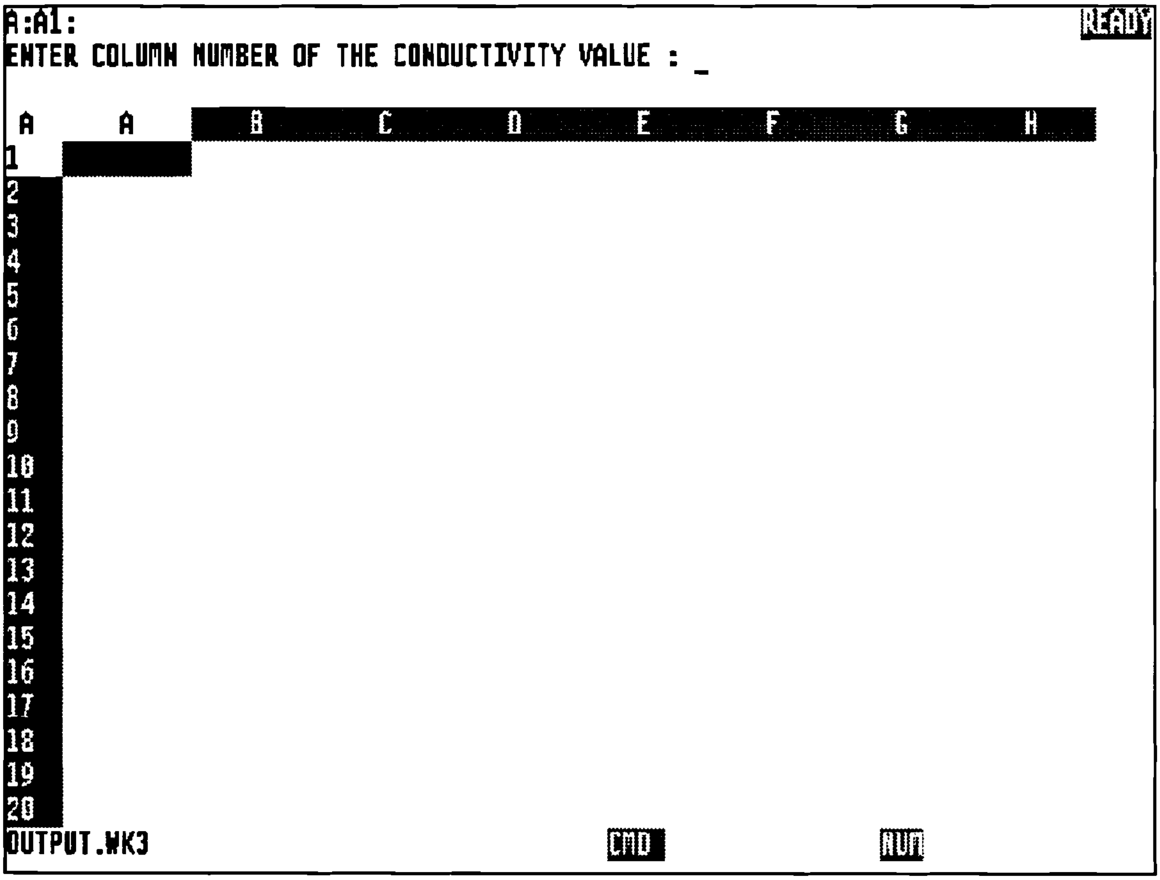

A:A1:
READY
ENTER THE DISTANCE BETWEEN POINTS IN E-W DIRECTION : _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM

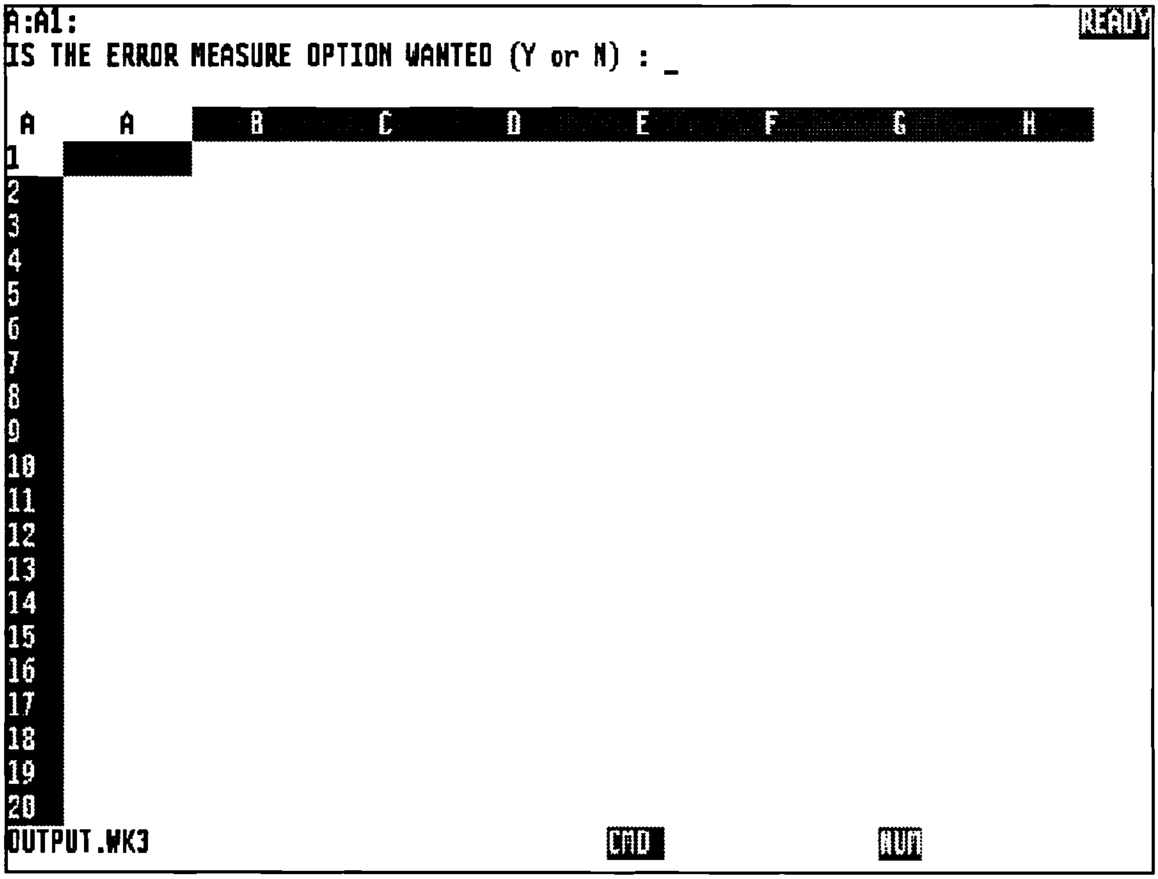

A:A1:
READY
ENTER NORTHING OF SOUTHWEST CORNER OF GRID : _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM


A:A1:
READY
ENTER EASTING OF SOUTHWEST CORNER OF GRID : _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM

```
A:A1:                                                                READY
ENTER COLUMN NUMBER OF THE NORTH COORDINATE : _

A      A        B        C        D        E        F        G        H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                                  CMD             NUM
```


A:A1:
READY
ENTER COLUMN NUMBER OF THE EAST COORDINATE : _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM


A:A1:
READY
ENTER COLUMN NUMBER OF THE CONDUCTIVITY VALUE : _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM


A:A1:
READY
IS THE ERROR MEASURE OPTION WANTED (Y or N) : _
A A B C D E F G H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3
CMD
NUM

```
A:A8:                                                                    READY
DO YOU WANT TO SAVE YOUR EXISTING KRIGE OUTPUT FILES (Y or N) _

 A      A        B        C        D        E        F        G        H
1
2                               WARNING !!
3
4
5   THE PROGRAM WILL AUTOMATICALLY ERASE ALL OLD KRIGE OUTPUT FILES
6   UNLESS THE OPERATOR SAVES THEM MANUALLY TO ANOTHER DIRECTORY.
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                              CMD                NUM
```

```
A:C4: 'WILL BE ERASED !                                              READY
 DO YOU WANT TO CONTINUE (Y or N) _

 A      A       B       C       D       E       F       G       H
1
2   ANY REMAINING KRIGE OUTPUT FILES IN THE STATPAK SUBDIRECTORY
3
4                        WILL BE ERASED !
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
OUTPUT.WK3                          CMD            NUM
```

```
 1  EXPO  275.     .000        1.00        825.       .000

SEARCH RADIUS = .40E+03
MAXIMUM NUMBER OF HOLES USED =     5


NUMBER OF POINTS IN NORTH-SOUTH DIRECTION =    20
DISTANCE BETWEEN POINTS IN NORTH-SOUTH DIRECTION =   30.00
NUMBER OF POINTS IN  EAST-WEST  DIRECTION =    20
DISTANCE BETWEEN POINTS IN  EAST-WEST  DIRECTION =   30.00
NORTHING OF SOUTHWEST CORNER OF GRID OF POINTS =     .00
EASTING  OF SOUTHWEST CORNER OF GRID OF POINTS =     .00
SEARCH RADIUS =  400.00
MAXIMUM NUMBER OF HOLES USED =     5

  400    NOW KRIGING GRID POINTS
THE DISK FILES HAVE BEEN WRITTEN
THE INPUT FILE WAS test.UPR
THE STATPAC OUTPUT FILE IS test.UGR
THE CHARACTER OUTPUT FILE IS test.FGR
RUN TIME WAS    .12 MINUTES
NORMAL END OF PROGRAM


C:\ENVIR\STATPAK>
```

```
A:A8:                                                                   MENU
DATA  KRIGE  RUNMOD  PROGRAMS  QUIT
RUN MULTIPLE CONDITIONAL SIMULATIONS OF MODEL
 A      A        B        C        D        E        F        G        H
1   WORKSHEET ASSUMES 3 VARIABLES --
2
3      A)  DISTANCE FROM ORIGIN IN X DIRECTION
4
5      B)  DISTANCE FROM ORIGIN IN Y DIRECTION
6
7      C)  HYDRAULIC CONDUCTIVITY
8
9
10
11
12
13
14
15
16
17
18
19
20
04-Jan-95 11:54 AM                          CMD                NUM
```

```
A:A8:                                                                    READY

A      A          B        C        D        E        F        G        H
1                 INPUT RAW DATA POINTS FROM STATPAC
2
3   MOVE CURSOR TO UPPER LEFT CORNER OF RANGE FOR TABLE OF STATPAC VALUES
4
5   TO AVOID POTENTIAL RANGE OVERLAP (& LOSS OF DATA!)
6
7   NO DATA SHOULD BE BELOW SELECTED RANGE --  PRESS ENTER TO CONTINUE
8
9
10
11
12
13
14
15
16
17
18
19
20
04-Jan-95 11:55 AM                          CMD                 NUM
```

```
A:A28:                                                          READY
WAS ASCII FILE OF RAW DATA ALREADY BEEN CREATED (Y or N)? _

A      A        B      C      D      E      F      G      H
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
04-Jan-95 11:56 AM                 CMD            NUM
```

```
A:A12:                                                                    READY
DO YOU WISH TO CONTINUE WITH CONDITIONAL SIMULATION (Y OR N)? _

 A     A        B        C        D        E        F        G        H
1   CONDITIONAL SIMULATION REQUIRES MULTIPLE ITERATIONS OF THE MODELS
2
3   THIS PROCESS ASSUMES THAT THE INITIAL SAMPLE DATA HAS BEEN ANALYZED
4
5   AND SATISFACTORLY KRIGED.   IT FURTHER ASSUMES THAT COVAR HAS BEEN RUN
6
7   AND THE REQUIRED NUMBER OF COVAR REALIZATIONS SUCESSFULLY COMPLETED.
8
9        IF ANY OF THESE CONDITIONS HAVE NOT BEEN MET --
10
11   QUIT CONDITIONAL SIMULATION NOW (SELECT N) TO RETURN TO FUNCTION MENU
12
13
14
15
16
17
18
19
20
04-Jan-95 11:59 AM                          CMD              NUM
```

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT	VALUE	
1385								
1386	0	0	16.54	38.04	27.2267	6	6	
1387	0	30	16.41	37.56	33.9714	13	13	
1388	0	60	16.89	37.8	14.2956	-7	0.01	
1389	0	90	16.52	37.8	37.2675	16	16	
1390	0	120	17.21	38.01	22.0271	1	1	
1391	0	150	17.93	38.21	25.2611	5	5	
1392	0	180	18.59	38.41	13.4242	-6	0.01	
1393	0	210	19.14	38.55	16.5413	-3	0.01	
1394	0	240	19.48	38.58	28.0707	9	9	
1395	0	270	19.56	38.32	31.3999	13	13	
1396	0	300	19.34	37.58	26.3724	8	8	
1397	0	330	18.83	36.29	16.6489	-1	0.01	
1398	0	360	18.07	34.65	29.1839	13	13	
1399	0	390	17.15	32.93	15.3124	0	0.01	
1400	0	420	16.16	31.34	32.9624	18	18	
1401	0	450	16.02	29.77	30.3131	17	17	
1402	0	480	15.27	28.71	29.0617	16	16	
1403	0	510	14.93	27.9	21.0718	8	8	

CMD NUM CAP

A:A1403: 0 READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT VALUE		
1385								
1386	0	0	16.54	20.96	20.2256	16	16	
1387	0	30	16.41	20.84	19.09	15	15	
1388	0	60	16.09	20.75	8.9877	5	5	
1389	0	90	16.52	19.85	25.4058	22	22	
1390	0	120	17.21	19.71	15.5848	13	13	
1391	0	150	17.93	19.52	26.0462	24	24	
1392	0	180	18.59	19.26	19.8672	19	19	
1393	0	210	19.14	18.91	22.3392	23	23	
1394	0	240	19.48	18.5	10.0407	11	11	
1395	0	270	19.56	18.06	31.601	33	33	
1396	0	300	19.34	17.67	36.8184	38	38	
1397	0	330	18.03	17.38	22.6456	24	24	
1398	0	360	18.07	17.13	13.313	14	14	
1399	0	390	17.15	16.86	16.3616	17	17	
1400	0	420	16.16	16.55	23.544	23	23	
1401	0	450	16.02	16.37	21.8686	22	22	
1402	0	480	15.27	16.18	25.8671	25	25	
1403	0	510	14.93	16.21	24.7419	23	23	

CMD NUM CAP

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT VALUE		
1385								
1386	0	0	16.54	25.51	24.8556	16	16	
1387	0	30	16.41	25.13	19.263	11	11	
1388	0	60	16.89	24.75	30.2329	22	22	
1389	0	90	16.52	25.35	24.8744	16	16	
1390	0	120	17.21	24.84	7.4563	0	0.1	
1391	0	150	17.93	24.27	17.7948	11	11	
1392	0	180	18.59	23.65	25.4269	20	20	
1393	0	210	19.14	23.02	32.9584	29	29	
1394	0	240	19.48	22.46	17.803	15	15	
1395	0	270	19.56	22.12	24.7256	22	22	
1396	0	300	19.34	22.23	13.3136	10	10	
1397	0	330	18.83	22.91	18.0528	14	14	
1398	0	360	18.07	24.04	43.8435	38	38	
1399	0	390	17.15	25.42	15.9137	8	8	
1400	0	420	16.16	26.87	22.3206	12	12	
1401	0	450	16.02	28.13	18.52	6	6	
1402	0	480	15.27	29.2	27.6258	14	14	
1403	0	510	14.93	29.88	21.4471	6	6	

CMD NUM CAP

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT VALUE		
1385								
1386	0	0	16.54	20.35	11.1602	7	7	
1387	0	30	16.41	20.23	23.8897	20	20	
1388	0	60	16.89	20.27	27.3818	24	24	
1389	0	90	16.52	21.53	37.08	32	32	
1390	0	120	17.21	21.66	15.806	11	11	
1391	0	150	17.93	21.02	26.4424	23	23	
1392	0	180	18.59	21.99	34.9262	32	32	
1393	0	210	19.14	22.19	33.0945	30	30	
1394	0	240	19.48	22.44	26.1596	23	23	
1395	0	270	19.56	22.79	20.0654	17	17	
1396	0	300	19.34	23.33	17.2138	13	13	
1397	0	330	18.83	24.1	34.9868	30	30	
1398	0	360	18.07	25.09	36.2375	29	29	
1399	0	390	17.15	26.2	18.1074	9	9	
1400	0	420	16.16	27.35	24.3053	13	13	
1401	0	450	16.02	28.66	40.7588	28	28	
1402	0	480	15.27	29.44	47.4005	33	33	
1403	0	510	14.93	29.84	14.538	0	0.1	

CMD NUM CAP

A:A1384: "X-COORD READY

A	A	B	C	D	E	F	G	H
1384	X-COORD	Y-COORD	INIT VAL	KRIGE VAL	COV VAL	CONDIT VALUE		
1385								
1386	0	0	16.54	19.3	34.985	32	32	
1387	0	30	16.41	20.19	25.0321	21	21	
1388	0	60	16.89	20.86	22.0726	18	18	
1389	0	90	16.52	19.87	29.5084	26	26	
1390	0	120	17.21	20.84	34.9664	31	31	
1391	0	150	17.93	21.93	20.1503	16	16	
1392	0	180	18.59	23.11	39.6803	35	35	
1393	0	210	19.14	24.33	28.7705	24	24	
1394	0	240	19.48	25.45	19.7935	14	14	
1395	0	270	19.56	26.25	35.8601	29	29	
1396	0	300	19.34	26.46	29.7287	23	23	
1397	0	330	18.83	25.9	33.2322	26	26	
1398	0	360	18.07	24.67	34.3565	28	28	
1399	0	390	17.15	23	33.7652	28	28	
1400	0	420	16.16	21.14	19.9305	15	15	
1401	0	450	16.02	19.81	27.7752	24	24	
1402	0	480	15.27	18.35	25.3081	22	22	
1403	0	510	14.93	17.52	30.2614	28	28	

CMD NUM CAP

APPENDIX D

LIST OF PROGRAMMING CODE (MACROS)

FOR RISC2 AND RISC2A

\A
{HOME}{DOWN}
MACRO REQUIRES 1 SCREEN AREA FOR COMMENTS AND HELP. ~{DOWN}{DOWN}
MOVE CURSOR TO UPPER LEFT CORNER OF AREA TO BE RESERVED FOR COMMENTS ~{DOWN}{DOWN}
PRESS ENTER TO CONTINUE ~{HOME}
{?}/RNCCOMMENTS~.{PGDN}{UP}{RIGHT}~
{PGDN}{UP}{UP}{BIGRIGHT}{LEFT}/RNCNUM~~{DOWN}/RNCNUM1~~
{HOME}/RE.{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{BIGRIGHT}~
{GOTO}COMMENTS~
MOVE CURSOR TO UPPER LEFT HAND CORNER OF RANGE FOR TABLE OF INPUT VALUES ~{DOWN}{DOWN}
PRESS ENTER TO CONTINUE ~
{?}/RNCTABLE~~/WCS3~{RIGHT}/WCS10~
/RECOMMENTS~{GOTO}COMMENTS~{DOWN}
SELECT JOB CONTROL FUNCTIONS FROM MENU"~{DOWN}
{FRAMEOFF}
{MENUBRANCH SELECT}

SELECT

PREPROCESSOR	RISK	MODEL	FILE	QUIT
RUN LOTUS PREPROCESSOR OPTI	RUN MODEL WITH @RISK OPTIONS	RUN MODEL	IMPORT OR EXPORT A FILE	STOP MACRO PROCESSING
{MENUCALL FUNCTION}~	/FOARISC2A~	{MODRUN}	{MENUBRANCH FIL}	{QUIT}
{BRANCH C823}~		{MENUBRANCH SELECT}		

PREPROCESSOR
RUN LOTUS PREPROCESSOR OPTION FOR MODEL
{MENUCALL FUNCTION}~
{BRANCH C823}~

RISK
RUN MODEL WITH @RISK OPTIONS
/FOARISC2A~

MODEL
RUN MODEL
{MODRUN}
{MENUBRANCH SELECT}

FILE
IMPORT OR EXPORT A FILE
{MENUBRANCH FIL}

QUIT
STOP MACRO PROCESSING
{QUIT}

FUNCTION

CO	SO	RE	ME	EV	OU	QUIT
OVERALL JOB CONTROL	SOURCE INFORMATION	RECEPTOR INFORMATION	METEOROLOGY INFORMATIO	EVENT INFORMATION	OUTPUT OPTIONS	RETURN TO PREVIOUS MENU
{GOTO}TABLE~"CO~{RIGHT}STA	{GOTO}TABLE~{END}{DOWN}{DO	{GOTO}TABLE~{END}{DOWN}{DO	{GOTO}TABLE~{END}{DOWN	{GOTO}TABLE~{END}{DOWN}{DOW	{GOTO}TABLE~{END}{DOWN}{DOWN	~{RETURN}~
{MENUBRANCH T}	{MENUBRANCH SO}	{MENUBRANCH RE}	{MENUBRANCH ME}	{MENUBRANCH EV}	{MENUBRANCH OU}	

CO
OVERALL JOB CONTROL
{GOTO}TABLE~"CO~{RIGHT}STARTING~
{MENUBRANCH T}

EV
EVENT INFORMATION
{GOTO}TABLE~{END}{DOWN}{DOWN}"EV~{RIGHT}STARTING~
{MENUBRANCH EV}

SO
SOURCE INFORMATION
{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}STARTING ~
{MENUBRANCH SO}

RE
RECEPTOR INFORMATION
{GOTO}TABLE ~{END}{DOWN}{DOWN}"RE ~{RIGHT}STARTING ~
{MENUBRANCH RE}

ME
METEOROLOGY INFORMATION
{GOTO}TABLE ~{END}{DOWN}{DOWN}"ME ~{RIGHT}STARTING ~
{MENUBRANCH ME}

OU
OUTPUT OPTIONS
{GOTO}TABLE ~{END}{DOWN}{DOWN}"OU ~{RIGHT}STARTING ~
{MENUBRANCH OU}

QUIT
RETURN TO PREVIOUS MENU
~{RETURN}~

T

TITLES	MODEL OPTS	INTERVALS	POLLUTION ID	RUN OR NOT	TERRAIN HEIGHTS	MORE	QUIT
UP TO 2 LINES OF TITLES MAY BE	SELECT MODEL OPTIONKEYWORD	SPECIFY SHORT OR LONG TERM T	NAME OF POLLUTANT TO BE I	OPTION TO RUN MODEL OR PROCESS	SELECT EITHER "FLAT" OR "ELEVATED"	TERRAIN OPTIONS	END CONTROL FUNCTION SELECTION & R
{GOTO} TABLE ~{DOWN}"CO ~{RI	{GOTO} TABLE ~{END}{DOWN}{D	{BRANCH \I}	{GOTO} TABLE ~{END}{DOWN	{GOTO} TABLE ~{END}{DOWN}{DOW	{GOTO} TABLE ~{END}{DOWN}{DOWN	/RECOMMENTS ~{GOTO}	{GOTO} TABLE ~{END}{DOWN}{DOWN}"C
{LEFT}{DOWN}{LEFT}"CO{RIGHT	/RECOMMENTS~		{RIGHT}/RNCPOLLUTID ~~	/RECOMMENTS~	{MENUBRANCH HEIGHTS}	SELECT JOB CONTROL FU	{MENUBRANCH FUNCTION}
{GOTO} COMMENTS ~	{GOTO} COMMENTS ~{DOWN}	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~		{MENUBRANCH Q}	
{GETLABEL "TYPE TITLE 1 (UP TO	DFAULT -- Specifies that the regulatory default options will be used. ~{down}{d		{GETLABEL "TYPE NAME OF P	{MENUBRANCH R}			
{GETLABEL "TYPE TITLE 2 (UP TO	CONC -- Specifies that CONCentration values will be calculated ~{down}{down		/RNDPOLLUTID ~				
/RNDTITLE ~/RNDTITLE2 ~	DEPOS -- Specifies that dry DEPOSition values will be calculated. ~{down}{dow		{MENUBRANCH T}				
{MENUBRANCH T}	RURAL -- Specifies that RURAL dispersion parameters will be used. ~{down}{down}						
	URBAN -- Specifies that URBAN dispersion parameters will be used. ~{down}{down}						
	GRDRIS -- Use non-default option for gradual plume rise. ~{down}{down}						
	NOSTD -- Use non-default option for no stack-tip downwash. ~{down}{down}						
	NOBID -- Use non-default option for no buoyancy-induced dispersion. ~{down}{down}						
	NOCALM -- Use non-default option to bypass the calms processing routine. (short term only) ~{down}{down}						
	MSGPRO -- Use non-default option for the missing data processing routine. (short term only) ~{UP}						
	{MENUBRANCH MODEL}						

TITLES
UP TO 2 LINES OF TITLES MAY BE INPUT
{GOTO}TABLE ~{DOWN}"CO ~{RIGHT}TITLEONE ~{RIGHT}/RNCTITLE ~ ~
{LEFT}{DOWN}{LEFT}"CO{RIGHT}TITLETWO ~{RIGHT}/RNCTITLE2 ~ ~
{GOTO}COMMENTS ~
{GETLABEL "TYPE TITLE 1 (UP TO 80 CHARACTERS) AND PRESS ENTER: ",TITLE}
{GETLABEL "TYPE TITLE 2 (UP TO 80 CHARACTERS) AND PRESS ENTER: ",TITLE2}
/RNDTITLE ~/RNDTITLE2 ~
{MENUBRANCH T}

MODEL OPTS
SELECT MODEL OPTION KEYWORDS
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"CO ~ {RIGHT}MODELOPT ~
/RECOMMENTS ~
{GOTO}COMMENTS ~ {DOWN}
DFAULT -- Specifies that the regulatory default options will be used. ~ {down}{down}
CONC -- Specifies that CONCentration values will be calculated. ~ {down}{down}
DEPOS -- Specifies that dry DEPOSition values will be calculated. ~ {down}{down}
RURAL -- Specifies that RURAL dispersion parameters will be used. ~ {down}{down}
URBAN -- Specifies that URBAN dispersion parameters will be used. ~ {down}{down}
GRDRIS -- Use non-default option for gradual plume rise. ~ {down}{down}
NOSTD -- Use non-default option for no stack-tip downwash. ~ {down}{down}
NOBID -- Use non-default option for no buoyancy-induced dispersion. ~ {down}{down}
NOCALM -- Use non-default option to bypass the calms processing routine. (short term only) ~ {down}{down}
MSGPRO -- Use non-default option for the missing data processing routine. (short term only) ~ {UP}
{MENUBRANCH MODEL}

INTERVALS
SPECIFY SHORT OR LONG TERM TIME INTERVALS
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"CO ~ {RIGHT}AVERTIME ~
/RECOMMENTS ~ {GOTO}COMMENTS ~ {DOWN}
Select short term or long term time interval from menu. ~ {DOWN}
{MENUCALL I}
{MENUBRANCH T}

POLLUTION ID
NAME OF POLLUTANT TO BE MODELED
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"CO ~ {RIGHT}POLLUTID ~
{RIGHT}/RNCPOLLUTID ~ ~
{GOTO}COMMENTS ~
{GETLABEL "TYPE NAME OF POLLUTANT (8 CHARACTERS MAX) & PRESS ENTER: ",POLLUTID}
/RNDPOLLUTID ~
{MENUBRANCH T}

RUN OR NOT
OPTION TO RUN MODEL OR PROCESS INPUT & SUMMARIZE SETUP INFORMATION
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"CO ~ {RIGHT}RUNORNOT ~ {RIGHT}/RNCRUNORNOT ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
{MENUBRANCH R}

TERRAIN HEIGHTS
SELECT EITHER "FLAT" OR "ELEVATED" TERRAIN OPTIONS

{GOTO}TABLE ~ {END} {DOWN}{DOWN}"CO ~ {RIGHT}TERRHGTS ~ {RIGHT}/RNCOPT ~ ~
{MENUBRANCH HEIGHTS}

MORE
ADDITIONAL SELECTIONS
/RECOMMENTS ~ {GOTO}COMMENTS ~ {DOWN}
Select Job control functions from menu" ~ {DOWN}
{MENUBRANCH C}

QUIT
END CONTROL FUNCTION SELECTION & RETURN TO MAIN MENU
{GOTO}TABLE ~ {END} {DOWN}{DOWN}"CO ~ {RIGHT}FINISHED ~
{MENUBRANCH FUNCTION}

MODEL

DFAULT	CONC	DEPOS	RURAL	URBAN	NON-DEFAULT OPTIONS
Specifies that the regulatory default opti	Specifies that CONCentration values will	Specifies that dry DEPOSition values will	Specifies that RURAL dispersion pa	Specifies that URBAN dispersion parame ters	Select various non-default options
{GOTO} TABLE ~{END}{DOWN}{E	{GOTO} TABLE ~{END}{DOWN}{EN	{GOTO} TABLE ~{END}{DOWN}{EN	{GOTO} TABLE ~{END}{DOWN	{GOTO} TABLE ~{END}{DOWN}{END}	{MENUBRANCH MODEL2}
{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	
{LET OPT, DFAULT}	{LET OPT,CONC}	{LET OPT,DEPOS}	{LET OPT,RURAL}	{LET OPT, URBAN}	
/RNDOPT ~	/RNDOPT ~	/RNDOPT ~	/RNDOPT ~	/RNDOPT ~	
{MENUBRANCH MODEL}	{MENUBRANCH MODEL}	{MENUBRANCH MODEL}	{MENUBRANCH MODEL}	{MENUBRANCH MODEL}	

DFAULT
Specifies that the regulatory default options will be used.
{GOTO}TABLE ~ {END} {DOWN}{END} {RIGHT} {RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,DFAULT}
/RNDOPT ~
{MENUBRANCH MODEL}

CONC
Specifies that CONCentration values will be calculated.
{GOTO}TABLE ~ {END} {DOWN}{END} {RIGHT} {RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,CONC}
/RNDOPT ~
{MENUBRANCH MODEL}

DEPOS
Specifies that dry DEPOSition values will be calculated.
{GOTO}TABLE ~ {END} {DOWN}{END} {RIGHT} {RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,DEPOS}
/RNDOPT ~
{MENUBRANCH MODEL}

RURAL
Specifies that RURAL dispersion parameters will be used.
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,RURAL}
/RNDOPT ~
{MENUBRANCH MODEL}

URBAN
Specifies that URBAN dispersion parameters will be used.
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,URBAN}
/RNDOPT ~
{MENUBRANCH MODEL}

NON-DEFAULT OPTIONS
Select various non-default options
{MENUBRANCH MODEL2}

QUIT
RETURN TO PREVIOUS MENU
/RECOMMENTS ~
{MENUBRANCH T}

MODEL2

GRDRIS	NOSTD	NOBID	NOCALM	MSGPRO	RETURN	QUIT
Use non-default option for gradual plu	Use non-default option for no stack-tip	Use non-default option for no buoyancy	Use non-default option to bypass th	Use non-default option for the missing data	Return to previous menu	Return to control menu
{GOTO}TABLE ~{END}{DOWN}{E	{GOTO}TABLE ~{END}{DOWN}{EN	{GOTO}TABLE ~{END}{DOWN}{EN	{GOTO}TABLE ~{END}{DOWN	{GOTO}TABLE ~{END}{DOWN}{END}	{MENUBRANCH MODEL}	/RECOMMENTS ~
{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~		{MENUBRANCH T}
{LET OPT,GRDRIS}	{LET OPT,NOSTD}	{LET OPT,NOBID}	{LET OPT,NOCALM}	{LET OPT,MSGPRO}		
/RNDOPT ~	/RNDOPT ~	/RNDOPT ~	/RNDOPT ~	/RNDOPT ~		
{MENUBRANCH MODEL2}	{MENUBRANCH MODEL2}	{MENUBRANCH MODEL2}	{MENUBRANCH MODEL2}	{MENUBRANCH MODEL2}		

GRDRIS
Use non-default option for gradual plume rise.
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,GRDRIS}
/RNDOPT ~
{MENUBRANCH MODEL2}

NOSTD
Use non-default option for no stack-tip downwash.
{GOTO}TABLE ~ {END} {DOWN}{END} {RIGHT} {RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,NOSTD}
/RNDOPT ~
{MENUBRANCH MODEL2}

NOBID
Use non-default option for no buoyancy-induced dispersion.
{GOTO}TABLE ~ {END} {DOWN}{END} {RIGHT} {RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,NOBID}
/RNDOPT ~
{MENUBRANCH MODEL2}

NOCALM
Use non-default option to bypass the calms processing routine. (short term only)
{GOTO}TABLE ~ {END} {DOWN}{END} {RIGHT} {RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,NOCALM}
/RNDOPT ~
{MENUBRANCH MODEL2}

MSGPRO
Use non-default option for the missing data processing routine. (short term only)
{GOTO}TABLE ~ {END} {DOWN}{END} {RIGHT} {RIGHT}/RNCOPT ~ ~
{GOTO}COMMENTS ~
{LET OPT,MSGPRO}
/RNDOPT ~
{MENUBRANCH MODEL2}

RETURN
Return to previous menu
{MENUBRANCH MODEL}

QUIT
Return to control menu
/RECOMMENTS ~
{MENUBRANCH T}

I

SHORT TERM	LONG TERM	QUIT
Short Term AVERTIME keywords ~	Long Term AVERTIME keywords	Return to previous menu
{LET <<AIR>>TERM,1}	{LET <<AIR>>TERM,2}	{MENUBRANCH T}
{MENUBRANCH II}	{BRANCH III}	

SHORT TERM
Short Term AVERTIME keywords ~
{LET <<RISC2>>TERM,1}
{MENUBRANCH II}

LONG TERM
Long Term AVERTIME keywords
{LET <<RISC2>>TERM,2}
{BRANCH III}

QUIT
Return to previous menu
{MENUBRANCH T}

II

TIME1	TIME2	TIME3	TIME4	MONTH	PERIOD	QUIT
AVERAGING PERIOD #1	AVERAGING PERIOD #2	AVERAGING PERIOD #3	AVERAGING PERIOD #4	CALCULATE MONTHLY AVERAGE	CALCULATE AVERAGE FOR ENTIRE D	RETURN TO PREVIOUS MENU
{GOTO}TABLE ~{END}{DOWN}{E	{GOTO}TABLE ~{END}{DOWN}{EN	{GOTO}TABLE ~{END}{DOWN}{EN	{GOTO}TABLE ~{END}{DOWN	{GOTO}TABLE ~{END}{DOWN}{END	{GOTO}TABLE ~{END}{DOWN}{END}{R	{RETURN}
{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	MONTH ~	PERIOD ~	
Select from the following short term aver	Select from the following short term avera	Select from the following short term avera	Select from the following short term	/RNDTIME ~	/RNDTIME ~	
1 (hr) ~{down}{down}	1 (hr) ~{down}{down}	1 (hr) ~{down}{down}	1 (hr) ~{down}{down}	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	
2 (hrs) ~{down}{down}	2 (hrs) ~{down}{down}	2 (hrs) ~{down}{down}	2 (hrs) ~{down}{down}	{menubranch II}	{menubranch II}	
3 (hrs) ~{down}{down}	3 (hrs) ~{down}{down}	3 (hrs) ~{down}{down}	3 (hrs) ~{down}{down}			
4 (hrs) ~{down}{down}	4 (hrs) ~{down}{down}	4 (hrs) ~{down}{down}	4 (hrs) ~{down}{down}			
6 (hrs) ~{down}{down}	6 (hrs) ~{down}{down}	6 (hrs) ~{down}{down}	6 (hrs) ~{down}{down}			
8 (hrs) ~{down}{down}	8 (hrs) ~{down}{down}	8 (hrs) ~{down}{down}	8 (hrs) ~{down}{down}			
12 (hrs) ~{down}{down}	12 (hrs) ~{down}{down}	12 (hrs) ~{down}{down}	12 (hrs) ~{down}{down}			
24 (hrs) ~{down}{down}	24 (hrs) ~{down}{down}	24 (hrs) ~{down}{down}	24 (hrs) ~{down}{down}			
{GETNUMBER "ENTER SHORT TE	{GETNUMBER "ENTER SHORT TER	{GETNUMBER "ENTER SHORT TER	{GETNUMBER "ENTER SHORT TERM AVERAGING PERIOD IN HOURS: ",TIME} ~			
/RNDTIME ~	/RNDTIME ~	/RNDTIME ~	/RNDTIME ~			
/RECOMMENTS ~	/RECOMMENTS ~	/RECOMMENTS ~	/RECOMMENTS ~			
{MENUBRANCH II}	{MENUBRANCH II}	{MENUBRANCH II}	{MENUBRANCH II}			

TIME1
AVERAGING PERIOD #1
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCTIME ~ ~
{GOTO}COMMENTS ~
Select from the following short term averaging periods: ~ {down}{down}
1 (hr) ~ {down}{down}
2 (hrs) ~ {down}{down}
3 (hrs) ~ {down}{down}
4 (hrs) ~ {down}{down}

TIME2
AVERAGING PERIOD #2
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCTIME ~ ~
{GOTO}COMMENTS ~
Select from the following short term averaging periods: ~ {down}{down}
1 (hr) ~ {down}{down}
2 (hrs) ~ {down}{down}
3 (hrs) ~ {down}{down}
4 (hrs) ~ {down}{down}

```
 6 (hrs) ~ {down}{down}
 8 (hrs) ~ {down}{down}
 12 (hrs) ~ {down}{down}
 24 (hrs) ~ {down}{down}
{GETNUMBER "ENTER SHORT TERM AVERAGING PERIOD IN HOURS: ",TIME} ~
/RNDTIME ~
/RECOMMENTS ~
{MENUBRANCH II}
```

TIME3

```
AVERAGING PERIOD #3
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCTIME ~ ~
{GOTO}COMMENTS ~
Select from the following short term averaging periods: ~ {down}{down}
 1 (hr) ~ {down}{down}
 2 (hrs) ~ {down}{down}
 3 (hrs) ~ {down}{down}
 4 (hrs) ~ {down}{down}
 6 (hrs) ~ {down}{down}
 8 (hrs) ~ {down}{down}
 12 (hrs) ~ {down}{down}
 24 (hrs) ~ {down}{down}
{GETNUMBER "ENTER SHORT TERM AVERAGING PERIOD IN HOURS: ",TIME} ~
/RNDTIME ~
/RECOMMENTS ~
{MENUBRANCH II}
```

MONTH

```
CALCULATE MONTHLY AVERAGE
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCTIME ~ ~
MONTH ~
/RNDTIME ~
{GOTO}COMMENTS ~
{MENUBRANCH II}
```

QUIT

```
RETURN TO PREVIOUS MENU
{RETURN}
```

```
 6 (hrs) ~ {down}{down}
 8 (hrs) ~ {down}{down}
 12 (hrs) ~ {down}{down}
 24 (hrs) ~ {down}{down}
{GETNUMBER "ENTER SHORT TERM AVERAGING PERIOD IN HOURS: ",TIME} ~
/RNDTIME ~
/RECOMMENTS ~
{MENUBRANCH II}
```

TIME4

```
AVERAGING PERIOD #4
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCTIME ~ ~
{GOTO}COMMENTS ~
Select from the following short term averaging periods: ~ {down}{down}
 1 (hr) ~ {down}{down}
 2 (hrs) ~ {down}{down}
 3 (hrs) ~ {down}{down}
 4 (hrs) ~ {down}{down}
 6 (hrs) ~ {down}{down}
 8 (hrs) ~ {down}{down}
 12 (hrs) ~ {down}{down}
 24 (hrs) ~ {down}{down}
{GETNUMBER "ENTER SHORT TERM AVERAGING PERIOD IN HOURS: ",TIME} ~
/RNDTIME ~
/RECOMMENTS ~
{MENUBRANCH II}
```

PERIOD

```
CALCULATE AVERAGE FOR ENTIRE DATA PERIOD
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCTIME ~ ~
PERIOD ~
/RNDTIME ~
{GOTO}COMMENTS ~
{MENUBRANCH II}
```

R

RUN	NOT-RUN
RUN MODEL & PERFORM ALL CA	PROCESS INPUT DATA AND SUMMARIZE SETUP INFORMATION ONLY
{LET RUNORNOT,RUN}	{LET RUNORNOT,NOT}
/RNDRUNORNOT ~	/RNDRUNORNOT ~
{MENUBRANCH T}	{MENUBRANCH T}

RUN
RUN MODEL & PERFORM ALL CALCULATIONS
{LET RUNORNOT,RUN}
/RNDRUNORNOT ~
{MENUBRANCH T}

NOT-RUN
PROCESS INPUT DATA AND SUMMARIZE SETUP INFORMATION ONLY
{LET RUNORNOT,NOT}
/RNDRUNORNOT ~
{MENUBRANCH T}

HEIGHTS

FLAT	ELEV
IGNORE ALL TERRAIN HEIGHTS	ALLOWS INPUT OF RECEPTOR HEIGHTS
{LET OPT,FLAT}	{LET OPT,ELEV}
/RNDOPT ~	/RNDOPT ~
{MENUBRANCH T}	{MENUBRANCH T}

FLAT
IGNORE ALL TERRAIN HEIGHTS
{LET OPT,FLAT}
/RNDOPT ~
{MENUBRANCH T}

ELEV
ALLOWS INPUT OF RECEPTOR HEIGHTS
{LET OPT,ELEV}
/RNDOPT ~
{MENUBRANCH T}

C

HALFLIFE	DECAY COEFF	ELEV UNITS	FLAGPOLE	EVENT	RE-START	ERROR FILE	QUIT
HALF LIFE FOR EXPONENTIAL DE	DECAY COEFFICIENT FOR EXPONE	SPECIFIES INPUT UNITS FOR TERR	VALUE FOR HEIGHT OF FLAG	SHORT TERM EVENT PROCESSING	RESTORE INTERMEDIATE RESULTS IN AN	SPECIFY A DETAILED LIS	RETURN TO CONTROL MENU
{GOTO}TABLE ~{END}{DOWN}{D	{GOTO}TABLE ~{END}{DOWN}{D	{BRANCH \E}	{GOTO}TABLE ~{END}{DOWN	{MENUBRANCH S}	{MENUBRANCH RS}	{GOTO}TABLE ~{END}{D	{MENUBRANCH T}
{GOTO}COMMENTS ~	{GOTO}COMMENTS ~		/RECOMMENTS~{GOTO}COMMENTS ~			/RECOMMENTS~{GOTO}COMMENTS ~{DOWN}	
{GETNUMBER "ENTER HALFLIFE	{GETNUMBER "ENTER DECAY COEFFICIENT: ",DECAY} ~		{GETNUMBER "ENTER HEIGHT OF FLAGPOLE RECEPTORS ABOVE GL: ",FLAG} ~			DEBUG OPTION ALLOWS FOR DETAILED HOURLY REPORT OF ALL	
/RNDHAFLIF ~	/RNDDECAY ~		/RNDFLAG ~			{GETLABEL "ENTER THE FILE NAME FOR THE FILE OF ERROR MESS	
{BRANCH \C} ~	{BRANCH \C} ~		{BRANCH \C} ~			/RNDERRFIL ~	
						{MENUBRANCH CC}	

HALFLIFE
HALF LIFE FOR EXPONENTIAL DECAY (IN SECONDS)
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"CO ~ {RIGHT}HAFLIF ~ {RIGHT}/RNCHAFLIF ~ ~
{GOTO}COMMENTS ~
{GETNUMBER "ENTER HALFLIFE NUMBER IN HOURS: ",HAFLIF} ~
/RNDHAFLIF ~
{BRANCH C} ~

DECAY COEFF
DECAY COEFFICIENT FOR EXPONENTIAL DECAY (S ^ -1) =.693/HAFLIF
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"CO ~ {RIGHT}DECAY ~ {RIGHT}/RNCDECAY ~ ~

{GOTO}COMMENTS~
{GETNUMBER "ENTER DECAY COEFFICIENT: ",DECAY}~
/RNDDECAY~
{BRANCH C}~

ELEV UNITS

SPECIFIES INPUT UNITS FOR TERRAIN ELEVAIONS IN METERS OR FEET
/RECOMMENTS~{GOTO}COMMENTS~{DOWN}
SELECT EITHER FEET OR METERS FROM MENU"~{UP}
{MENUBRANCH E}

FLAGPOLE

VALUE FOR HEIGHT OF FLAGPOLE RECEPTORS
{GOTO}TABLE~{END}{DOWN}{DOWN}"CO~{RIGHT}FLAGPOLE~{RIGHT}/RNCFLAG~~
/RECOMMENTS~{GOTO}COMMENTS~
{GETNUMBER "ENTER HEIGHT OF FLAGPOLE RECEPTORS ABOVE GL: ",FLAG}~
/RNDFLAG~
{BRANCH C}~

EVENT

SHORT TERM EVENT PROCESSING KEYWORDS
{MENUBRANCH S}

RE-START

STORE INTERMEDIATE RESULTS IN AN UNFORMATTED FILE
{MENUBRANCH RS}

ERROR FILE

SPECIFY A DETAILED LISTING FILE OF ALL MESSAGES GENERATED
{GOTO}TABLE~{END}{DOWN}{DOWN}"CO~{RIGHT}ERRORFIL~{RIGHT}/RNCERRFIL~~{RIGHT}/RNCDEB~~
/RECOMMENTS~{GOTO}COMMENTS~{DOWN}
DEBUG OPTION ALLOWS FOR DETAILED HOURLY REPORT OF ALL PARAMETERS.~{DOWN}
{GETLABEL "ENTER THE FILE NAME FOR THE FILE OF ERROR MESSAGES: ",ERRFIL}
/RNDERRFIL~
{GOTO}COMMENTS~
{GETLABEL "IS AN HOURLY DETAILED LISTING DESIRED (Y or N) ?",DEB}
{IF DEB="Y"}{LET DEB,DEBUG}
/RNDDEB~
{MENUBRANCH C}

QUIT

RETURN TO CONTROL MENU

{MENUBRANCH T}

E

FEET	METERS
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{DOWN}"CO~{RIGHT}ELEVUNIT~{RIGHT}/RNCUNIT~~
/RECOMMENTS~{GOTO}COMME	/RECOMMENTS~{GOTO}COMMENTS~
{LET UNIT,FEET}	{LET UNIT,METERS}
/RNDUNIT~	/RNDUNIT~
{MENUBRANCH C}	{MENUBRANCH C}

FEET

{GOTO}TABLE~{END}{DOWN}{DOWN}"CO~{RIGHT}ELEVUNIT~{RIGHT}/RNCUNIT~~
/RECOMMENTS~{GOTO}COMMENTS~
{LET UNIT,FEET}
/RNDUNIT~
{MENUBRANCH C}

METERS

{GOTO}TABLE~{END}{DOWN}{DOWN}"CO~{RIGHT}ELEVUNIT~{RIGHT}/RNCUNIT~~
/RECOMMENTS~{GOTO}COMMENTS~
{LET UNIT,METERS}
/RNDUNIT~
{MENUBRANCH C}

S

EVFILE	SOCONT	DETAIL	QUIT
SPECIFIES NAME OF "event" INPUT	SPECIFIES THE LEVEL OF DETAIL T	SPECIFIES THE LEVEL OF DETAIL T	RETURN TO PREVIOUS MENU
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{EN	{GOTO}TABLE~{END}{DOWN}{EN	{MENUBRANCH C}
/RECOMMENTS~{GOTO}COMME	/RECOMMENTS~{GOTO}COMMEN	/RECOMMENTS~{GOTO}COMMENTS~{DOWN}	
THE DEFAULT FILENAME IS "PASS	{LET EVOPT,SOCONT}	{LET EVOPT,DETAIL}	
THE DEFAULT LEVEL OF DETAIL	/RNDEVOPT~	/RNDEVOPT~	
{GETLABEL "SPECIFY THE NAME	{MENUBRANCH S}	{MENUBRANCH S}	
/RNDEVFILE~			
{MENUBRANCH S}			

EVFILE

SPECIFIES NAME OF "event" INPUT FILE TO BE GENERATED
{GOTO}TABLE~{END}{DOWN}{DOWN}"CO~{RIGHT}EVENTFIL~{RIGHT}/RNCEVFILE~~
/RECOMMENTS~{GOTO}COMMENTS~{DOWN}
THE DEFAULT FILENAME IS "PASSTWO.INP" IF NO PARAMETERS ARE SPECIFIED~{DOWN}{DOWN}
THE DEFAULT LEVEL OF DETAIL IS "DETAIL" IF NOT OTHERWISE SPECIFIED.~{DOWN}
{GETLABEL "SPECIFY THE NAME OF THE event INPUT FILE (UPTO 40 CHARACTERS): ",EVFILE}
/RNDEVFILE~
{MENUBRANCH S}

SOCONT

SPECIFIES THE LEVEL OF DETAIL TO BE USED IN THE EVENT OUTPUT FILE
{GOTO}TABLE ~ {END} {DOWN} {END} {RIGHT} {RIGHT} {RIGHT}/RNCEVOPT ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~ {DOWN}
{LET EVOPT,SOCONT}
/RNDEVOPT ~
{MENUBRANCH S}

DETAIL

SPECIFIES THE LEVEL OF DETAIL TO BE USED IN THE EVENT OUTPUT FILE
{GOTO}TABLE ~ {END} {DOWN} {END} {RIGHT} {RIGHT} {RIGHT}/RNCEVOPT ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~ {DOWN}
{LET EVOPT,DETAIL}
/RNDEVOPT ~
{MENUBRANCH S}

QUIT

RETURN TO PREVIOUS MENU
{MENUBRANCH C}

RS

SAVEFILE	MULTIYEAR
Save the intermediate results to a file	Perform multiple year analysis
{GOTO}TABLE ~{END}{DOWN}{D	/RECOMMENTS ~{GOTO}COMMENTS ~{DOWN}
{MENUBRANCH RS2}	MULTYEAR NOT COMPATIBLE WITH SAVEFILE OR INITFILE KEYWORDS ~ {DOWN}
	{MENUBRANCH RS1}

SAVEFILE

Save the intermediate results to a file
{GOTO}TABLE ~ {END} {DOWN} {DOWN}"CO ~ {RIGHT}SAVEFILE ~ {RIGHT}/RNCSAVFIL ~ ~
{MENUBRANCH RS2}

MULTIYEAR

PERFORM MULTIPLEYEAR ANALYSIS – THIS SELECTION MAY BE REPEATED
/RECOMMENTS ~ {GOTO}COMMENTS ~ {DOWN}
MULTYEAR NOT COMPATIBLE WITH SAVEFILE OR INITFILE KEYWORDS ~ {DOWN}
{GOTO}TABLE ~ {END} {DOWN} {DOWN}"CO ~ {RIGHT}MULTIYEAR ~ {RIGHT}/RNCSAVFIL ~ ~ {RIGHT}/RNCINIFIL ~ ~
{MENUBRANCH RS1}

RS1

SAVFIL	INIFIL	RETURN
PRIMARY STORAGE FILE	The unformatted file of intermediate resu	RETURN TO PREVIOUS MENU
{GETLABEL "ENTER FILENAME F	{GETLABEL "ENTER FILENAME OF	{MENUBRANCH C}
{MENUBRANCH RS1}	/RNDINIFIL ~	
	{MENUBRANCH RS1}	

SAVFIL

PRIMARY STORAGE FILE FOR MULTIYEAR OPTION
{GETLABEL "ENTER FILENAME FOR PRIMARY INTERMEDIATE STORAGE: ",SAVFIL}
{MENUBRANCH RS1}

INIFIL

The unformatted file of intermediate results for initializing the model.
{GETLABEL "ENTER FILENAME OF UNFORMATED INTERMEDIATE RESULTS: ",INIFIL}
/RNDINIFIL ~
{MENUBRANCH RS1}

RETURN

RETURN TO PREVIOUS MENU
{MENUBRANCH C}

RS2

SAVFIL	DAYINC	SAVFL2	INITFILE	RETURN
Primary storage file	Specify the number of days between successi	Secondary storage file	The unformatted file of intermediate	Return to previous menu
{GETLABEL "ENTER FILENAME F	{GOTO}SAVFIL ~{RIGHT}{RIGHT}	{GOTO}SAVFIL ~{RIGHT}{RIGHT}	{GOTO}TABLE ~{END}{DOWN	{MENUBRANCH C}
{MENUBRANCH RS2}	{GETNUMBER "ENTER NUMBER OF	{GETLABEL "ENTER FILENAME FO	{GETLABEL "ENTER FILENAME OF UNFORMATED INTERMEDIATE RESULTS: ",INIFIL}	
	/RNDDAYINC ~	/RNDSAVFL2 ~	/RNDINIFIL ~	
	{MENUBRANCH RS2}	{MENUBRANCH RS2}	{MENUBRANCH RS2}	

SAVFIL

Primary storage file
{GETLABEL "ENTER FILENAME FOR PRIMARY INTERMEDIATE STORAGE: ",SAVFIL}
{MENUBRANCH RS2}

DAYINC

Specify the number of days between successive dumps
{GOTO}SAVFIL ~ {RIGHT}{RIGHT}/RNCDAYINC ~ ~
{GETNUMBER "ENTER NUMBER OF DAYS BETWEEN SUCCESSIVE DUMPS: ",DAYINC}
/RNDDAYINC ~
{MENUBRANCH RS2}

SAVFL2

Secondary storage file
{GOTO}SAVFIL ~ {RIGHT}{RIGHT}{RIGHT}/RNCSAVFL2 ~ ~
{GETLABEL "ENTER FILENAME FOR SECONDARY INTERMEDIATE RESULT FILE: ",SAVFL2}
/RNDSAVFL2 ~
{MENUBRANCH RS2}

INITFILE

The unformatted file of intermediate results for initializing the model.

{GOTO}TABLE~{END}{DOWN}{DOWN}"CO~{RIGHT}INITFILE~{RIGHT}/RNCINIFIL~~
{GETLABEL "ENTER FILENAME OF UNFORMATTED INTERMEDIATE RESULTS: ",INIFIL}
/RNDINIFIL~
{MENUBRANCH RS2}

RETURN

Return to previous menu
{MENUBRANCH C}

SO

318

LOCATION	DOWNWASH	EMISSIONS	UNITS	VARIABLES	GROUPS	QUIT
SPECIFY SOURCE LOCATION & TY	SPECIFY BUILDING DOWNWASH IN	OPTIONS TO USE VARIABLE EMISSI	SPECIFY OUTPUT UNITS	SPECIFY SETTLING, REMOVAL & DEP	GROUP CONTRIBUTIONS FROM SOURC	RETURN TO MAIN MENU
{GOTO}TABLE~{END}{DOWN}{D	/RECOMMENTS~{GOTO}COMMEN	{IF <<AIR>>TERM=2}{MENUBRA	{GOTO}TABLE~{END}{DOWN	{MENUBRANCH VAR}	{GOTO}TABLE~{END}{DOWN}{DOWN	{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}FINISHED~
LOCATION~{RIGHT}/RNCSRCID~	BUILDING DOWNWASH ALGORITH	{MENUBRANCH EMISFACS}	EMISUNIT~{RIGHT}/RNCEMIFAC~~{RIGHT}/RNCEMILBL~~{RIG		{RIGHT}/RNCGRPID~~{RIGHT}/RNCG	{MENUBRANCH FUNCTION}
{RIGHT}/RNCSRCTYP~~{RIGHT}	{MENUBRANCH DOWN}		/RECOMMENTS~{GOTO}COMMENTS~		/RECOMMENTS~	
/RECOMMENTS~{GOTO}COMMENTS~			{GETLABEL "ENTER INPUT UNIT CONVERSION FACTOR : ",EMIFAC}		{GOTO}COMMENTS~	
ENTER SOURCE ID (UP TO 8 CHARACTERS) AND PRESS ENTER:~{DOWN}{DOWN}			LABEL FOR EMISSION UNITS (UP TO 40 CHARACTERS).		THE GROUP ID IS A UNIQUE IDENTIFIER FOR EACH GROUP OF SOURCES~{DOWN}{DOWN}	
SOURCE TYPE, Xs AND Ys COORDINATES MUST BE ENTERED AFTER EACH ID.~{DOWN}			{GETLABEL "ENTER INPUT UNIT LABEL FOR EMISSIONS : ",EMILBL}		THE GROUP ID "ALL" IS USED TO AUTOMATICALLY SETUP A SOURCE GROUP CALL "ALL"~{DOWN}{DOWN}	
THE Zs COORDINATE IS OPTIONAL~{DOWN}			LABEL FOR OUTPUT UNITS (UP TO 40 CHARACTERS)		THAT INCLUDES ALL SOURCES MODELED FOR A PARTICULAR RUN~	
{GETLABEL "ENTER UNIQUE SOURCE ID AND PRESS ENTER : ",SRCID}			{GETLABEL "ENTER OUTPUT UNIT LABEL : ",CONLBL}		{GETLABEL "ENTER GROUP ID (UP TO 8 CHARACTERS) FOR SELECTED GROUP : ",GRPID}	
{MENUBRANCH SOO}			/RNDEMIFAC~/RNDEMILBL~/RNDCONLBL~		{IF GRPID="ALL"}{BRANCH G213}	
			{MENUBRANCH SO}		/RECOMMENTS~	
					SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}	
					USER MAY SPECIFY A RANGE OF SOURCES TO BE INCLUDED IN A PARTICULAR GROUP.~{DOWN}{DOWN}	
					A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}	
					BY A DASH, ie. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}	
					{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",GSRCID}	
					/RNDGRPID~/RNDGSRCID~	
					{MENUBRANCH SO}	

LOCATION

SPECIFY LOCATION OF SOURCE
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}
LOCATION~{RIGHT}/RNCSRCID~~
{RIGHT}/RNCSRCTYP~~{RIGHT}/RNCXS~~{RIGHT}/RNCYS~~{RIGHT}/RNCZS~~
/RECOMMENTS~{GOTO}COMMENTS~
ENTER SOURCE ID (UP TO 8 CHARACTERS) AND PRESS ENTER:~{DOWN}{DOWN}
SOURCE TYPE, Xs AND Ys COORDINATES MUST BE ENTERED AFTER EACH ID.~{DOWN}
THE Zs COORDINATE IS OPTIONAL~{DOWN}
{GETLABEL "ENTER UNIQUE SOURCE ID AND PRESS ENTER : ",SRCID}
{MENUBRANCH SOO}

DOWNWASH

SPECIFY BUILDING DOWNWASH INFORMATION
/RECOMMENTS~{GOTO}COMMENTS~

BUILDING DOWNWASH ALGORITHMS DO NOT APLY TO VOLUME OR AREA SOURCES. ~ {DOWN}
{MENUBRANCH DOWN}

EMISSIONS

OPTIONS TO USE VARIABLE EMISSION RATES
{IF <<RISC2>>TERM=2}{MENUBRANCH EMISFACL}
{MENUBRANCH EMISFACS}

UNITS

SPECIFY OUTPUT UNITS
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISUNIT ~ {RIGHT}/RNCEMIFAC ~ ~ {RIGHT}/RNCEMILBL ~ ~ {RIGHT}/RNCCONLBL ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
{GETLABEL "ENTER INPUT UNIT CONVERSION FACTOR : ",EMIFAC}
LABEL FOR EMISSION UNITS (UP TO 40 CHARACTERS).
{GETLABEL "ENTER INPUT UNIT LABEL FOR EMIISIONS : ",EMILBL}
LABEL FOR OUTPUT UNITS (UP TO 40 CHARACTERS).
{GETLABEL "ENTER OUTPUT UNIT LABEL : ",CONLBL}
/RNDEMIFAC ~ /RNDEMILBL ~ /RNDCONLBL ~
{MENUBRANCH SO}

VARIABLES

SPECIFY SETTLING, REMOVAL & DEPOSITION VARIABLES
{MENUBRANCH VAR}

GROUPS

GROUP CONTRIBUTIONS FROM SOURCES TOGETHER
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}SRCGROUP ~
{RIGHT}/RNCGRPID ~ ~ {RIGHT}/RNCGSRCID ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
THE GROUP ID IS A UNIQUE IDENTIFIER FOR EACH GROUP OF SOURCES ~ {DOWN}{DOWN}
THE GROUP ID "ALL" IS USED TO AUTOMATICALLY SETUP A SOURCE GROUP CALL "ALL" ~ {DOWN}{DOWN}
THAT INCLUDES ALL SOURCES MODELED FOR A PARTICULAR RUN. ~
{GETLABEL "ENTER GROUP ID (UP TO 8 CHARACTERS) FOR SELECTED GROUP : ",GRPID}
{IF GRPID="ALL"}{BRANCH G213}
/RECOMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES TO BE INCLUDED IN A PARTICULAR GROUP. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",GSRCID}
/RNDGRPID ~ /RNDGSRCID ~
{MENUBRANCH SO}

QUIT

RETURN TO MAIN MENU
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}FINISHED ~
{MENUBRANCH FUNCTION}

SOO

Xs	Ys	Zs	SOURCE TYPE
X (EAST-WEST) COORDINATE OF	Y (NORTH-SOUTH) COORDINATE	SOURCE ELEVATION (ONLY USED	SPECIFY SOURCE TYPE
/RECOMMENTS~{GOTO}COMME	/RECOMMENTS~{GOTO}COMMEN	{GETNUMBER "ENTER THE SOURC	{MENUBRANCH SSO}
THE X (EAST-WEST) AND Y (NOR	THE X (EAST-WEST) AND Y (NORT	/RNDZS~	
THE CENTER OF THE SOURCE FO	THE CENTER OF THE SOURCE FOR	{MENUBRANCH SOO}	
THE SOUTHWEST CORNER OF TH	THE SOUTHWEST CORNER OF THE SOURCE FOR AREA SOUCES ~{DOWN}		
{GETNUMBER "ENTER X COORDI	{GETNUMBER "ENTER Y COORDINATE (IN METERS) : ",YS}		
/RNDXS~	/RNDYS~		
{MENUBRANCH SOO}	{MENUBRANCH SOO}		

Xs

X (EAST-WEST) COORDINATE OF SOURCE LOCATION (IN METERS)
/RECOMMENTS ~ {GOTO}COMMENTS ~
THE X (EAST-WEST) AND Y (NORTH-SOUTH) COORDINATES ARE ~ {DOWN}{DOWN}
THE CENTER OF THE SOURCE FOR POINT AND VOLUME SOURCES AND ~ {DOWN}{DOWN}
THE SOUTHWEST CORNER OF THE SOURCE FOR AREA SOUCES ~ {DOWN}
{GETNUMBER "ENTER X COORDINATE (IN METERS) : ",XS}
/RNDXS ~
{MENUBRANCH SOO}

Ys

Y (NORTH-SOUTH) COORDINATE OF SOURCE LOCATION (IN METERS)
/RECOMMENTS ~ {GOTO}COMMENTS ~
THE X (EAST-WEST) AND Y (NORTH-SOUTH) COORDINATES ARE ~ {DOWN}{DOWN}
THE CENTER OF THE SOURCE FOR POINT AND VOLUME SOURCES AND ~ {DOWN}{DOWN}
THE SOUTHWEST CORNER OF THE SOURCE FOR AREA SOUCES ~ {DOWN}
{GETNUMBER "ENTER Y COORDINATE (IN METERS) : ",YS}
/RNDYS ~
{MENUBRANCH SOO}

Zs

SOURCE ELEVATION (ONLY USED IF CO TERRHGTS ELEV OPTION IS SELECTED)
{GETNUMBER "ENTER THE SOURCE ELEVATION AND PRESS ENTER : ",ZS}
/RNDZS ~
{MENUBRANCH SOO}

SOURCE TYPE

SPECIFY SOURCE TYPE
{MENUBRANCH SSO}

SSO

POINT	VOLUME	AREA	QUIT
POINT TYPE SOURCE	VOLUME TYPE SOURCE	AREA TYPE SOURCE	RETURN TO PREVIOUS MENU
{LET SRCTYP,POINT}	{LET SRCTYP,VOLUME}	{LET SRCTYP,AREA}	{MENUBRANCH SO}
/RNDSRCTYP~	/RNDSRCTYP~	/RNDSRCTYP~	
/RECOMMENTS~{GOTO}COMME	/RECOMMENTS~{GOTO}COMMEN	/RECOMMENTS~{GOTO}COMMENTS~	
THE ABOVE PARAMETERS ARE R	THE ABOVE PARAMETERS ARE RE	THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR AREA SOURCES. ~{DOWN}	
{MENUBRANCH SOP}	{MENUBRANCH SOV}	{MENUBRANCH SOA}	

POINT

POINT TYPE SOURCE
{LET SRCTYP,POINT}
/RNDSRCTYP~
/RECOMMENTS~{GOTO}COMMENTS~
THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR POINT SOURCES. ~{DOWN}
{MENUBRANCH SOP}

VOLUME

VOLUME TYPE SOURCE
{LET SRCTYP,VOLUME}
/RNDSRCTYP~
/RECOMMENTS~{GOTO}COMMENTS~
THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR VOLUME SOURCES. ~{DOWN}
{MENUBRANCH SOV}

AREA

AREA TYPE SOURCE
{LET SRCTYP,AREA}
/RNDSRCTYP~
/RECOMMENTS~{GOTO}COMMENTS~
THE ABOVE PARAMETERS ARE REQUIRED INPUT FOR AREA SOURCES. ~{DOWN}
{MENUBRANCH SOA}

QUIT

RETURN TO PREVIOUS MENU
{MENUBRANCH SO}

SOP

RATE	HEIGHT	TEMP	VELOCITY	DIAMETER	QUIT
POINT EMISSION RATE IN G/S	RELEASE HEIGHT ABOVE GL IN M	STACK GAS EXIT TEMP IN DEGREE	STACK GAS VELOCITY IN M/S	STACK INSIDE DIAMETER IN METERS	RETURN TO LOCATION
{GOTO}TABLE~{END}{DOWN}{D	{GETNUMBER "ENTER RELEASE HE	{GETNUMBER "ENTER STACK GAS	{GETNUMBER "ENTER STACK	{GETNUMBER "ENTER STACK INSIDE	{MENUBRANCH SO}
SRCPARAM~{RIGHT}/RNCPARID	/RNDHEIGHT~	/RNDTEMP~	/RNDVEL~	/RNDDIAM~	
{contents parid,srcid,9,117}{GOTO}CO	{MENUBRANCH SOP}	{MENUBRANCH SOP}	{MENUBRANCH SOP}	{MENUBRANCH SOP}	
{GETNUMBER "ENTER POINT EMISSION RATE IN G/S : ",RATE}					
/RNDSRCID~/RNDPARID~/RNDRATE~					
{MENUBRANCH SOP}					

RATE

```
POINT EMISSION RATE IN G/S
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
SRCPARAM ~ {RIGHT}/RNCPARID ~ ~ {right}/rncrate ~ ~ {RIGHT}/RNCHEIGHT ~ ~ {RIGHT}/RNCTEMP ~ ~ {RIGHT}/RNCVEL ~ ~ {RIGHT}/RNCDIAM ~ ~
{contents parid,srcid,9,117}{GOTO}COMMENTS~
{GETNUMBER "ENTER POINT EMISSION RATE IN G/S :  ",RATE}
/RNDSRCID ~ /RNDPARID ~ /RNDRATE ~
{MENUBRANCH  SOP}
```

HEIGHT

```
RELEASE HEIGHT ABOVE GL IN METERS
{GETNUMBER "ENTER RELEASE HEIGHT ABOVE GROUND (IN METERS) :  ",HEIGHT}
/RNDHEIGHT ~
{MENUBRANCH  SOP}
```

TEMP

```
STACK GAS EXIT TEMP IN DEGREES K
{GETNUMBER "ENTER STACK GAS EXIT TEMPERATURE (DEGREES K) :  ",TEMP}
/RNDTEMP ~
{MENUBRANCH  SOP}
```

VELOCITY

```
STACK GAS VELOCITY IN M/S
{GETNUMBER "ENTER STACK GAS EXIT VELOCITY (M/S) :  ",VEL}
/RNDVEL ~
{MENUBRANCH  SOP}
```

DIAMETER

```
STACK INSIDE DIAMETER IN METERS
{GETNUMBER "ENTER STACK INSIDE DIAMETER (IN METERS) :  ",DIAM}
/RNDDIAM~
{MENUBRANCH  SOP}
```

QUIT

```
RETURN TO LOCATION
{MENUBRANCH  SO}
```

SOV

RATE	HEIGHT	LATERAL	VERTICAL	QUIT
VOLUME EMISSION RATE IN G/S	RELEASE HEIGHT (CENTER OF VO	INITIAL LATERAL DIMENSION OF V	INITIAL VERTICAL DIMENSIO	RETURN TO LOCATION
{GOTO}TABLE ~{END}{DOWN}{D	{GETNUMBER "ENTER RELEASE HE	{GETNUMBER "ENTER INITIAL LAT	{GETNUMBER "ENTER INITIA	{MENUBRANCH SO}
SRCPARAM ~{RIGHT}/RNCPARID	/RNDHEIGHT ~	/RNDSYINIT ~	/RNDSZINIT ~	
{contents parid,srcid,9,117}{GOTO}A5	{MENUBRANCH SOV}	{MENUBRANCH SOV}	{MENUBRANCH SOV}	
{GETNUMBER "ENTER VOLUME EMISSION RATE IN G/S : ",RATE}				
/RNDSRCID ~/RNDPARID ~/RNDRATE ~				
{MENUBRANCH SOV}				

RATE
VOLUME EMISSION RATE IN G/S
{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}
SRCPARAM ~{RIGHT}/RNCPARID ~ ~{right}/rncrate ~ ~{RIGHT}/RNCHEIGHT ~ ~{RIGHT}/RNCSYINIT ~ ~{RIGHT}/RNCSZINIT ~ ~
{contents parid,srcid,9,117}{GOTO}A50 ~
{GETNUMBER "ENTER VOLUME EMISSION RATE IN G/S : ",RATE}
/RNDSRCID ~/RNDPARID ~/RNDRATE ~
{MENUBRANCH SOV}

HEIGHT
RELEASE HEIGHT (CENTER OF VOLUME) ABOVE GL IN METERS
{GETNUMBER "ENTER RELEASE HEIGHT ABOVE GROUND (IN METERS) : ",HEIGHT}
/RNDHEIGHT ~
{MENUBRANCH SOV}

LATERAL
INITIAL LATERAL DIMENSION OF VOLUME
{GETNUMBER "ENTER INITIAL LATERAL DIMENSION OF VOLUME (METERS) : ",SYINIT}
/RNDSYINIT ~
{MENUBRANCH SOV}

VERTICAL
INITIAL VERTICAL DIMENSION OF VOLUME
{GETNUMBER "ENTER INITIAL VERTICAL DIMENSION OF THE VOLUME (METERS) : ",SZINIT}
/RNDSZINIT ~
{MENUBRANCH SOV}

QUIT
RETURN TO LOCATION
{MENUBRANCH SO}

SOA

RATE	HEIGHT	LENGTH	QUIT
AREA EMISSION RATE IN G/S/SQ M	RELEASE HEIGHT ABOVE GROUN	LENGTH OF SIDE OF SQUARE AREA (METERS)	
{GOTO}TABLE ~{END}{DOWN}{D	{GETNUMBER "ENTER RELEASE HE	{GETNUMBER "ENTER LENGTH OF SIDE OF SQUARE ARE (METERS) : ",XINIT}	
SRCPARAM ~{RIGHT}/RNCPARID	/RNDRELHGT ~	/RNDXINIT ~	
{contents parid,srcid,9,117}{GOTO}A5	{MENUBRANCH SOA}	{MENUBRANCH SOA}	
{GETNUMBER "ENTER AREA EMISSION RATE IN G/S/SQ M : ",RATE}			
/RNDSRCID ~/RNDPARID ~/RNDRATE ~			
{MENUBRANCH SOA}			

RATE

```
AREA EMISSION RATE IN G/S/SQ M
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
SRCPARAM ~ {RIGHT}/RNCPARID ~ ~ {right}/rncrate ~ ~ {RIGHT}/RNCRELHGT ~ ~ {RIGHT}/RNCXINIT ~ ~
{contents parid,srcid,9,117}{GOTO}A50 ~
{GETNUMBER "ENTER AREA EMISSION RATE IN G/S/SQ M :  ",RATE}
/RNDSRCID ~ /RNDPARID ~ /RNDRATE ~
{MENUBRANCH  SOA}
```

HEIGHT

```
RELEASE HEIGHT ABOVE GROUND (IN METERS)
{GETNUMBER "ENTER RELEASE HEIGHT ABOVE GROUND (IN METERS) :  ",RELHGT}
/RNDRELHGT ~
{MENUBRANCH  SOA}
```

LENGTH

```
LENGTH OF SIDE OF SQUARE AREA (METERS)
{GETNUMBER "ENTER LENGTH OF SIDE OF SQUARE ARE (METERS) :  ",XINIT}
/RNDXINIT ~
{MENUBRANCH  SOA}
```

DOWN

```
HEIGHT                          WIDTH                           LOWBOUND                        RETURN
BUILDING HEIGHTS(IN METERS) BUILDING WIDTHS (IN METERS)    CALCULATE "LOWER BOUND" CONRETURN TO SOURCE MENU
{IF <<RISC2>>TERM=2}{BRANCH{IF <<RISC2>>TERM=2}{BRANCH{IF <<RISC2>>TERM=2}{BRANCH{MENUBRANCH SO}
{GOTO}TABLE ~{END}{DOWN}{D{GOTO}TABLE ~{END}{DOWN}{D{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}LOWBOUND ~{RIGHT}/RNCDSRCID ~ ~{RIGHT}/RNCTEN ~ ~{RIGHT}/RNCTWENTY ~ ~{RIGHT}/RNCTHIRTY ~ ~{RIGHT}/RNCfourty ~ ~{RIGHT}/RNCFIFTY ~
/RECOMMENTS ~{GOTO}COMME/RECOMMENTS ~{GOTO}COMMEN/RECOMMENTS ~{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNSOURCE ID MAY BE THE SAME UNISOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SUSER MAY SPECIFY A RANGE OF SOUSER MAY SPECIFY A RANGE OF SOURCES FOR THE LOWER BOUNDS CALCULATIONS ~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIEA RANGE OF SOURCES IS SPECIFIEDA RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~{DOWN}
BY A DASH, ie. STACK1-STACK10BY A DASH, ie. STACK1-STACK10 BY A DASH, ie. STACK1-STACK10 (NOTE NO SPACES BETWEEN ID'S) ~{DOWN}
{GETLABEL "ENTER SOURCE IDF{GETLABEL "ENTER SOURCE IDF O{GETLABEL "ENTER SOURCE IDF OR SELECTED SOURCE : ",DSRCID}
/RECOMMENTS ~{GOTO}COMME/RECOMMENTS ~{GOTO}COMMEN/RECOMMENTS ~{GOTO}COMMENTS ~
FOR THE SHORT TERM MODEL - FOR THE SHORT TERM MODEL - - FOR THE SHORT TERM MODEL - -  ~{DOWN}{DOWN}
USER INPUTS 36 DIRECTION-SPECUSER INPUTS 36 DIRECTION-SPECIUSER INPUTS 36 DIRECTION-SPECIFICLOWER BOUND WAKE OPTIONS SWITCHES ~{DOWN}{DOWN}
BEGINNING WITH THE 10 DEGREEBEGINNING WITH THE 10 DEGREE BEGINNING WITH THE 10 DEGREE FLOW VECTOR (WIND BLOWING TOWARD 10 ~{DOWN}{DOWN}
DEGREES FROM NORTH) AND INDEGREES FROM NORTH) AND INCIDEGREES FROM NORTH) AND INCREMENTING BY 10 DEGREES ~{DOWN}{DOWN}
IN A CLOCK WISE DIRECTION ~{DIN A CLOCK WISE DIRECTION ~{DOIN A CLOCK WISE DIRECTION ~{DOWN}{DOWN}
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING WA SWITCH VALUE OF 0 MEANS TO USE THE UPPER BOUND (REGULATORY DEFAULT) ~{DOWN}{DOWN}
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING WA SWITCH VALUE OF 1 MEANS TO USE THE LOWER BOUND FOR THAT SECTOR ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 10 DEGREES :",TEN}/RNDTEN ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 20 DEGREES :",TWENTY}/RNDTWENTY ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 30 DEGREES :",THIRTY}/RNDTHIRTY ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 40 DEGREES :",FOURTY}/RNDFOURTY ~
{GOTO}TABLE ~{END}{DOWN}{D{GOTO}TABLE ~{END}{DOWN}{D{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 50 DEGREES :",FIFTY}/RNDFIFTY ~
{contents DSRCID2,Drcid,9,117}/RND{contents DSRCID2,Drcid,9,117}/RND{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 60 DEGREES :",SIXTY}/RNDSIXTY ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}LOWBOUND ~{RIGHT}/RNCDSRCID2 ~ ~{RIGHT}/RNCone ~ ~{RIGHT}/RNCtwo ~ ~{RIGHT}/RNCthree ~ ~{RIGHT}/RNCfour ~ ~{RIGHT}/RNCfive ~ ~{RIGHT}/R N
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{contents DSRCID2,Drcid,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 70 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 80 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 90 DEGREES :",THREE}/RNDTHREE ~
```

```
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 100 DEGREES :",FOUR}/RNDFOUR~
{GOTO}TABLE~{END}{DOWN}{D{GOTO}TABLE~{END}{DOWN}{D{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 110 DEGREES :",FIVE}/RNDFIVE~
{contents DSRCID2,Dsrcid,9,117}/RND{contents DSRCID2,Dsrcid,9,117}/RND{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 120 DEGREES :",SIX}/RNDSIX~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}LOWBOUND~{RIGHT}/RNCDSRCID2~~{RIGHT}/RNCone~~{RIGHT}/RNCtwo~~{RIGHT}/RNCthree~~{RIGHT}/RNCfour~~{RIGHT}/RNCfive~~{RIGHT}/R N
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{contents DSRCID2,Dsrcid,9,117}/RNDDSRCID2~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 130 DEGREES :",ONE}/RNDONE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 140 DEGREES :",TWO}/RNDTWO~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 150 DEGREES :",THREE}/RNDTHREE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 160 DEGREES :",FOUR}/RNDFOUR~
{GOTO}TABLE~{END}{DOWN}{D{GOTO}TABLE~{END}{DOWN}{D{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 170 DEGREES :",FIVE}/RNDFIVE~
{contents DSRCID2,Dsrcid,9,117}/RND{contents DSRCID2,Dsrcid,9,117}/RND{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 180 DEGREES :",SIX}/RNDSIX~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}LOWBOUND~{RIGHT}/RNCDSRCID2~~{RIGHT}/RNCone~~{RIGHT}/RNCtwo~~{RIGHT}/RNCthree~~{RIGHT}/RNCfour~~{RIGHT}/RNCfive~~{RIGHT}/R N
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{contents DSRCID2,Dsrcid,9,117}/RNDDSRCID2~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 190 DEGREES :",ONE}/RNDONE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 200 DEGREES :",TWO}/RNDTWO~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 210 DEGREES :",THREE}/RNDTHREE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 220 DEGREES :",FOUR}/RNDFOUR~
{GOTO}TABLE~{END}{DOWN}{D{GOTO}TABLE~{END}{DOWN}{D{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 230 DEGREES :",FIVE}/RNDFIVE~
{contents DSRCID2,Dsrcid,9,117}/RND{contents DSRCID2,Dsrcid,9,117}/RND{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 240 DEGREES :",SIX}/RNDSIX~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}LOWBOUND~{RIGHT}/RNCDSRCID2~~{RIGHT}/RNCone~~{RIGHT}/RNCtwo~~{RIGHT}/RNCthree~~{RIGHT}/RNCfour~~{RIGHT}/RNCfive~~{RIGHT}/R N
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{contents DSRCID2,Dsrcid,9,117}/RNDDSRCID2~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 250 DEGREES :",ONE}/RNDONE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 260 DEGREES :",TWO}/RNDTWO~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 270 DEGREES :",THREE}/RNDTHREE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 280 DEGREES :",FOUR}/RNDFOUR~
{GOTO}TABLE~{END}{DOWN}{D{GOTO}TABLE~{END}{DOWN}{D{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 290 DEGREES :",FIVE}/RNDFIVE~
{contents DSRCID2,Dsrcid,9,117}/RND{contents DSRCID2,Dsrcid,9,117}/RND{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 300 DEGREES :",SIX}/RNDSIX~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}LOWBOUND~{RIGHT}/RNCDSRCID2~~{RIGHT}/RNCone~~{RIGHT}/RNCtwo~~{RIGHT}/RNCthree~~{RIGHT}/RNCfour~~{RIGHT}/RNCfive~~{RIGHT}/R N
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{contents DSRCID2,Dsrcid,9,117}/RNDDSRCID2~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 310 DEGREES :",ONE}/RNDONE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 320 DEGREES :",TWO}/RNDTWO~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 330 DEGREES :",THREE}/RNDTHREE~
{GETNUMBER "ENTER BUILDING {GETNUMBER "ENTER BUILDING W{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 340 DEGREES :",FOUR}/RNDFOUR~
/RNDDSRCID~                  /RNDDSRCID~                {GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 350 DEGREES :",FIVE}/RNDFIVE~
{MENUBRANCH DOWN}            {MENUBRANCH DOWN}          {GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 360 DEGREES :",SIX}/RNDSIX~
                                                        {MENUBRANCH DOWN}
```

HEIGHT

BUILDING HEIGHTS (IN METERS)
{IF <<RISC2>>TERM=2}{BRANCH HTLT}~
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}BUILDHGT~{RIGHT}/RNCDSRCID~~{RIGHT}/RNCTEN~~
{RIGHT}/RNCTWENTY~~{RIGHT}/RNCTHIRTY~~{RIGHT}/RNCfourty~~{RIGHT}/RNCFIFTY~~{RIGHT}/RNCSIXTY~~
/RECOMMENTS~{GOTO}COMMENTS~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY.~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",DSRCID}
/RECOMMENTS~{GOTO}COMMENTS~
FOR THE SHORT TERM MODEL -- ~{DOWN}{DOWN}
USER INPUTS 36 DIRECTION-SPECIFIC BUILDING HEIGHTS (IN METERS)~{DOWN}{DOWN}
BEGINNING WITH THE 10 DEGREE FLOW VECTOR (WIND BLOWING TOWARD 10~{DOWN}{DOWN}
DEGREES FROM NORTH) AND INCREMENTING BY 10 DEGREES~{DOWN}{DOWN}
IN A CLOCKWISE DIRECTION~{DOWN}

```
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 10 DEGREES :",TEN}/RNDTEN ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 20 DEGREES :",TWENTY}/RNDTWENTY ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 30 DEGREES :",THIRTY}/RNDTHIRTY ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 40 DEGREES :",FOURTY}/RNDFOURTY ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 50 DEGREES :",FIFTY}/RNDFIFTY ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 60 DEGREES :",SIXTY}/RNDSIXTY ~
{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}BUILDHGT ~{RIGHT}/RNCDSRCID2 ~ ~{RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~{RIGHT}/RNCthree ~ ~{RIGHT}/RNCfour ~ ~{RIGHT}/RNCfive ~ ~{RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 70 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 80 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 90 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 100 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 110 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 120 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}BUILDHGT ~{RIGHT}/RNCDSRCID2 ~ ~{RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~{RIGHT}/RNCthree ~ ~{RIGHT}/RNCfour ~ ~{RIGHT}/RNCfive ~ ~{RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 130 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 140 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 150 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 160 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 170 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 180 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}BUILDHGT ~{RIGHT}/RNCDSRCID2 ~ ~{RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~{RIGHT}/RNCthree ~ ~{RIGHT}/RNCfour ~ ~{RIGHT}/RNCfive ~ ~{RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 190 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 200 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 210 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 220 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 230 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 240 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}BUILDHGT ~{RIGHT}/RNCDSRCID2 ~ ~{RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~{RIGHT}/RNCthree ~ ~{RIGHT}/RNCfour ~ ~{RIGHT}/RNCfive ~ ~{RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 250 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 260 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 270 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 280 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 290 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 300 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~{END}{DOWN}{DOWN}"SO ~{RIGHT}BUILDHGT ~{RIGHT}/RNCDSRCID2 ~ ~{RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~{RIGHT}/RNCthree ~ ~{RIGHT}/RNCfour ~ ~{RIGHT}/RNCfive ~ ~{RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 310 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 320 DEGREES :",TWO}/RNDTWO ~
```

```
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 330 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 340 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 350 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR 360 DEGREES :",SIX}/RNDSIX ~
/RNDDSRCID ~
```
{MENUBRANCH DOWN}

WIDTH

```
BUILDING WIDTHS (IN METERS)
{IF <<RISC2>>TERM=2}{BRANCH WDLT} ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}BUILDWID ~ {RIGHT}/RNCDSRCID ~ ~ {RIGHT}/RNCTEN ~ ~
{RIGHT}/RNCTWENTY ~ ~ {RIGHT}/RNCTHIRTY ~ ~ {RIGHT}/RNCfourty ~ ~ {RIGHT}/RNCFIFTY ~ ~ {RIGHT}/RNCSIXTY ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING WIDTHS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",DSRCID}
/RECOMMENTS ~ {GOTO}COMMENTS ~
FOR THE SHORT TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 36 DIRECTION-SPECIFIC BUILDING WIDTHS (IN METERS) ~ {DOWN}{DOWN}
BEGINNING WITH THE 10 DEGREE FLOW VECTOR (WIND BLOWING TOWARD 10 ~ {DOWN}{DOWN}
DEGREES FROM NORTH) AND INCREMENTING BY 10 DEGREES ~ {DOWN}{DOWN}
IN A CLOCKWISE DIRECTION ~ {DOWN}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 10 DEGREES :",TEN}/RNDTEN ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 20 DEGREES :",TWENTY}/RNDTWENTY ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 30 DEGREES :",THIRTY}/RNDTHIRTY ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 40 DEGREES :",FOURTY}/RNDFOURTY ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 50 DEGREES :",FIFTY}/RNDFIFTY ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 60 DEGREES :",SIXTY}/RNDSIXTY ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}BUILDWID ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 70 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 80 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 90 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 100 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 110 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 120 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}BUILDWID ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 130 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 140 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 150 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 160 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 170 DEGREES :",FIVE}/RNDFIVE ~
```

```
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 180 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}BUILDWID ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 190 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 200 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 210 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 220 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 230 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 240 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}BUILDWID ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 250 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 260 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 270 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 280 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 290 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 300 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}BUILDWID ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 310 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 320 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 330 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 340 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 350 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR 360 DEGREES :",SIX}/RNDSIX ~
/RNDDSRCID ~
{MENUBRANCH DOWN}
```

LOWBOUND

```
CALCULATE "LOWER BOUND" CONCENTRATIONS
{IF <<RISC2>>TERM=2}{BRANCH LBLT} ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}LOWBOUND ~ {RIGHT}/RNCDSRCID ~ ~ {RIGHT}/RNCTEN ~ ~
{RIGHT}/RNCTWENTY ~ ~ {RIGHT}/RNCTHIRTY ~ ~ {RIGHT}/RNCfourty ~ ~ {RIGHT}/RNCFIFTY ~ ~ {RIGHT}/RNCSIXTY ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR THE LOWER BOUNDS CALCULATIONS. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",DSRCID}
/RECOMMENTS ~ {GOTO}COMMENTS ~
FOR THE SHORT TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 36 DIRECTION-SPECIFIC LOWER BOUND WAKE OPTIONS SWITCHES ~ {DOWN}{DOWN}
BEGINNING WITH THE 10 DEGREE FLOW VECTOR (WIND BLOWING TOWARD 10 ~ {DOWN}{DOWN}
```

```
DEGREES FROM NORTH) AND INCREMENTING BY 10 DEGREES ~ {DOWN}{DOWN}
IN A CLOCKWISE DIRECTION ~ {DOWN}{DOWN}
A SWITCH VALUE OF 0 MEANS TO USE THE UPPER BOUND (REGULATORY DEFAULT) ~ {DOWN}{DOWN}
A SWITCH VALUE OF 1 MEANS TO USE THE LOWER BOUND FOR THAT SECTOR. ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 10 DEGREES :",TEN}/RNDTEN ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 20 DEGREES :",TWENTY}/RNDTWENTY ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 30 DEGREES :",THIRTY}/RNDTHIRTY ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 40 DEGREES :",FOURTY}/RNDFOURTY ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 50 DEGREES :",FIFTY}/RNDFIFTY ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 60 DEGREES :",SIXTY}/RNDSIXTY ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}LOWBOUND ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 70 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 80 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 90 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 100 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 110 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 120 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}LOWBOUND ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 130 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 140 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 150 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 160 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 170 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 180 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}LOWBOUND ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 190 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 200 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 210 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 220 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 230 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 240 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}LOWBOUND ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
{RIGHT}/RNCtwo ~ ~ {RIGHT}/RNCthree ~ ~ {RIGHT}/RNCfour ~ ~ {RIGHT}/RNCfive ~ ~ {RIGHT}/RNCsix ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2 ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 250 DEGREES :",ONE}/RNDONE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 260 DEGREES :",TWO}/RNDTWO ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 270 DEGREES :",THREE}/RNDTHREE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 280 DEGREES :",FOUR}/RNDFOUR ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 290 DEGREES :",FIVE}/RNDFIVE ~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 300 DEGREES :",SIX}/RNDSIX ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}LOWBOUND ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCone ~ ~
```

{RIGHT}/RNCtwo~~{RIGHT}/RNCthree~~{RIGHT}/RNCfour~~{RIGHT}/RNCfive~~{RIGHT}/RNCsix~~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 310 DEGREES:",ONE}/RNDONE~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 320 DEGREES:",TWO}/RNDTWO~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 330 DEGREES:",THREE}/RNDTHREE~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 340 DEGREES:",FOUR}/RNDFOUR~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 350 DEGREES:",FIVE}/RNDFIVE~
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR 360 DEGREES:",SIX}/RNDSIX~
{MENUBRANCH DOWN}

RETURN

RETURN TO SOURCE MENU
{MENUBRANCH SO}

EMISFACS

SEASON	MONTH	HOUR	STAR	SEASON & HOUR	CONTINUE
EMISSION RATES VARY SEASONA	EMISSION RATES VARY MONTHLY	EMISSION RATES VARY BY HOUR -	RATES VARY BY SPEED AND S	RATES VARY BY SEASON & HOUR - O	RETURN TO SOURCE MENU
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}COMMENTS~{DOWN}	{GOTO}TABLE~{END}{DOWN}{DOW	{MENUBRANCH SO}
EMISFACT~{RIGHT}/RNCESRCID	EMISFACT~{RIGHT}/RNCESRCID~	EMISFACT~{RIGHT}/RNCESRCID~	INPUT 36 "STAR" VALUES~{DO	EMISFACT~{RIGHT}/RNCESRCID~~{RIGHT}SEASHR~{RIGHT}/RNCONE~~{RIGHT}/RNCTWO~~{RIGHT}/RNCTHREE~~{RIGHT}/RNCFOUR ~	
/RECOMMENTS~	/RECOMMENTS~	{GOTO}TABLE~{END}{RIGHT}{D	{GOTO}TABLE~{END}{DOWN	{GOTO}TABLE~{END}{RIGHT}{DOWN}"SO~{RIGHT}	
{GOTO}COMMENTS~	{GOTO}COMMENTS~	EMISFACT~{RIGHT}/RNCESRCID~	EMISFACT~{RIGHT}/RNCESR	EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNC13~~{RIGHT}/RNC14~~{RIGHT}/RNC15~~{RIGHT}/RNC16~~{RIGHT}/R	
SOURCE ID MAY BE THE SAME U	SOURCE ID MAY BE THE SAME UN	/RECOMMENTS~	/RECOMMENTS~	/RECOMMENTS~	
USER MAY SPECIFY A RANGE OF	USER MAY SPECIFY A RANGE OF S	{GOTO}COMMENTS~	{GOTO}COMMENTS~	{GOTO}COMMENTS~	
A RANGE OF SOURCES IS SPECIFI	A RANGE OF SOURCES IS SPECIFIE	SOURCE ID MAY BE THE SAME UN	SOURCE ID MAY BE THE SAME	SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}	
BY A DASH, ie. STACK1-STACK10	BY A DASH, ie. STACK1-STACK10	USER MAY SPECIFY A RANGE OF S	USER MAY SPECIFY A RANGE	USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY.~{DOWN}{DOWN}	
{GETLABEL "ENTER SOURCE IDF	{GETLABEL "ENTER SOURCE IDF O	A RANGE OF SOURCES IS SPECIFIE	A RANGE OF SOURCES IS SPEC	A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}	
{GOTO}COMMENTS~	{GOTO}COMMENTS~	BY A DASH, ie. STACK1-STACK10	BY A DASH, ie. STACK1-STAC	BY A DASH, ie. STACK1-STACK10 (NOTE NO SPACES BETWEEN ID'S)~{DOWN}	
FOR THE SHORT TERM MODEL --	FOR THE SHORT TERM MODEL --	{GETLABEL "ENTER SOURCE IDF O	{GETLABEL "ENTER SOURCE I	{GETLABEL "ENTER SOURCE IDF OR SELECTED SOURCE: ",ESRCID}	
USER INPUTS 4 SEASONAL EMISSI	USER INPUTS 12 MONTHLY EMISSI	{GOTO}COMMENTS~	{GOTO}COMMENTS~	{GOTO}COMMENTS~	
WINTER, SPRING, SUMMER, FAL	JAN, FEB, MAR, APR, MAY, JUNE,	FOR THE SHORT TERM MODEL --	FOR THE SHORT TERM MODE	FOR THE SHORT TERM MODEL -- ~{DOWN}{DOWN}	
{GETNUMBER "ENTER WINTER E	{GETNUMBER "ENTER JANUARY E	USER INPUTS 24 HOURLY EMISSIO	USER INPUTS 36 EMISSION RA	USER INPUTS 24 HOURLY EMISSION FACTORS STARTING WITH 1 AM~{DOWN}{DOWN}	
{GETNUMBER "ENTER SPRING EM	{GETNUMBER "ENTER FEBRUARY	{GETNUMBER "ENTER 1:00 AM EMI	{GOTO}TABLE~{UP}/RNCFOR	FOR EACH OF THE 4 SEASONS IN THE FOLLOWING ORDER:~{DOWN}{DOWN}	
{GETNUMBER "ENTER SUMMER E	{GETNUMBER "ENTER MARCH EMI	{GETNUMBER "ENTER 2:00 AM EMI	{GOTO}ONE~/RNDONE~	WINTER, SPRING, SUMMER, FALL~{DOWN}	
{GETNUMBER "ENTER FALL EMIS	{GETNUMBER "ENTER APRIL EMIS	{GETNUMBER "ENTER 3:00 AM EMI	{FOR FOR1,1,12,1,STAR1}	{GOTO}TABLE~{UP}/RNCFOR1~~	
/RNDESRCID~/RNDWINT~/RNDS	{GETNUMBER "ENTER MAY EMISS	{GETNUMBER "ENTER 4:00 AM EMI	{GOTO}TABLE~{END}{DOWN	{LET SRCID2,SRCID}/RNDSRCID2~	
{MENUBRANCH SO}	{GETNUMBER "ENTER JUNE EMISS	{GETNUMBER "ENTER 5:00 AM EMI	EMISFACT~{RIGHT}/RNCESR	{GOTO}COMMENTS~/RECOMMENTS~{DOWN}{RIGHT}WINTER~	
	{GETNUMBER "ENTER JULY EMISS	{GETNUMBER "ENTER 6:00 AM EMI	{LET SRCID2,SRCID}/RNDSRC	{FOR FOR1,1,12,1,HOUR1}	
	{GETNUMBER "ENTER AUGUST EM	{GETNUMBER "ENTER 7:00 AM EMI	{GOTO}ONE~/RNDONE~	{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}	
	{GETNUMBER "ENTER SEPTEMBER	{GETNUMBER "ENTER 8:00 AM EMI	{FOR FOR1,1,12,1,STAR1}	EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNCONE~~{RIGHT}/RNCTWO~~{RIGHT}/RNCTHREE~~{RIGHT}/RNCFOUR	
	{GETNUMBER "ENTER OCTOBER E	{GETNUMBER "ENTER 9:00 AM EMI	{GOTO}TABLE~{END}{DOWN	{LET SRCID2,SRCID}/RNDSRCID2~	
	{GETNUMBER "ENTER NOVEMBER	{GETNUMBER "ENTER 10:00 AM EM	EMISFACT~{RIGHT}/RNCESR	{GOTO}TABLE~{END}{RIGHT}{DOWN}"SO~{RIGHT}	
	{GETNUMBER "ENTER DECEMBER	{GETNUMBER "ENTER 11:00 AM EM	{LET SRCID2,SRCID}	EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNC13~~{RIGHT}/RNC14~~{RIGHT}/RNC15~~{RIGHT}/RNC16~~{RIGHT}/R	
	/RNDESRCID~/RNDJAN~/RNDFEB	{GETNUMBER "ENTER 12:00 NOON	{LET SRCID2,SRCID}/RNDSRC	{LET SRCID2,SRCID}/RNDSRCID2~	
	{MENUBRANCH SO}	{GETNUMBER "ENTER 1:00 PM EMIS	{GOTO}ONE~/RNDONE~	{GOTO}COMMENTS~/RECOMMENTS~{DOWN}{RIGHT}SPRING~	
		{GETNUMBER "ENTER 2:00 PM EMIS	{FOR FOR1,1,12,1,STAR1}	{FOR FOR1,1,12,1,HOUR1}	
		{GETNUMBER "ENTER 3:00 PM EMIS	/RNDSRCID~/RNDFOR1~	{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}	
		{GETNUMBER "ENTER 4:00 PM EMIS	{MENUBRANCH SO}	EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNCONE~~{RIGHT}/RNCTWO~~{RIGHT}/RNCTHREE~~{RIGHT}/RNCFOUR	
		{GETNUMBER "ENTER 5:00 PM EMISSION FACTOR: ",17}		{LET SRCID2,SRCID}/RNDSRCID2~	
		{GETNUMBER "ENTER 6:00 PM EMISSION FACTOR: ",18}		{GOTO}TABLE~{END}{RIGHT}{DOWN}"SO~{RIGHT}	
		{GETNUMBER "ENTER 7:00 PM EMISSION FACTOR: ",19}		EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNC13~~{RIGHT}/RNC14~~{RIGHT}/RNC15~~{RIGHT}/RNC16~~{RIGHT}/R	
		{GETNUMBER "ENTER 8:00 PM EMISSION FACTOR: ",20}		{LET SRCID2,SRCID}/RNDSRCID2~	
		{GETNUMBER "ENTER 9:00 PM EMISSION FACTOR: ",21}		{GOTO}COMMENTS~/RECOMMENTS~{DOWN}{RIGHT}SUMMER~	
		{GETNUMBER "ENTER 10:00 PM EMISSION FACTOR: ",22}		{FOR FOR1,1,12,1,HOUR1}	
		{GETNUMBER "ENTER 11:00 PM EMISSION FACTOR: ",23}		{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}	
		{GETNUMBER "ENTER 12:00 MIDNIGHT EMISSION FACTOR: ",24}		EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNCONE~~{RIGHT}/RNCTWO~~{RIGHT}/RNCTHREE~~{RIGHT}/RNCFOUR	
		/RNDESRCID~/RNDONE~/RNDTWO~/RNDTHREE~/RNDFOUR~		{LET SRCID2,SRCID}/RNDSRCID2~	

{MENUBRANCH SO}	{GOTO}TABLE ~{END}{RIGHT}{DOWN}"SO ~{RIGHT} EMISFACT ~{RIGHT}/RNCESRCID2 ~ ~{RIGHT}SEASHR ~{RIGHT}/RNC13 ~ ~{RIGHT}/RNC14 ~ ~{RIGHT}/RNC15 ~ ~{RIGHT}/RNC16 ~ ~{RIGHT}/R {LET SRCID2, SRCID}/RNDSRCID2 ~ {GOTO}COMMENTS ~/RECOMMENTS ~{DOWN}{RIGHT}FALL ~ {FOR FOR1,1,12,1,HOUR1} {MENU BRANCH SO}

SEASON

EMISSION RATES VARY SEASONALLY
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}SEASON ~ {RIGHT}/RNCWINT ~ ~ {RIGHT}/RNCSPR ~ ~ {RIGHT}/RNCSUM ~ ~ {RIGHT}/RNCFALL ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
{GOTO}COMMENTS ~
FOR THE SHORT TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 4 SEASONAL EMISSION FACTORS IN THE FOLLOWING ORDER : ~ {DOWN}{DOWN}
WINTER, SPRING, SUMMER, FALL ~
{GETNUMBER "ENTER WINTER EMISSION FACTOR : ",WINT}
{GETNUMBER "ENTER SPRING EMISSION FACTOR : ",SPR}
{GETNUMBER "ENTER SUMMER EMISSION FACTOR : ",SUM}
{GETNUMBER "ENTER FALL EMISSION FACTOR : ",FALL}
/RNDESRCID ~ /RNDWINT ~ /RNDSPR ~ /RNDSUM ~ /RNDFALL ~
{MENUBRANCH SO}

MONTH

EMISSION RATES VARY MONTHLY
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}MONTH ~ {RIGHT}/RNCJAN ~ ~ {RIGHT}/RNCFEB ~ ~ {RIGHT}/RNCMAR ~ ~ {RIGHT}/RNCAPR ~ ~ {RIGHT}/RNCMAY ~ ~
{RIGHT}/RNCJUNE ~ ~ {RIGHT}/RNCJULY ~ ~ {RIGHT}/RNCAUG ~ ~ {RIGHT}/RNCSEPT ~ ~ {RIGHT}/RNCOCT ~ ~ {RIGHT}/RNCNOV ~ ~ {RIGHT}/RNCDEC ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
{GOTO}COMMENTS ~
FOR THE SHORT TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 12 MONTHLY EMISSION FACTORS IN THE FOLLOWING ORDER : ~ {DOWN}{DOWN}

```
JAN, FEB, MAR, APR, MAY, JUNE, JULY, AUG, SEPT, OCT, NOV, DEC~
{GETNUMBER "ENTER JANUARY EMISSION FACTOR : ",JAN}
{GETNUMBER "ENTER FEBRUARY EMISSION FACTOR : ",FEB}
{GETNUMBER "ENTER MARCH EMISSION FACTOR : ",MAR}
{GETNUMBER "ENTER APRIL EMISSION FACTOR : ",APR}
{GETNUMBER "ENTER MAY EMISSION FACTOR : ",MAY}
{GETNUMBER "ENTER JUNE EMISSION FACTOR : ",JUNE}
{GETNUMBER "ENTER JULY EMISSION FACTOR : ",JULY}
{GETNUMBER "ENTER AUGUST EMISSION FACTOR : ",AUG}
{GETNUMBER "ENTER SEPTEMBER EMISSION FACTOR : ",SEPT}
{GETNUMBER "ENTER OCTOBER EMISSION FACTOR : ",OCT}
{GETNUMBER "ENTER NOVEMBER EMISSION FACTOR : ",NOV}
{GETNUMBER "ENTER DECEMBER EMISSION FACTOR : ",DEC}
/RNDESRCID~/RNDJAN~/RNDFEB~/RNDMAR~/RNDAPR~/RNDMAY~/RNDJUNE~/RNDJULY~/RNDAUG~/RNDSEPT~/RNDOCT~/RNDNOV~/RNDDEC~
{MENUBRANCH SO}
```

HOUR

```
EMISSION RATES VARY BY HOUR-OF-DAY
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}
EMISFACT~{RIGHT}/RNCESRCID~~{RIGHT}HROFDY~{RIGHT}/RNCONE~~{RIGHT}/RNCTWO~~{RIGHT}/RNCTHREE~~{RIGHT}/RNCFOUR~~{RIGHT}
/RNCFIVE~~{RIGHT}/RNCSIX~~{RIGHT}/RNCSEVEN~~{RIGHT}/RNCEIGHT~~{RIGHT}/RNCNINE~~{RIGHT}/RNCTEN~~{RIGHT}/RNC11~~{RIGHT}/RNC12~~
{GOTO}TABLE~{END}{RIGHT}{DOWN}"SO~{RIGHT}
EMISFACT~{RIGHT}/RNCESRCID~~{RIGHT}HROFDY~{RIGHT}/RNC13~~{RIGHT}/RNC14~~{RIGHT}/RNC15~~{RIGHT}/RNC16~~{RIGHT}/RNC17~~
{RIGHT}/RNC18~~{RIGHT}/RNC19~~{RIGHT}/RNC20~~{RIGHT}/RNC21~~{RIGHT}/RNC22~~{RIGHT}/RNC23~~{RIGHT}/RNC24~~
/RECOMMENTS~
{GOTO}COMMENTS~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY.~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
{GOTO}COMMENTS~
FOR THE SHORT TERM MODEL --  ~{DOWN}{DOWN}
USER INPUTS 24 HOURLY EMISSION FACTORS STARTING WITH 1 AM :~{DOWN}
{GETNUMBER "ENTER 1:00 AM EMISSION FACTOR : ",ONE}
{GETNUMBER "ENTER 2:00 AM EMISSION FACTOR : ",TWO}
{GETNUMBER "ENTER 3:00 AM EMISSION FACTOR : ",THREE}
{GETNUMBER "ENTER 4:00 AM EMISSION FACTOR : ",FOUR}
{GETNUMBER "ENTER 5:00 AM EMISSION FACTOR : ",FIVE}
{GETNUMBER "ENTER 6:00 AM EMISSION FACTOR : ",SIX}
{GETNUMBER "ENTER 7:00 AM EMISSION FACTOR : ",SEVEN}
{GETNUMBER "ENTER 8:00 AM EMISSION FACTOR : ",EIGHT}
{GETNUMBER "ENTER 9:00 AM EMISSION FACTOR : ",NINE}
{GETNUMBER "ENTER 10:00 AM EMISSION FACTOR : ",TEN}
{GETNUMBER "ENTER 11:00 AM EMISSION FACTOR : ",11}
{GETNUMBER "ENTER 12:00 NOON EMISSION FACTOR : ",12}
{GETNUMBER "ENTER 1:00 PM EMISSION FACTOR : ",13}
```

```
{GETNUMBER "ENTER 2:00 PM EMISSION FACTOR : ",14}
{GETNUMBER "ENTER 3:00 PM EMISSION FACTOR : ",15}
{GETNUMBER "ENTER 4:00 PM EMISSION FACTOR : ",16}
{GETNUMBER "ENTER 5:00 PM EMISSION FACTOR : ",17}
{GETNUMBER "ENTER 6:00 PM EMISSION FACTOR : ",18}
{GETNUMBER "ENTER 7:00 PM EMISSION FACTOR : ",19}
{GETNUMBER "ENTER 8:00 PM EMISSION FACTOR : ",20}
{GETNUMBER "ENTER 9:00 PM EMISSION FACTOR : ",21}
{GETNUMBER "ENTER 10:00 PM EMISSION FACTOR : ",22}
{GETNUMBER "ENTER 11:00 PM EMISSION FACTOR : ",23}
{GETNUMBER "ENTER 12:00 MIDNIGHT EMISSION FACTOR : ",24}
/RNDESRCID ~ /RNDONE ~ /RNDTWO ~ /RNDTHREE ~ /RNDFOUR ~ /RNDFIVE ~ /RNDSIX ~ /RNDSEVEN ~ /RNDEIGHT ~ /RNDNINE ~ /RNDTEN ~
/RND11 ~ /RND12 ~ /RND13 ~ /RND14 ~ /RND15 ~ /RND16 ~ /RND17 ~ /RND18 ~ /RND19 ~ /RND20 ~ /RND21 ~ /RND22 ~ /RND23 ~ /RND24 ~
{MENUBRANCH SO}
```

STAR

```
RATES VARY BY SPEED AND STABILITY CATEGORY
{GOTO}COMMENTS ~ {DOWN}
INPUT 36 "STAR" VALUES ~ {DOWN}
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}STAR ~ {RIGHT}/RNCONE ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
{GOTO}COMMENTS ~
FOR THE SHORT TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 36 EMISSION RATES BY SPEED AND STABILITY CATAGORY :~ {DOWN}
{GOTO}TABLE ~ {UP}/RNCFOR1 ~ ~
{GOTO}ONE ~ /RNDONE ~
{FOR FOR1,1,12,1,STAR1}
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID2 ~ ~ {RIGHT}STAR ~ {RIGHT}/RNCONE ~ ~
{LET SRCID2, SRCID}/RNDSRCID2 ~
{GOTO}ONE ~ /RNDONE ~
{FOR FOR1,1,12,1,STAR1}
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID2 ~ ~ {RIGHT}STAR ~ {RIGHT}/RNCONE ~ ~
{LET SRCID2, SRCID}
{LET SRCID2, SRCID}/RNDSRCID2 ~
{GOTO}ONE ~ /RNDONE ~
{FOR FOR1,1,12,1,STAR1}
/RNDSRCID ~ /RNDFOR1 ~
{MENUBRANCH SO}
```

STAR1

```
/RNCONE ~
{GETLABEL "ENTER STAR EMISSION FACTOR : ",ONE}
{GOTO}ONE ~
/RNDONE ~
{RIGHT}
```

SEASON & HOUR

```
RATES VARY BY SEASON & HOUR-OF-DAY
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}SEASHR ~ {RIGHT}/RNCONE ~ ~ {RIGHT}/RNCTWO ~ ~ {RIGHT}/RNCTHREE ~ ~ {RIGHT}/RNCFOUR ~ ~ {RIGHT}
/RNCFIVE ~ ~ {RIGHT}/RNCSIX ~ ~ {RIGHT}/RNCSEVEN ~ ~ {RIGHT}/RNCEIGHT ~ ~ {RIGHT}/RNCNINE ~ ~ {RIGHT}/RNCTEN ~ ~ {RIGHT}/RNC11 ~ ~ {RIGHT}/RNC12 ~ ~
{GOTO}TABLE ~ {END}{RIGHT}{DOWN}'SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID2 ~ ~ {RIGHT}SEASHR ~ {RIGHT}/RNC13 ~ ~ {RIGHT}/RNC14 ~ ~ {RIGHT}/RNC15 ~ ~ {RIGHT}/RNC16 ~ ~ {RIGHT}/RNC17 ~ ~
{RIGHT}/RNC18 ~ ~ {RIGHT}/RNC19 ~ ~ {RIGHT}/RNC20 ~ ~ {RIGHT}/RNC21 ~ ~ {RIGHT}/RNC22 ~ ~ {RIGHT}/RNC23 ~ ~ {RIGHT}/RNC24 ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
{GOTO}COMMENTS ~
FOR THE SHORT TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 24 HOURLY EMISSION FACTORS STARTING WITH 1 AM ~ {DOWN}{DOWN}
FOR EACH OF THE 4 SEASONS IN THE FOLLOWING ORDER : ~ {DOWN}{DOWN}
WINTER, SPRING, SUMMER, FALL ~ {DOWN}
{GOTO}TABLE ~ {UP}/RNCFOR1 ~ ~
{LET SRCID2, SRCID}/RNDSRCID2 ~
{GOTO}COMMENTS ~ /RECOMMENTS ~ {DOWN}{RIGHT}WINTER ~
```

{FOR FOR1,1,12,1,HOUR1}

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID2 ~ ~ {RIGHT}SEASHR ~ {RIGHT}/RNCONE ~ ~ {RIGHT}/RNCTWO ~ ~ {RIGHT}/RNCTHREE ~ ~ {RIGHT}/RNCFOUR ~ ~ {RIGHT}
/RNCFIVE ~ ~ {RIGHT}/RNCSIX ~ ~ {RIGHT}/RNCSEVEN ~ ~ {RIGHT}/RNCEIGHT ~ ~ {RIGHT}/RNCNINE ~ ~ {RIGHT}/RNCTEN ~ ~ {RIGHT}/RNC11 ~ ~ {RIGHT}/RNC12 ~ ~
{LET SRCID2, SRCID}/RNDSRCID2 ~
{GOTO}TABLE ~ {END}{RIGHT}{DOWN}'SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID2 ~ ~ {RIGHT}SEASHR ~ {RIGHT}/RNC13 ~ ~ {RIGHT}/RNC14 ~ ~ {RIGHT}/RNC15 ~ ~ {RIGHT}/RNC16 ~ ~ {RIGHT}/RNC17 ~ ~
{RIGHT}/RNC18 ~ ~ {RIGHT}/RNC19 ~ ~ {RIGHT}/RNC20 ~ ~ {RIGHT}/RNC21 ~ ~ {RIGHT}/RNC22 ~ ~ {RIGHT}/RNC23 ~ ~ {RIGHT}/RNC24 ~ ~
{LET SRCID2, SRCID}/RNDSRCID2 ~
{GOTO}COMMENTS ~ /RECOMMENTS ~ {DOWN}{RIGHT}SPRING ~
```

{FOR FOR1,1,12,1,HOUR1}

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID2 ~ ~ {RIGHT}SEASHR ~ {RIGHT}/RNCONE ~ ~ {RIGHT}/RNCTWO ~ ~ {RIGHT}/RNCTHREE ~ ~ {RIGHT}/RNCFOUR ~ ~ {RIGHT}
/RNCFIVE ~ ~ {RIGHT}/RNCSIX ~ ~ {RIGHT}/RNCSEVEN ~ ~ {RIGHT}/RNCEIGHT ~ ~ {RIGHT}/RNCNINE ~ ~ {RIGHT}/RNCTEN ~ ~ {RIGHT}/RNC11 ~ ~ {RIGHT}/RNC12 ~ ~
```

```
{LET SRCID2, SRCID}/RNDSRCID2~
{GOTO}TABLE~{END}{RIGHT}{DOWN}"SO~{RIGHT}
EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNC13~~{RIGHT}/RNC14~~{RIGHT}/RNC15~~{RIGHT}/RNC16~~{RIGHT}/RNC17~~
{RIGHT}/RNC18~~{RIGHT}/RNC19~~{RIGHT}/RNC20~~{RIGHT}/RNC21~~{RIGHT}/RNC22~~{RIGHT}/RNC23~~{RIGHT}/RNC24~~
{LET SRCID2, SRCID}/RNDSRCID2~
{GOTO}COMMENTS~/RECOMMENTS~{DOWN}{RIGHT}SUMMER~
{FOR FOR1,1,12,1,HOUR1}
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}
EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNCONE~~{RIGHT}/RNCTWO~~{RIGHT}/RNCTHREE~~{RIGHT}/RNCFOUR~~{RIGHT}
/RNCFIVE~~{RIGHT}/RNCSIX~~{RIGHT}/RNCSEVEN~~{RIGHT}/RNCEIGHT~~{RIGHT}/RNCNINE~~{RIGHT}/RNCTEN~~{RIGHT}/RNC11~~{RIGHT}/RNC12~~
{LET SRCID2, SRCID}/RNDSRCID2~
{GOTO}TABLE~{END}{RIGHT}{DOWN}"SO~{RIGHT}
EMISFACT~{RIGHT}/RNCESRCID2~~{RIGHT}SEASHR~{RIGHT}/RNC13~~{RIGHT}/RNC14~~{RIGHT}/RNC15~~{RIGHT}/RNC16~~{RIGHT}/RNC17~~
{RIGHT}/RNC18~~{RIGHT}/RNC19~~{RIGHT}/RNC20~~{RIGHT}/RNC21~~{RIGHT}/RNC22~~{RIGHT}/RNC23~~{RIGHT}/RNC24~~
{LET SRCID2, SRCID}/RNDSRCID2~
{GOTO}COMMENTS~/RECOMMENTS~{DOWN}{RIGHT}FALL~
{FOR FOR1,1,12,1,HOUR1}
{MENU BRANCH SO}
```

HOUR1

```
{GETNUMBER "ENTER 1:00 AM EMISSION FACTOR : ",ONE}
{GETNUMBER "ENTER 2:00 AM EMISSION FACTOR : ",TWO}
{GETNUMBER "ENTER 3:00 AM EMISSION FACTOR : ",THREE}
{GETNUMBER "ENTER 4:00 AM EMISSION FACTOR : ",FOUR}
{GETNUMBER "ENTER 5:00 AM EMISSION FACTOR : ",FIVE}
{GETNUMBER "ENTER 6:00 AM EMISSION FACTOR : ",SIX}
{GETNUMBER "ENTER 7:00 AM EMISSION FACTOR : ",SEVEN}
{GETNUMBER "ENTER 8:00 AM EMISSION FACTOR : ",EIGHT}
{GETNUMBER "ENTER 9:00 AM EMISSION FACTOR : ",NINE}
{GETNUMBER "ENTER 10:00 AM EMISSION FACTOR : ",TEN}
{GETNUMBER "ENTER 11:00 AM EMISSION FACTOR : ",11}
{GETNUMBER "ENTER 12:00 NOON EMISSION FACTOR : ",12}
{GETNUMBER "ENTER 1:00 PM EMISSION FACTOR : ",13}
{GETNUMBER "ENTER 2:00 PM EMISSION FACTOR : ",14}
{GETNUMBER "ENTER 3:00 PM EMISSION FACTOR : ",15}
{GETNUMBER "ENTER 4:00 PM EMISSION FACTOR : ",16}
{GETNUMBER "ENTER 5:00 PM EMISSION FACTOR : ",17}
{GETNUMBER "ENTER 6:00 PM EMISSION FACTOR : ",18}
{GETNUMBER "ENTER 7:00 PM EMISSION FACTOR : ",19}
{GETNUMBER "ENTER 8:00 PM EMISSION FACTOR : ",20}
{GETNUMBER "ENTER 9:00 PM EMISSION FACTOR : ",21}
{GETNUMBER "ENTER 10:00 PM EMISSION FACTOR : ",22}
{GETNUMBER "ENTER 11:00 PM EMISSION FACTOR : ",23}
{GETNUMBER "ENTER 12:00 MIDNIGHT EMISSION FACTOR : ",24}
/RNDONE~/RNDTWO~/RNDTHREE~/RNDFOUR~/RNDFIVE~/RNDSIX~/RNDSEVEN~/RNDEIGHT~/RNDNINE~/RNDTEN~/RND11~/RND12~
/RND13~/RND14~/RND15~/RND16~/RND17~/RND18~/RND19~/RND20~/RND21~/RND22~/RND23~/RND24~
```

CONTINUE
RETURN TO SOURCE MENU
{MENUBRANCH SO}

VAR

```
SETTLING VELOCITIE | MASS FRACTIONS | REFLECTION COEFF | SOURCE MENU
                                                         RETURN TO SOURCE MENU
{GOTO}TABLE~{END}{DOWN}{D{GOTO}TABLE~{END}{DOWN}{D{GOTO}TABLE~{END}{DOWN}{D{MENUBRANCH SO}
SETVELOC~{RIGHT}/RNCVSRCIDMASSFRAX~{RIGHT}/RNCVSRCID REFLCOEF~{RIGHT}/RNCVSRCID~~{RIGHT}/RNCRF1~~{RIGHT}/RNCRF2~~{RIGHT}/RNCRF3~~{RIGHT}/RNCRF4~~{RIGHT}/RNCRF5~~{RIGHT}/RNCRF6~~{RIGHT}/RNCRF7~~{RIGHT}/RNCRF8~~{RI
/RECOMMENTS~              /RECOMMENTS~              /RECOMMENTS~
{GOTO}COMMENTS~           {GOTO}COMMENTS~           {GOTO}COMMENTS~
SOURCE ID MAY BE THE SAME UNSOURCE ID MAY BE THE SAME UNSOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SUSER MAY SPECIFY A RANGE OF SUSER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE REFLECTION COEFFICIENTS APPLY. ~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIEA RANGE OF SOURCES IS SPECIFIEA RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}
  BY A DASH, ie. STACK1-STACK   BY A DASH, ie. STACK1-STACK1   BY A DASH, ie. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}
{GETLABEL "ENTER SOURCE IDF{GETLABEL "ENTER SOURCE IDF O{GETLABEL "ENTER SOURCE IDF OR SELECTED SOURCE: ",VSRCID}
/RECOMMENTS~{GOTO}COMME/RECOMMENTS~{GOTO}COMMEN/RECOMMENTS~{GOTO}COMMENTS~
INPUT GRAVITATIONAL SETTLININPUT MASS FRACTION (NUMBER EINPUT REFLECTION COEFFICIENT (NUMBER FROM 0 TO 1) ~{DOWN}{DOWN}
FOR EACH OF THE SETTLING CATFOR EACH OF THE CATEGORIES (MFOR EACH OF THE CATEGORIES (MAXIMUM OF 20)~{DOWN}{DOWN}
FOR BEST RESULTS AS MANY CATTHE MASS FRACTIONS MUST SUM TA REFLECTION COEFFICIENT OF 1 INDICATES THAT ALL THE PLUME MATERIAL~{DOWN}{DOWN}
THE NUMBER OF CATEGORIES MTHE NUMBER OF CATEGORIES MUIS REFLECTED FROM THE SURFACE WITH NO DEPOSITION~{DOWN}{DOWN}
AN ENTRY OF "0" FOR ANY CATAGAN ENTRY OF "0" FOR ANY CATAGWHILE A COEFFICIENT OF 0 INDICATES THAT ALL THE PLUME MATERIAL IS~{DOWN}{DOWN}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F COMPLETELY REMOVED WHEN IT REACHES THE SURFACE ~{DOWN}{DOWN}
{IF VSN1=0}{BRANCH B478}     {IF MF1=0}{BRANCH C478}     THE NUMBER OF CATEGORIES MUST AGREE FOR EACH OF THE 3 KEYWORDS~{DOWN}{DOWN}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F AN ENTRY OF "2" FOR ANY CATAGORY WILL RETURN THE USER TO THE VARIABLE MENU~{DOWN}
{IF VSN2=0}{BRANCH B478}     {IF MF2=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 1: ",RF1}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF1=2}{BRANCH D482}
{IF VSN3=0}{BRANCH B478}     {IF MF3=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 2: ",RF2}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF2=2}{BRANCH D482}
{IF VSN4=0}{BRANCH B478}     {IF MF4=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 3: ",RF3}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF3=2}{BRANCH D482}
{IF VSN5=0}{BRANCH B478}     {IF MF5=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 4: ",RF4}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF4=2}{BRANCH D482}
{IF VSN6=0}{BRANCH B478}     {IF MF6=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 5: ",RF5}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF5=2}{BRANCH D482}
{IF VSN7=0}{BRANCH B478}     {IF MF7=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 6: ",RF6}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF6=2}{BRANCH D482}
{IF VSN8=0}{BRANCH B478}     {IF MF8=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 7: ",RF7}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF7=2}{BRANCH D482}
{IF VSN9=0}{BRANCH B478}     {IF MF9=0}{BRANCH C478}     {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 8: ",RF8}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF8=2}{BRANCH D482}
{IF VSN10=0}{BRANCH B478}    {IF MF10=0}{BRANCH C478}    {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 9: ",RF9}
{GOTO}J18~{END}{DOWN}{DOW{GOTO}J18~{END}{DOWN}{DOWN{IF RF9=2}{BRANCH D482}
SETVELOC~{RIGHT}/RNCVSRCIDMASSFRAX~{RIGHT}/RNCVSRCID{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 10: ",RF10}
/CVSRCID~VSRCID1~            /CVSRCID~VSRCID1~            {IF RF10=2}{BRANCH D482}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{GOTO}J18~{END}{DOWN}{DOWN}
{IF VSN11=0}{BRANCH B479}    {IF MF11=0}{BRANCH C479}    REFLCOEF~{RIGHT}/RNCVSRCID1~~{RIGHT}/RNCRF11~~{RIGHT}/RNCRF12~~{RIGHT}/RNCRF13~~{RIGHT}/RNCRF14~~{RIGHT}/RNCRF15~~{RIGHT}/RNCRF16~~{RIGHT}/RNCRF17~~{RIGHT}/RNCRF1
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F/CVSRCID~VSRCID1~
{IF VSN12=0}{BRANCH B479}    {IF MF12=0}{BRANCH C479}    {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 11: ",RF11}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF11=2}{BRANCH D481}
{IF VSN13=0}{BRANCH B479}    {IF MF13=0}{BRANCH C479}    {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 12: ",RF12}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF12=2}{BRANCH D481}
{IF VSN14=0}{BRANCH B479}    {IF MF14=0}{BRANCH C479}    {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 13: ",RF13}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF13=2}{BRANCH D481}
{IF VSN15=0}{BRANCH B479}    {IF MF15=0}{BRANCH C479}    {GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 14: ",RF14}
{GETNUMBER "ENTER THE SETTL{GETNUMBER "ENTER THE MASS F{IF RF14=2}{BRANCH D481}
```

{IF VSN16=0}{BRANCH B479}	{IF MF16=0}{BRANCH C479}	{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 15 : ",RF15}
{GETNUMBER "ENTER THE SETTL	{GETNUMBER "ENTER THE MASS F	{IF RF15=2}{BRANCH D481}
{IF VSN17=0}{BRANCH B479}	{IF MF17=0}{BRANCH C479}	{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 16 : ",RF16}
{GETNUMBER "ENTER THE SETTL	{GETNUMBER "ENTER THE MASS F	{IF RF16=2}{BRANCH D481}
{IF VSN18=0}{BRANCH B479}	{IF MF18=0}{BRANCH C479}	{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 17 : ",RF17}
{GETNUMBER "ENTER THE SETTL	{GETNUMBER "ENTER THE MASS F	{IF RF17=2}{BRANCH D481}
{IF VSN19=0}{BRANCH B479}	{IF MF19=0}{BRANCH C479}	{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 18 : ",RF18}
{GETNUMBER "ENTER THE SETTL	{GETNUMBER "ENTER THE MASS F	{IF RF18=2}{BRANCH D481}
/RNDVSRCID1 ~/RNDVSN11 ~/RND	/RNDVSRCID1 ~/RNDMF11 ~/RNDM	{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 19 : ",RF19}
/RNDVSRCID~/RNDVSN1 ~/RNDV	/RNDVSRCID~/RNDMF1 ~/RNDMF2	{IF RF19=2}{BRANCH D481}
{MENUBRANCH VAR}	{MENUBRANCH VAR}	{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 20 : ",RF20}
		/RNDVSRCID1 ~/RNDRF11 ~/RNDRF12 ~/RNDRF13 ~/RNDRF14 ~/RNDRF15 ~/RNDRF16 ~/RNDRF17 ~/RNDRF18 ~/RNDRF19 ~/RNDRF20 ~
		/RNDVSRCID~/RNDRF1 ~/RNDRF2 ~/RNDRF3 ~/RNDRF4 ~/RNDRF5 ~/RNDRF6 ~/RNDRF7 ~/RNDRF8 ~/RNDRF9 ~/RNDRF10 ~
		{MENUBRANCH VAR}

SETTLING VELOCITIES

```
{GOTO}TABLE ~{END}{DOWN}{DOWN}'SO ~{RIGHT}
SETVELOC ~{RIGHT}/RNCVSRCID ~ ~{RIGHT}/RNCVSN1 ~ ~{RIGHT}/RNCVSN2 ~ ~{RIGHT}/RNCVSN3 ~ ~{RIGHT}/RNCVSN4 ~ ~{RIGHT}/RNCVSN5 ~ ~
{RIGHT}/RNCVSN6 ~ ~{RIGHT}/RNCVSN7 ~ ~{RIGHT}/RNCVSN8 ~ ~{RIGHT}/RNCVSN9 ~ ~{RIGHT}/RNCVSN10 ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE SETTLING VELOCITIES APPLY. ~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~{DOWN}
   BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~{DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",VSRCID}
/RECOMMENTS ~{GOTO}COMMENTS ~
INPUT GRAVITATIONAL SETTLING VELOCITIES IN (M/S) ~{DOWN}{DOWN}
FOR EACH OF THE SETTLING CATEGORIES (MAXIMUM OF 20) ~{DOWN}{DOWN}
FOR BEST RESULTS AS MANY CATEGORIES AS POSSIBLE SHOULD BE USED ~{DOWN}{DOWN}
THE NUMBER OF CATEGORIES MUST AGREE FOR EACH OF THE 3 KEYWORDS ~{DOWN}{DOWN}
AN ENTRY OF "0" FOR ANY CATAGORY WILL RETURN THE USER TO THE VARIABLE MENU ~{DOWN}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 1 : ",VSN1}
{IF VSN1=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 2 : ",VSN2}
{IF VSN2=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 3 : ",VSN3}
{IF VSN3=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 4 : ",VSN4}
{IF VSN4=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 5 : ",VSN5}
{IF VSN5=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 6 : ",VSN6}
{IF VSN6=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 7 : ",VSN7}
{IF VSN7=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 8 : ",VSN8}
{IF VSN8=0}{BRANCH B478}
```

```
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 9 : ",VSN9}
{IF VSN9=0}{BRANCH B478}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 10 : ",VSN10}
{IF VSN10=0}{BRANCH B478}
{GOTO}J18~{END}{DOWN}{DOWN}
SETVELOC~{RIGHT}/RNCVSRCID1~~{RIGHT}/RNCVSN11~~{RIGHT}/RNCVSN12~~{RIGHT}/RNCVSN13~~{RIGHT}/RNCVSN14~~
{RIGHT}/RNCVSN15~~{RIGHT}/RNCVSN16~~{RIGHT}/RNCVSN17~~{RIGHT}/RNCVSN18~~{RIGHT}/RNCVSN19~~{RIGHT}/RNCVSN20~~
/CVSRCID~VSRCID1~
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 11 : ",VSN11}
{IF VSN11=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 12 : ",VSN12}
{IF VSN12=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 13 : ",VSN13}
{IF VSN13=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 14 : ",VSN14}
{IF VSN14=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 15 : ",VSN15}
{IF VSN15=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 16 : ",VSN16}
{IF VSN16=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 17 : ",VSN17}
{IF VSN17=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 18 : ",VSN18}
{IF VSN18=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 19 : ",VSN19}
{IF VSN19=0}{BRANCH B479}
{GETNUMBER "ENTER THE SETTLING VELOCITY FOR CATEGORY 20 : ",VSN20}
/RNDVSRCID1~/RNDVSN11~/RNDVSN12~/RNDVSN13~/RNDVSN14~/RNDVSN15~/RNDVSN16~/RNDVSN17~/RNDVSN18~/RNDVSN19~/RNDVSN20~
/RNDVSRCID~/RNDVSN1~/RNDVSN2~/RNDVSN3~/RNDVSN4~/RNDVSN5~/RNDVSN6~/RNDVSN7~/RNDVSN8~/RNDVSN9~/RNDVSN10~
{MENUBRANCH VAR}
```

MASS FRACTIONS

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}
MASSFRAX~{RIGHT}/RNCVSRCID~~{RIGHT}/RNCMF1~~{RIGHT}/RNCMF2~~{RIGHT}/RNCMF3~~{RIGHT}/RNCMF4~~
{RIGHT}/RNCMF5~~{RIGHT}/RNCMF6~~{RIGHT}/RNCMF7~~{RIGHT}/RNCMF8~~{RIGHT}/RNCMF9~~{RIGHT}/RNCMF10~~
/RECOMMENTS~
{GOTO}COMMENTS~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE MASS FRACTIONS APPLY.~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}
   BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",VSRCID}
/RECOMMENTS~{GOTO}COMMENTS~
INPUT MASS FRACTION (NUMBER BETWEEN 0 AND 1) ~{DOWN}{DOWN}
FOR EACH OF THE CATEGORIES (MAXIMUM OF 20)~{DOWN}{DOWN}
```

```
THE MASS FRACTIONS MUST SUM TO 1.0( + OR - 2%) ~ {DOWN} {DOWN}
THE NUMBER OF CATEGORIES MUST AGREE FOR EACH OF THE 3 KEYWORDS ~ {DOWN} {DOWN}
AN ENTRY OF "0" FOR ANY CATAGORY WILL RETURN THE USER TO THE VARIABLE MENU ~ {DOWN}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 1 : ",MF1}
{IF MF1=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 2 : ",MF2}
{IF MF2=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 3 : ",MF3}
{IF MF3=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 4 : ",MF4}
{IF MF4=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 5 : ",MF5}
{IF MF5=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 6 : ",MF6}
{IF MF6=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 7 : ",MF7}
{IF MF7=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 8 : ",MF8}
{IF MF8=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 9 : ",MF9}
{IF MF9=0}{BRANCH C478}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 10 : ",MF10}
{IF MF10=0}{BRANCH C478}
{GOTO}J18 ~ {END} {DOWN}{DOWN}
MASSFRAX ~ {RIGHT}/RNCVSRCID1 ~ ~ {RIGHT}/RNCMF11 ~ ~ {RIGHT}/RNCMF12 ~ ~ {RIGHT}/RNCMF13 ~ ~ {RIGHT}/RNCMF14 ~ ~
{RIGHT}/RNCMF15 ~ ~ {RIGHT}/RNCMF16 ~ ~ {RIGHT}/RNCMF17 ~ ~ {RIGHT}/RNCMF18 ~ ~ {RIGHT}/RNCMF19 ~ ~ {RIGHT}/RNCMF20 ~ ~
/CVSRCID ~ VSRCID1 ~
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 11 : ",MF11}
{IF MF11=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 12 : ",MF12}
{IF MF12=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 13 : ",MF13}
{IF MF13=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 14 : ",MF14}
{IF MF14=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 15 : ",MF15}
{IF MF15=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 16 : ",MF16}
{IF MF16=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 17 : ",MF17}
{IF MF17=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 18 : ",MF18}
{IF MF18=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 19 : ",MF19}
{IF MF19=0}{BRANCH C479}
{GETNUMBER "ENTER THE MASS FRACTION FOR CATEGORY 20 : ",MF20}
/RNDVSRCID1 ~ /RNDMF11 ~ /RNDMF12 ~ /RNDMF13 ~ /RNDMF14 ~ /RNDMF15 ~ /RNDMF16 ~ /RNDMF17 ~ /RNDMF18 ~ /RNDMF19 ~ /RNDMF20 ~
```

```
/RNDVSRCID~/RNDMF1~/RNDMF2~/RNDMF3~/RNDMF4~/RNDMF5~/RNDMF6~/RNDMF7~/RNDMF8~/RNDMF9~/RNDMF10~
{MENUBRANCH VAR}
```

REFLECTION COEFFICIENT

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}
REFLCOEF~{RIGHT}/RNCVSRCID~~{RIGHT}/RNCRF1~~{RIGHT}/RNCRF2~~{RIGHT}/RNCRF3~~{RIGHT}/RNCRF4~~
{RIGHT}/RNCRF5~~{RIGHT}/RNCRF6~~{RIGHT}/RNCRF7~~{RIGHT}/RNCRF8~~{RIGHT}/RNCRF9~~{RIGHT}/RNCRF10~~
/RECOMMENTS~
{GOTO}COMMENTS~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE REFLECTION COEFFICIENTS APPLY.~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}
  BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",VSRCID}
/RECOMMENTS~{GOTO}COMMENTS~
INPUT REFLECTION COEFFICIENT (NUMBER FROM 0 TO 1) ~{DOWN}{DOWN}
FOR EACH OF THE CATEGORIES (MAXIMUM OF 20)~{DOWN}{DOWN}
A REFLECTION COEFFICIENT OF 1 INDICATES THAT ALL THE PLUME MATERIAL~{DOWN}{DOWN}
 IS REFLECTED FROM THE SURFACE WITH NO DEPOSITION~{DOWN}{DOWN}
WHILE A COEFFICIENT OF 0 INDICATES THAT ALL THE PLUME MATERIAL IS~{DOWN}{DOWN}
COMPLETELY REMOVED WHEN IT REACHES THE SURFACE.~{DOWN}{DOWN}
THE NUMBER OF CATEGORIES MUST AGREE FOR EACH OF THE 3 KEYWORDS~{DOWN}{DOWN}
AN ENTRY OF "2" FOR ANY CATAGORY WILL RETURN THE USER TO THE VARIABLE MENU~{DOWN}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 1 : ",RF1}
{IF RF1=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 2 : ",RF2}
{IF RF2=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 3 : ",RF3}
{IF RF3=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 4 : ",RF4}
{IF RF4=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 5 : ",RF5}
{IF RF5=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 6 : ",RF6}
{IF RF6=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 7 : ",RF7}
{IF RF7=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 8 : ",RF8}
{IF RF8=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 9 : ",RF9}
{IF RF9=2}{BRANCH D482}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 10 : ",RF10}
{IF RF10=2}{BRANCH D482}
{GOTO}J18~{END}{DOWN}{DOWN}
REFLCOEF~{RIGHT}/RNCVSRCID1~~{RIGHT}/RNCRF11~~{RIGHT}/RNCRF12~~{RIGHT}/RNCRF13~~{RIGHT}/RNCRF14~~
```

{RIGHT}/RNCRF15~~{RIGHT}/RNCRF16~~{RIGHT}/RNCRF17~~{RIGHT}/RNCRF18~~{RIGHT}/RNCRF19~~{RIGHT}/RNCRF20~~
/CVSRCID~VSRCID1~
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 11 : ",RF11}
{IF RF11=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 12 : ",RF12}
{IF RF12=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 13 : ",RF13}
{IF RF13=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 14 : ",RF14}
{IF RF14=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 15 : ",RF15}
{IF RF15=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 16 : ",RF16}
{IF RF16=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 17 : ",RF17}
{IF RF17=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 18 : ",RF18}
{IF RF18=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 19 : ",RF19}
{IF RF19=2}{BRANCH D481}
{GETNUMBER "ENTER THE REFLECTION COEFFICIENT FOR CATEGORY 20 : ",RF20}
/RNDVSRCID1~/RNDRF11~/RNDRF12~/RNDRF13~/RNDRF14~/RNDRF15~/RNDRF16~/RNDRF17~/RNDRF18~/RNDRF19~/RNDRF20~
/RNDVSRCID~/RNDRF1~/RNDRF2~/RNDRF3~/RNDRF4~/RNDRF5~/RNDRF6~/RNDRF7~/RNDRF8~/RNDRF9~/RNDRF10~
{MENUBRANCH VAR}

SOURCE MENU

RETURN TO SOURCE MENU
{MENUBRANCH SO}

RE

GRID	DISCRETE CARTESIA	DISCRETE POLAR	PLANT BOUNDARY	BOUNDARY ELEVATIO	QUIT
Select cartesian or polar grid system	Select discrete receptor with cartesian coo	Select discrete receptor with polar coordin	Defines receptor locations for plant	Defines elevations for receptor locations at p	Return to main menu
/RECOMMENTS~	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN	{GOTO}TABLE~{END}{DOWN}{DOW	{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}FINISHED~
{GOTO}COMMENTS~	{GETNUMBER "ENTER X COORDIN	{GETLABEL "ENTER ALPHANUME	{GETLABEL "ENTER ALPHANU	{GETLABEL "ENTER ALPHANUMERIC	{MENUBRANCH FUNCTION}
PROGRAM WILL ALLOW 5 GRIDDE	{GETNUMBER "ENTER Y COORDIN	{GETNUMBER "ENTER DISTANCE T	{GETNUMBER "ENTER 1ST DIS	{GETNUMBER "ENTER ELEVATION AT 1ST RECEPTOR (IN METERS): ",ELEV1}~/RNDELEV1~	
TYPES IN A SINGLE RUN, PLUS DIS	{RIGHT}/RNCXE~~{GETNUMBER	{GETNUMBER "ENTER DIRECTION	{GETNUMBER "ENTER NEXT D	{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV2}~/RNDELEV2~	
{MENUBRANCH GRID}	{if XE=0}{branch B537}~	{RIGHT}/RNCXE~~{GETNUMBER	{GETNUMBER "ENTER NEXT D	{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV3}~/RNDELEV3~	
	/RNDXE~{RIGHT}/RNCXE~~	{if XE=0}{branch B537}~	{GETNUMBER "ENTER NEXT D	{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV4}~/RNDELEV4~	
	{GETNUMBER "ENTER RECEPTOR	/RNDXE~{RIGHT}/RNCXE~~	{GETNUMBER "ENTER NEXT D	{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV5}~/RNDELEV5~	
	{if XE=0}{branch B537}~	{GETNUMBER "ENTER RECEPTOR	{GETNUMBER "ENTER NEXT D	{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV6}~/RNDELEV6~	
{BLANK XE}	{MENUBRANCH RE}	{if XE=0}{branch B537}~	{GOTO}NUM~{EDIT}+1~	{GOTO}NUM~{EDIT}+1~	
/RNDXE~		{MENUBRANCH RE}	{IF NUM=6}{BRANCH E542}	{IF NUM=6}{BRANCH E542}	
{MENUBRANCH RE}			{GOTO}TABLE~{END}{DOWN	{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}BOUNDELV~{RIGHT}/RNCSRCID2~~{RIGHT}/RNCELEV1~~{RIGHT}/RNCELEV2~~{RIG	
	0		/CSRCID~SRCID2~	/CSRCID~SRCID2~	
			{GETNUMBER "ENTER DISTAN	{GETNUMBER "ENTER ELEVATAION AT NEXT RECEPTOR (IN METERS): ",ELEV1}~/RNDELEV1~{BRANCH PLANT}	
			/ndsrcid~/ndsrcid2~/RENUM~	/ndsrcid~/ndsrcid2~/RENUM~	
			{MENUBRANCH RE}	{MENUBRANCH RE}	

GRID

Select cartesian or polar grid system

```
/RECOMMENTS~
{GOTO}COMMENTS~
PROGRAM WILL ALLOW 5 GRIDDED RECEPTOR NETWORKS OF EITHER (OR BOTH) ~ {DOWN}{DOWN}
TYPES IN A SINGLE RUN, PLUS DISCRETE RECEPTORS OF EITHER TYPE. ~ {DOWN}
{MENUBRANCH  GRID}
```

DISCRETE CARTESIAN

Select discrete receptor with cartesian coordinates

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"RE ~ {RIGHT}DISCCART ~ {RIGHT}/RNCXCOORD ~ ~ {RIGHT}/mcYCOOORD ~ ~
{GETNUMBER "ENTER X COORDINATE OF RECEPTOR (IN METERS) :  ",XCOORD} ~ /RNDXCOORD ~
{GETNUMBER "ENTER Y COORDINATE OF RECEPTOR (IN METERS):  ",YCOORD} ~ /RNDYCOORD ~
{RIGHT}/RNCXE ~ ~ {GETNUMBER "ENTER RECEPTOR ELEVATION IF REQUIRED:  ",XE} ~
{if XE=0}{branch B537} ~
/RNDXE ~ {RIGHT}/RNCXE ~ ~
{GETNUMBER "ENTER RECEPTOR FLAGPOLE HEIGHT IF REQUIRED:  ",XE} ~ /RNDXE ~
{if XE=0}{branch B537} ~
{MENUBRANCH  RE}
```

DISCRETE POLAR

Select discrete receptor with polar coordinates

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"RE ~ {RIGHT}DISCPOLR ~ {RIGHT}/RNCSRCID ~ ~ {RIGHT}/RNCDIST ~ ~ {RIGHT}/RNCDIR ~ ~
{GETLABEL "ENTER ALPHANUMERIC SOURCE ID TO DEFINE ORIGIN OF POLAR RECEPTOR LOCATION:  ",SRCID} ~ /RNDSRCID ~
{GETNUMBER "ENTER DISTANCE TO RECEPTOR (IN METERS):  ",DIST} ~ /RNDDIST ~
{GETNUMBER "ENTER DIRECTION TO RECEPTOR (IN DEGREES - CLOCKWISE FROM NORTH):  ",DIR} ~ /RNDDIR ~
{RIGHT}/RNCXE ~ ~ {GETNUMBER "ENTER RECEPTOR ELEVATION (IF REQUIRED):  ",XE} ~
{if XE=0}{branch B537} ~
/RNDXE ~ {RIGHT}/RNCXE ~ ~
{GETNUMBER "ENTER RECEPTOR FLAGPOLE HEIGHT IF REQUIRED:  ",XE} ~ /RNDXE ~
{if XE=0}{branch B537} ~
{MENUBRANCH  RE}
```

PLANT BOUNDARY

Defines receptor locations for plant boundary

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"RE ~ {RIGHT}BOUNDARY ~ {RIGHT}/RNCSRCID ~ ~ {RIGHT}/RNCDIST1 ~ ~
{RIGHT}/RNCDIST2 ~ ~ {RIGHT}/RNCDIST3 ~ ~ {RIGHT}/RNCDIST4 ~ ~ {RIGHT}/RNCDIST5 ~ ~ {RIGHT}/RNCDIST6 ~ ~
{GETLABEL "ENTER ALPHANUMERIC SOURCE ID TO DEFINE ORIGIN OF POLAR RECEPTOR LOCATION:  ",SRCID}
{GETNUMBER "ENTER 1ST DISTANCE TO RECEPTOR (IN METERS):  ",DIST1} ~ /RNDDIST1 ~
{GETNUMBER "ENTER NEXT DISTANCE TO RECEPTOR (IN METERS):  ",DIST2} ~ /RNDDIST2 ~
{GETNUMBER "ENTER NEXT DISTANCE TO RECEPTOR (IN METERS):  ",DIST3} ~ /RNDDIST3 ~
{GETNUMBER "ENTER NEXT DISTANCE TO RECEPTOR (IN METERS):  ",DIST4} ~ /RNDDIST4 ~
{GETNUMBER "ENTER NEXT DISTANCE TO RECEPTOR (IN METERS):  ",DIST5} ~ /RNDDIST5 ~
{GETNUMBER "ENTER NEXT DISTANCE TO RECEPTOR (IN METERS):  ",DIST6} ~ /RNDDIST6 ~
{GOTO}NUM ~ {EDIT} +1 ~
```

{IF NUM=6}{BRANCH E542}
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'RE ~ {RIGHT}BOUNDARY ~ {RIGHT}/RNCSRCID2 ~ ~ {RIGHT}/RNCDIST1 ~ ~
{RIGHT}/RNCDIST2 ~ ~ {RIGHT}/RNCDIST3 ~ ~ {RIGHT}/RNCDIST4 ~ ~ {RIGHT}/RNCDIST5 ~ ~ {RIGHT}/RNCDIST6 ~ ~
/CSRCID ~ SRCID2 ~
{GETNUMBER "ENTER DISTANCE AT NEXT RECEPTOR (IN METERS): ",DIST1} ~ /RNDDIST1 ~ {BRANCH PLAN}
/rndsrcid ~ /rndsrcid2 ~ /RENUM ~
{MENUBRANCH RE}

BOUNDARY ELEVATIONS

Defines elevations for receptor locations at plant boundary
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'RE ~ {RIGHT}BOUNDELV ~ {RIGHT}/RNCSRCID ~ ~ {RIGHT}/RNCELEV1 ~ ~
{RIGHT}/RNCELEV2 ~ ~ {RIGHT}/RNCELEV3 ~ ~ {RIGHT}/RNCELEV4 ~ ~ {RIGHT}/RNCELEV5 ~ ~ {RIGHT}/RNCELEV6 ~ ~
{GETLABEL "ENTER ALPHANUMERIC SOURCE ID TO DEFINE ORIGIN OF POLAR RECEPTOR LOCATION: ",SRCID}
{GETNUMBER "ENTER ELEVATION AT 1ST RECEPTOR (IN METERS): ",ELEV1} ~ /RNDELEV1 ~
{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV2} ~ /RNDELEV2 ~
{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV3} ~ /RNDELEV3 ~
{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV4} ~ /RNDELEV4 ~
{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV5} ~ /RNDELEV5 ~
{GETNUMBER "ENTER ELEVATION AT NEXT RECEPTOR (IN METERS): ",ELEV6} ~ /RNDELEV6 ~
{GOTO}NUM ~ {EDIT} +1 ~
{IF NUM=6}{BRANCH E542}
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'RE ~ {RIGHT}BOUNDELV ~ {RIGHT}/RNCSRCID2 ~ ~ {RIGHT}/RNCELEV1 ~ ~
{RIGHT}/RNCELEV2 ~ ~ {RIGHT}/RNCELEV3 ~ ~ {RIGHT}/RNCELEV4 ~ ~ {RIGHT}/RNCELEV5 ~ ~ {RIGHT}/RNCELEV6 ~ ~
/CSRCID ~ SRCID2 ~
{GETNUMBER "ENTER ELEVATAION AT NEXT RECEPTOR (IN METERS): ",ELEV1} ~ /RNDELEV1 ~ {BRANCH PLAN1}
/rndsrcid ~ /rndsrcid2 ~ /RENUM ~
{MENUBRANCH RE}

QUIT

Return to main menu
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'RE ~ {RIGHT}FINISHED ~
{MENUBRANCH FUNCTION}

GRID

CARTESIAN	POLAR
Select cartesian grid system	Select POLAR coordinate grid system
{GOTO}TABLE ~ {END}{DOWN}{D	{GOTO}TABLE ~ {END}{DOWN}{DOWN}'RE ~ {RIGHT}GRIDPOLR ~ {RIGHT}/RNCGRIDID ~ ~ {RIGHT}STA ~
{GETLABEL "ENTER GRID ID (UP T	{GETLABEL "ENTER GRID ID (UP TO 8 ALPHANUMERIC CHARACTERS: ",GRIDID}
{MENUBRANCH GRID2}	{MENUBRANCH GRID3}

CARTESIAN

Select cartesian grid system
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'RE ~ {RIGHT}GRIDCART ~ {RIGHT}/RNCGRIDID ~ ~ {RIGHT}STA ~
{GETLABEL "ENTER GRID ID (UP TO 8 ALPHANUMERIC CHARACTERS: ",GRIDID} ~
{MENUBRANCH GRID2}

POLAR

Select POLAR coordinate grid system

{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}GRIDPOLR~{RIGHT}/RNCGRIDID~~{RIGHT}STA~

{GETLABEL "ENTER GRID ID (UP TO 8 ALPHANUMERIC CHARACTERS: ",GRIDID}

{MENUBRANCH GRID3}

GRID2

INCREMENTS	X-POINTS	Y-POINTS	ELEVATIONS	FLAGPOLE	NEW NETWORK	END
Uniform grid network generated from X	Grid network defined by series of discrete	Grid network defined by series of discrete	Specify receptor elevations	Specify flagpole receptor heights	Specify new Grid network	RETURN TO MAIN RECEPTOR MENU
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN	{GOTO}TABLE~{END}{DOWN}{DOW	{GOTO}TABLE~{END}{DOWN}{DOWN	{MENUBRANCH RE}
/CGRIDID~GRIDID2~/RNDGRIDI	/CGRIDID~GRIDID2~/RNDGRIDID	/CGRIDID~GRIDID2~/RNDGRIDID	/CGRIDID~GRIDID2~/RNDGR	/CGRIDID~GRIDID2~/RNDGRIDID2	~/CGRIDID~GRIDID2~/RNDGRIDID2~	
{RIGHT}/RNCXINIT~~{RIGHT}/R	{GETNUMBER "ENTER FIRST X CO	{GETNUMBER "ENTER FIRST Y CO	{GETNUMBER "ENTER ROW #	{GETNUMBER "ENTER ROW # FOR R	{MENUBRANCH GRID}	
{GETNUMBER "ENTER STARTING	{RIGHT}/RNCGX~~{GETNUMBER	{RIGHT}/RNCGY~~{GETNUMBER	{GETNUMBER "ENTER FIRST E	{GETNUMBER "ENTER FIRST FLAGPOLE HEIGHT FOR DESIGNATED ROW (IN METERS): ",fp}~/RNDfp~		
{GETNUMBER "ENTER NUMBER O	{getnumber "Enter a 1 to continue with ne	{getnumber "Enter a 1 to continue with ne	{RIGHT}/RNCEL~~{GETNUM	{RIGHT}/RNCFP~~{GETNUMBER "ENTER NEXT FLAGPOLE HEIGHT (IN METERS): ",FP}~/RNDFP~		
{GETNUMBER "ENTER SPACING (I	{if <<AIR>>c565=0}{branch <<AIR	{if <<AIR>>D565=0}{branch <<AIR	{getnumber "Enter a 1 to continue w	{getnumber "Enter a 1 to continue with next flagpole height in the row or a 0 to quit ",<<AIR>>f565}~		
{GETNUMBER "ENTER STARTING	{branch c555}	{branch D555}	{if <<AIR>>e565=0}{branch <<	{if <<AIR>>f565=0}{branch <<AIR>>f563}~		
{GETNUMBER "ENTER NUMBER O	{MENUBRANCH GRID2}	{MENUBRANCH GRID2}	{branch e555}	{branch f555}		
{GETNUMBER "ENTER SPACING (IN METERS) BETWEEN Y-AXIS RECEPTORS: ",YDELTA}~			{MENUBRANCH GRID2}	{MENUBRANCH GRID2}		
/RNDXINIT~/RNDXNUM~/RNDXDELTA~/RNDYINIT~/RNDYNUM~/RNDYDELTA~						
{MENUBRANCH GRID2}	0	0	0			

INCREMENTS

Uniform grid network generated from X & Y increments

{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}GRIDCART~{RIGHT}/RNCGRIDID2~~{RIGHT}XYINC~

/CGRIDID~GRIDID2~/RNDGRIDID2~

{RIGHT}/RNCXINIT~~{RIGHT}/RNCXNUM~~{RIGHT}/RNCXDELTA~~{RIGHT}/RNCYINIT~~{RIGHT}/RNCYNUM~~{RIGHT}/RNCYDELTA~~

{GETNUMBER "ENTER STARTING X LOCATION (IN METERS): ",XINIT}~

{GETNUMBER "ENTER NUMBER OF X-AXIS RECEPTORS: ",XNUM}~

{GETNUMBER "ENTER SPACING (IN METERS) BETWEEN X-AXIS RECEPTORS: ",XDELTA}~

{GETNUMBER "ENTER STARTING Y LOCATION (IN METERS): ",YINIT}~

{GETNUMBER "ENTER NUMBER OF Y-AXIS RECEPTORS: ",YNUM}~

{GETNUMBER "ENTER SPACING (IN METERS) BETWEEN Y-AXIS RECEPTORS: ",YDELTA}~

/RNDXINIT~/RNDXNUM~/RNDXDELTA~/RNDYINIT~/RNDYNUM~/RNDYDELTA~

{MENUBRANCH GRID2}

X-POINTS

Grid network defined by series of discrete X & Y coordinates

{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}GRIDCART~{RIGHT}/RNCGRIDID2~~{RIGHT}XPTS~{RIGHT}/rncgX~~

/CGRIDID~GRIDID2~/RNDGRIDID2~

{GETNUMBER "ENTER FIRST X COORDINATE (IN METERS): ",GX}~/RNDGX~

{RIGHT}/RNCGX~~{GETNUMBER "ENTER NEXT X COORDINATE: ",GX}~/RNDGX~

{getnumber "Enter a 1 to continue with next X coordinate or a 0 to quit ",<<RISC2>>c565}~

{if <<RISC2>>c565=0}{branch <<RISC2>>c562}~

{branch c555}

{MENUBRANCH GRID2}

Y-POINTS

Grid network defined by series of discrete X & Y coordinates

```
{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}GRIDCART~{RIGHT}/RNCGRIDID2~~{RIGHT}YPTS~{RIGHT}/rncgY~~
/CGRIDID~GRIDID2~/RNDGRIDID2~
{GETNUMBER "ENTER FIRST Y COORDINATE (IN METERS):  ",GY}~/RNDGY~
{RIGHT}/RNCGY~~{GETNUMBER "ENTER NEXT Y COORDINATE:  ",GY}~/RNDGY~
{getnumber "Enter a 1 to continue with next Y coordinate or a 0 to quit  ",<<RISC2>>D565}~
{if <<RISC2>>D565=0}{branch <<RISC2>>D562}~
{branch D555}
```

{MENUBRANCH GRID2}

ELEVATIONS

Specify receptor elevations

```
{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}GRIDCART~{RIGHT}/RNCGRIDID2~~{RIGHT}ELEV~{RIGHT}/rncrow~~{right}/rncEL~~
/CGRIDID~GRIDID2~/RNDGRIDID2~
{GETNUMBER "ENTER ROW # FOR RECEPTORS (ROW=1 IS SOUTHMOST ROW):  ",row}~/RNDrow~
{GETNUMBER "ENTER FIRST ELEVATION IN DESIGNATED ROW (IN METERS):  ",EL}~/RNDEL~
{RIGHT}/RNCEL~~{GETNUMBER "ENTER NEXT ELEVATION (IN METERS):  ",EL}~/RNDEL~
{getnumber "Enter a 1 to continue with next elevation in the row or a 0 to quit  ",<<RISC2>>E565}~
{if <<RISC2>>e565=0}{branch <<RISC2>>e563}~
{branch e555}
```

{MENUBRANCH GRID2}

FLAGPOLE

Specify flagpole receptor heights

```
{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}GRIDCART~{RIGHT}/RNCGRIDID2~~{RIGHT}FLAG~{RIGHT}/rncrow~~{right}/rncfp~~
/CGRIDID~GRIDID2~/RNDGRIDID2~
{GETNUMBER "ENTER ROW # FOR RECEPTORS (ROW=1 IS SOUTHMOST ROW):  ",row}~/RNDrow~
{GETNUMBER "ENTER FIRST FLAGPOLE HEIGHT FOR DESIGNATED ROW (IN METERS):  ",fp}~/RNDfp~
{RIGHT}/RNCFP~~{GETNUMBER "ENTER NEXT FLAGPOLE HEIGHT (IN METERS):  ",FP}~/RNDFP~
{getnumber "Enter a 1 to continue with next flagpole height in the row or a 0 to quit  ",<<RISC2>>f565}~
{if <<RISC2>>f565=0}{branch <<RISC2>>f563}~
{branch f555}
```

{MENUBRANCH GRID2}

NEW NETWORK

Specify new Grid network

```
{GOTO}TABLE~{END}{DOWN}{DOWN}'RE~{RIGHT}GRIDCART~{RIGHT}/RNCGRIDID2~~{RIGHT}END~
/CGRIDID~GRIDID2~/RNDGRIDID2~
```

{MENUBRANCH GRID}

END

RETURN TO MAIN RECEPTOR MENU

{MENUBRANCH RE}

GRID3

ORIGIN	DISTANCES	DISCRETE DIR	GENERATED DIR	ELEVATIONS	FLAGPOLE	NEW NETWORK	END
Specify origin of the Polar network	Specify distances for polar network	Specify discrete direction radials for polar	Specify Generated direction radials	Specify receptor elevations	Specify flagpole receptor heights	Specify new Grid network	RETURN TO MAIN RECEPTOR MENU
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN	{GOTO}TABLE~{END}{DOWN}{DOW	{GOTO}TABLE~{END}{DOWN}{DOWN	{GOTO}TABLE~{END}{D	{GOTO}TABLE~{END}{DOWN}{DOWN}"R
/CGRIDID~GRIDID2~/RNDGRIDI	/CGRIDID~GRIDID2~/RNDGRIDID	/CGRIDID~GRIDID2~/RNDGRIDID	/CGRIDID~GRIDID2~/RNDGR	/CGRIDID~GRIDID2~/RNDGRIDID2	~/CGRIDID~GRIDID2~/RNDGRIDID2~	/CGRIDID~GRIDID2~/RN	/CGRIDID~GRIDID2~/RNDGRIDID2~
{RIGHT}/RNCXINIT~~{RIGHT}/R	{GETNUMBER "ENTER DISTANCE T	{GETNUMBER "ENTER FIRST DIRE	{GETNUMBER "ENTER NUMBE	{GETNUMBER "ENTER DIRECTION T	{GETNUMBER "ENTER DIRECTION TO B	{MENUBRANCH GRID}	{MENUBRANCH RE}
{GETNUMBER "ENTER X COORDI	{RIGHT}/RNCRING~~{GETNUMB	{RIGHT}/RNCDIR~~{GETNUMBE	{GETNUMBER "ENTER STARTI	{GETNUMBER "ENTER FIRST ELEVAT	{GETNUMBER "ENTER FIRST FLAGPOLE HEIGHT FOR DESIGNATED ARRAY (IN METERS): ",ZFLAG}~/RND2		
{GETNUMBER "ENTER Y COORDI	{getnumber "Enter a 1 to continue with ne	{getnumber "Enter a 1 to continue with ne	{GETNUMBER "ENTER INCREM	{RIGHT}/RNCZELEV~~{GETNUMBE	{RIGHT}/RNCEL~~{GETNUMBER "ENTER NEXT FLAGPOLE HEIGHT (IN METERS): ",ZFLAG}~/RNDZFLAG~		
/RNDXINIT~/RNDYINIT~	{if NUM=0}{branch c577}~	{if NUM=0}{branch d577}~	{MENUBRANCH GRID3}	{getnumber "Enter a 1 to continue with next	{getnumber "Enter a 1 to continue with next flagpole height in the row or a 0 to quit ",NUM}~		
{MENUBRANCH GRID3}	{branch c573}	{branch d573}		{if NUM=0}{branch f574}~	{if NUM=0}{branch G574}~		
	{MENUBRANCH GRID3}	{MENUBRANCH GRID3}		{branch f574}	{branch G574}		
				{MENUBRANCH GRID3}	{MENUBRANCH GRID3}		

ORIGIN

Specify origin of the Polar network
{GOTO}TABLE~{END}{DOWN}{DOWN}"RE~{RIGHT}GRIDPOLR~{RIGHT}/RNCGRIDID2~~{RIGHT}ORIG~
/CGRIDID~GRIDID2~/RNDGRIDID2~
{RIGHT}/RNCXINIT~~{RIGHT}/RNCYINIT~~
{GETNUMBER "ENTER X COORDINATE FOR ORIGIN OF POLAR NETWORK: ",XINIT}~
{GETNUMBER "ENTER Y COORDINATE FOR ORIGIN OF POLAR NETWORK: ",YINIT}~
/RNDXINIT~/RNDYINIT~
{MENUBRANCH GRID3}

DISTANCES

Specify distances for polar network
{GOTO}TABLE~{END}{DOWN}{DOWN}"RE~{RIGHT}GRIDPOLR~{RIGHT}/RNCGRIDID2~~{RIGHT}DIST~{RIGHT}/RNCRING~~
/CGRIDID~GRIDID2~/RNDGRIDID2~
{GETNUMBER "ENTER DISTANCE TO FIRST RING OF POLAR COORDINATES (IN METERS): ",RING}~/RNDRING~
{RIGHT}/RNCRING~~{GETNUMBER "ENTER DISTANCE TO NEXT RING OF POLAR COORDINATES: ",RING}~/RNDRING~
{GETLABEL "DO YOU WANT TO CONTINUE WITH ANOTHER RING (Y or N) ? ",NUM}~
{if NUM="N"}{branch c577}~
{branch c573}
{MENUBRANCH GRID3}

DISCRETE DIR

Specify discrete direction radials for polar network
{GOTO}TABLE~{END}{DOWN}{DOWN}"RE~{RIGHT}GRIDPOLR~{RIGHT}/RNCGRIDID2~~{RIGHT}DDIR~{RIGHT}/RNCDIR~~
/CGRIDID~GRIDID2~/RNDGRIDID2~
{GETNUMBER "ENTER FIRST DIRECTION RADIAL IN DEGREES (1 TO 360): ",DIR}~/RNDDIR~
{RIGHT}/RNCDIR~~{GETNUMBER "ENTER NEXT DIRECTION RADIAL IN DEGREES (1 TO 360): ",DIR}~/RNDDIR~
{GETLABEL "DO YOU WISH TO CONTINUE WITH THE NEXT DIRECTION RADIAL (Y or N) ? ",NUM}~
{if NUM="N"}{branch d577}~
{branch d573}
{MENUBRANCH GRID3}

GENERATED DIR

Specify Generated direction radials for polar network

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"RE ~ {RIGHT}GRIDPOLR ~ {RIGHT}/RNCGRIDID2 ~ ~
{RIGHT}GDIR ~ {RIGHT}/RNCNUM ~ ~ {RIGHT}/RNCDIRINI ~ ~ {RIGHT}/RNCDIRINC ~ ~
/CGRIDID ~ GRIDID2 ~ /RNDGRIDID2 ~
{GETNUMBER "ENTER NUMBER OF DIRECTIONS USED TO DEFINE POLAR GRID: ",NUM} ~ /RNDNUM ~
{GETNUMBER "ENTER STARTING DIRECTION OF THE POLAR GRID: ",DIRINI} ~ /RNDDIRINI ~
{GETNUMBER "ENTER INCREMENT ( IN DEGREES) FOR DEFINING DIRECTIONS: ",DIRINC} ~ /RNDDIRINC ~
```

{MENUBRANCH GRID3}

ELEVATIONS

Specify receptor elevations

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"RE ~ {RIGHT}GRIDPOLR ~ {RIGHT}/RNCGRIDID2 ~ ~ {RIGHT}ELEV ~ {RIGHT}/rncDIR ~ ~ {right}/rncZELEV ~ ~
/CGRIDID ~ GRIDID2 ~ /RNDGRIDID2 ~
{GETNUMBER "ENTER DIRECTION TO BE INPUT: ",DIR} ~ /RNDDIR ~
{GETNUMBER "ENTER FIRST ELEVATION IN DESIGNATED RECEPTOR ARRAY ( IN METERS): ",ZELEV} ~ /RNDZELEV ~
{RIGHT}/RNCZELEV ~ ~ {GETNUMBER "ENTER NEXT ELEVATION ( IN METERS): ",ZELEV} ~ /RNDZELEV ~
{GETLABEL "DO YOU WISH TO CONTINUE WITH NEXT ELEVATIONIN THE ARRAY ( Y or N)? ",NUM} ~
{if NUM="N"}{branch f578} ~
{branch f574}
```

{MENUBRANCH GRID3}

FLAGPOLE

Specify flagpole receptor heights

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"RE ~ {RIGHT}GRIDPOLR ~ {RIGHT}/RNCGRIDID2 ~ ~ {RIGHT}FLAG ~ {RIGHT}/rncDIR ~ ~ {right}/rncZFLAG ~ ~
/CGRIDID ~ GRIDID2 ~ /RNDGRIDID2 ~
{GETNUMBER "ENTER DIRECTION TO BE INPUT: ",DIR} ~ /RNDDIR ~
{GETNUMBER "ENTER FIRST FLAGPOLE HEIGHT FOR DESIGNATED ARRAY ( IN METERS): ",ZFLAG} ~ /RNDZFLAG ~
{RIGHT}/RNCEL ~ ~ {GETNUMBER "ENTER NEXT FLAGPOLE HEIGHT ( IN METERS): ",ZFLAG} ~ /RNDZFLAG ~
{GETLABEL "DO YOU WISH TO CONTINUE WITH NEXT FLAGPOLE HEIGHT IN ROW ( Y or N) ? ",NUM} ~
{if NUM="N"}{branch G578} ~
{branch G574}
```

{MENUBRANCH GRID3}

NEW NETWORK

Specify new Grid network

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"RE ~ {RIGHT}GRIDPOLR ~ {RIGHT}/RNCGRIDID2 ~ ~ {RIGHT}END ~
/CGRIDID ~ GRIDID2 ~ /RNDGRIDID2 ~
```

{MENUBRANCH GRID}

END

RETURN TO MAIN RECEPTOR MENU
{GOTO}TABLE~{END}{DOWN}{DOWN}"RE~{RIGHT}GRIDPOLR~{RIGHT}/RNCGRIDID2~~{RIGHT}END~
/CGRIDID~GRIDID2~/RNDGRIDID2~
{MENUBRANCH RE}

ME

FILENAME	HEIGHT	STATION	PERIOD	DATA	RETURN
Specify filename and format information	Specify Anemometer height above ground	Specify meteorological station informatio	Specify period within meteorological	Specifies data variations or adjustments	Return to main function menu
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{IF <<air>>TERM=1}{MENUB	{menubranch data}	{GOTO}TABLE~{END}{DOWN}{DOWN}"ME~{RIGHT}FINISHED~
{GETLABEL "ENTER FILE NAME (I	{GETNUMBER "ENTER HEIGHT OF	{MENUBRANCH DATA2}	{MENUBRANCH STARDAT}		{menubranch function}
{IF <<AIR>>TERM=2}{BRANCH	{GETLABEL "ENTER UNITS OF MEA	{GETNUMBER "ENTER 5 DIGIT WBAN NUMBER FOR NWS STATIONS: ",STANUM}~			
/RECOMMENTS~{GOTO}COMME	/RNDZREF~/RNDZRUNIT~	{GETNUMBER "ENTER YEAR FOR WHICH DATA IS BEING PROCESSED (2 OR 4 DIGITS): ",YEAR}~			
OPTIONAL FILE FORMATS~	{MENUBRANCH ME}	{GETLABEL "ENTER NAME OF STATION (OPTIONAL - UP TO 40 CHARACTERS): ",NAME}~			
BLANK -- Specifies the default ASCII format for sequential hourly file.~{dow		{GETNUMBER "ENTER X COORDINATE FOR LOCATION OF STATION (OPTIONAL): ",XCOORD}~			
READ -- Specifies the Fortran READ format for an ASCII sequential~{down		{GETNUMBER "ENTER Y COORDINATE FOR LOCATION OF STATION (OPTIONAL): ",YCOORD}~			
hourly file (See page 3-53 in manual).~{down}{down}		{IF XCOORD=0}{BLANK XCOORD}			
FREE -- Specifies free-formated READs for an ASCII sequential hourly ~{d		{IF YCOORD=0}{BLANK YCOORD}			
file.~{down}{down}		/RNDSTATION~/RNDSTANUM~/RNDYEAR~/RNDNAME~/RNDXCOORD~/RNDYCOORD~			
UNFORM -- Specifies an unformatted file generated by the RAMMET or MPR		{MENUBRANCH ME}			
preprocessors.~{down}{down}					
CARD -- Specifies use of "card image" data using a default ASCII format~{down}					
This option differs from option 1 (blank) by addition of ~{down}					
hourly wind profile exponents and hourly vertical potential~{down}					
temperature gradients in the input file.~{down}{down}					
See Page 3-51 through 3-55 for details~					
{menubranch mes1}					

FILENAME

Specify filename and format information for input file
{GOTO}TABLE~{END}{DOWN}{DOWN}"ME~{RIGHT}INPUTFIL~{RIGHT}/RNCMETFIL~~{RIGHT}/RNCFORM~~
{GETLABEL "ENTER FILE NAME (INCLUDE DOS PATH IF FILE IS NOT IN CURRENT DIRECTORY): ",METFIL}~
{IF <<RISC2>>TERM=2}{BRANCH MEL}
/RECOMMENTS~{GOTO}COMMENTS~
OPTIONAL FILE FORMATS~{down}{down}{down}
BLANK -- Specifies the default ASCII format for sequential hourly file.~{down}{down}
READ -- Specifies the Fortran READ format for an ASCII sequential~{down}
hourly file (See page 3-53 in manual).~{down}{down}
FREE -- Specifies free-formated READs for an ASCII sequential hourly ~{down}
file.~{down}{down}
UNFORM -- Specifies an unformatted file generated by the RAMMET or MPRM~{DOWN}
preprocessors.~{down}{down}
CARD -- Specifies use of "card image" data using a default ASCII format~{down}
This option differs from option 1 (blank) by addition of ~{down}
hourly wind profile exponents and hourly vertical potential~{down}
temperature gradients in the input file.~{down}{down}
See Page 3-51 through 3-55 for details~
{menubranch mes1}

HEIGHT

Specify Anemometer height above ground

{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}ANEMHGHT ~ {RIGHT}/RNCZREF ~ ~ {RIGHT}/RNCZRUNIT ~ ~
{GETNUMBER "ENTER HEIGHT OF ANEMOMETER ABOVE GROUND IN METERS OR FEET: ",ZREF} ~
{GETLABEL "ENTER UNITS OF MEASUREMENT FOR ANEMOMETER HEIGHT (METERS OR FEET): ",ZRUNIT} ~
/RNDZREF ~ /RNDZRUNIT ~
{MENUBRANCH ME}

STATION

Specify meteorological station information

{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}/RNCSTATION ~ ~
{RIGHT}/RNCSTANUM ~ ~ {RIGHT}/RNCYEAR ~ ~ {RIGHT}/RNCNAME ~ ~ {RIGHT}/RNCXCOORD ~ ~ {RIGHT}/RNCYCOORD ~ ~
{MENUCALL DATA2}
{GETNUMBER "ENTER 5 DIGIT WBAN NUMBER FOR NWS STATIONS: ",STANUM} ~
{GETNUMBER "ENTER YEAR FOR WHICH DATA IS BEING PROCESSED (2 OR 4 DIGITS): ",YEAR} ~
{GETLABEL "ENTER NAME OF STATION (OPTIONAL - UP TO 40 CHARACTERS): ",NAME} ~
{GETNUMBER "ENTER X COORDINATE FOR LOCATION OF STATION (OPTIONAL): ",XCOORD} ~
{GETNUMBER "ENTER Y COORDINATE FOR LOCATION OF STATION (OPTIONAL): ",YCOORD} ~
{IF XCOORD=0}{BLANK XCOORD}
{IF YCOORD=0}{BLANK YCOORD}
/RNDSTATION ~ /RNDSTANUM ~ /RNDYEAR ~ /RNDNAME ~ /RNDXCOORD ~ /RNDYCOORD ~
{MENUBRANCH ME}

PERIOD

Specify period within meteorlogical data file to process

{IF <<RISC2>>TERM=1}{MENUBRANCH PERIOD1}
{MENUBRANCH STARDAT}

DATA

Specifies data variations or adjustments

{menubranch data}

RETURN

Return to main function menu

{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}FINISHED ~
{menubranch function}

MES1

BLANK	READ	FREE	UNFORM	CARD	RETURN
Specifies default format	Specify Fortran read format	use fee - formated READS	Use unformated file	use "Card image" data	Return to main ME menu
{BLANK FORM}	{GETLABEL "INPUT FORTRAN "REA	{LETFORM,FREE}	{LETFORM,UNFORM}	{LETFORM,CARD}	{menubranch ME}
/RNDMETFIL ~ /RNDFORM ~	/RNDMETFIL ~ /RNDFORM ~	/RNDMETFIL ~ /RNDFORM ~	/RNDMETFIL ~ /RNDFORM ~	/RNDMETFIL ~ /RNDFORM ~	
{menubranch ME}	{menubranch ME}	{menubranch ME}	{menubranch ME}	{menubranch ME}	

BLANK
Specifies default format
{BLANK FORM}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

READ
Specify Fortran read format
{GETLABEL "INPUT FORTRAN "READ" FORMAT WITHIN ( ) (SEE PG 3-53) : "FORM}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

FREE
use free-formated READS
{LET FORM,FREE}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

UNFORM
Use unformated file
{LET FORM,UNFORM}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

CARD
use "Card image" data
{LET FORM,CARD}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

RETURN
Return to main ME menu
{menubranch ME}

DATA2

SURFDATA	UAIRDATA
Specifies surface meteorological station {let STATION,SURFDATA} {BRANCH D587}	Specifies upper air station {let STATION,UAIRDATA} {BRANCH D587}

SURFDATA
Specifies surface meteorological station
{let STATION,SURFDATA}
{BRANCH D587}

UAIRDATA
Specifies upper air station
{let STATION,UAIRDATA}
{BRANCH D587}

STARDAT

STARDATA	RETURN
Define STAR meteorolgical data summa	RETURN TO PREVIOUS MENU
{GOTO}TABLE ~{END}{DOWN}{D	{MENUBRANCH ME}
{MENUCALL III}	
{MENUBRANCH ME}	

STARDATA
Define STAR meteorolgical data summaries (OPTIONAL)
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}STARDATA ~
{MENUCALL III}
{MENUBRANCH ME}

RETURN
RETURN TO PREVIOUS MENU
{MENUBRANCH ME}

PERIOD1

START DATE	START HOUR	END DATE	END HOUR	DAYRANGE	QUIT
Specify start date for period	Specify start hour for period			Specify day or range of days to process	
{GOTO}TABLE ~{END}{DOWN}{D	{GOTO}TABLE ~{END}{DOWN}{EN	{GOTO}TABLE ~{END}{DOWN}{EN	{GOTO}TABLE ~{END}{DOWN	{GOTO}TABLE ~{END}{DOWN}{DOW	{MENUBRANCH ME}
{GETLABEL "ENTER START DATE	{GETLABEL "ENTER START HOUR (	{GETLABEL "ENTER STOP DATE FO	{GETLABEL "ENTER STOP HOU	{GETLABEL "ENTER DAY (1 2 3 ETC) OR RANGE OF DAYS(1-5): ",RANGE} ~	
{MENUBRANCH PERIOD1}	{MENUBRANCH PERIOD1}	{MENUBRANCH PERIOD1}	{MENUBRANCH PERIOD1}	{MENUBRANCH ME}	

START DATE
Specify start date for period
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}STARTEND ~ {RIGHT}/RNCSTART ~ ~
{GETLABEL "ENTER START DATE FOR PERIOD TO BE PROCESSED (YR MO DA): ",START}
{MENUBRANCH PERIOD1}

START HOUR
Specify start hour for period
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCSTHR ~ ~
{GETLABEL "ENTER START HOUR (1-24) FOR THE START DATE TO BE PROCESSED: ",STHR}

{MENUBRANCH PERIOD1}

END DATE

{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCSTOP ~ ~
{QUIT}

END HOUR

{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCSTHR ~ ~
{QUIT}

DAYRANGE

Specify day or range of days to process
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}DAYRANGE ~ {RIGHT}/RNCRANGE ~ ~
{GETLABEL "ENTER DAY (1 2 3 ETC) OR RANGE OF DAYS(1-5) : ",RANGE} ~
{MENUBRANCH ME}

QUIT

{MENUBRANCH ME}

DATA

WIND ALIGNMENT	WIND SPEED	EXPONENTS	TEMP GRAD	LONG TERM DATA	RETURN
Adjusts wind direction alignment	Windspeed categories	Specify wind profile exponents	Specify vert. potential temp gradient	Optional long term data adjustments	Return to main ME menu
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN	{menubranch data1}	{menubranch ME}
{GETLABEL "ENTER VALUE TO BE	{GETNUMBER "ENTER UPPER BOU	{GETLABEL "ENTER DESIGNATION	{GETLABEL "ENTER DESIGNATION (A-F OR 1-6) FOR STABILITY CATEGORY TO FOLLOW: ",STAB}		
/RNDROTANG~	{GETNUMBER "ENTER UPPER BOU	{GETNUMBER "ENTER WIND PROF	{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 1ST CATEGORY: ",DTDZ1}		
{MENUBRANCH DATA}	{GETNUMBER "ENTER UPPER BOU	{GETNUMBER "ENTER WIND PROF	{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 2ND CATEGORY: ",DTDZ2}		
	{GETNUMBER "ENTER UPPER BOU	{GETNUMBER "ENTER WIND PROF	{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 3RD CATEGORY: ",DTDZ3}		
	{GETNUMBER "ENTER UPPER BOU	{GETNUMBER "ENTER WIND PROF	{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 4TH CATEGORY: ",DTDZ4}		
	/RNDWS1~/RNDWS2~/RNDWS3~/R	{GETNUMBER "ENTER WIND PROF	{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 5TH CATEGORY: ",DTDZ5}		
	{MENUBRANCH DATA}	{GETNUMBER "ENTER WIND PROF	{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 6TH CATEGORY: ",DTDZ6}		
		/RNDSTAB~/RNDWP1~/RNDWP2~/	/RNDSTAB~/RNDDTDZ1~/RNDDTDZ2~/RNDDTDZ3~/RNDDTDZ4~/RNDDTDZ5~/RNDDTDZ6~~		
		{MENUBRANCH DATA}	{MENUBRANCH DATA}		

WIND ALIGNMENT

Adjusts wind direction alignment
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}WDROTATE ~ {RIGHT}/RNCROTANG ~ ~
{GETLABEL "ENTER VALUE TO BE SUBTRACTED FROM WIND DIRECTION MEASUREMENTS: ",ROTANG}
/RNDROTANG ~
{MENUBRANCH DATA}

WIND SPEED

Wind speed categories

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"ME~{RIGHT}WINDCATS~
{RIGHT}/RNCWS1~~{RIGHT}/RNCWS2~~{RIGHT}/RNCWS3~~{RIGHT}/RNCWS4~~{RIGHT}/RNCWS5~~
{GETNUMBER "ENTER UPPER BOUNDARY WIND SPEED (M/S) FOR 1ST CATEGORY:  ",WS1}
{GETNUMBER "ENTER UPPER BOUNDARY WIND SPEED (M/S) FOR 2ND CATEGORY:  ",WS2}
{GETNUMBER "ENTER UPPER BOUNDARY WIND SPEED (M/S) FOR 3RD CATEGORY:  ",WS3}
{GETNUMBER "ENTER UPPER BOUNDARY WIND SPEED (M/S) FOR 4TH CATEGORY:  ",WS4}
{GETNUMBER "ENTER UPPER BOUNDARY WIND SPEED (M/S) FOR 5TH CATEGORY:  ",WS5}
/RNDWS1~/RNDWS2~/RNDWS3~/RNDWS4~/RNDWS5~
{MENUBRANCH  DATA}
```

EXPONENTS

Specify wind profile exponents

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"ME~{RIGHT}WINDPROF~{RIGHT}/RNCSTAB~~
{RIGHT}/RNCWP1~~{RIGHT}/RNCWP2~~{RIGHT}/RNCWP3~~{RIGHT}/RNCWP4~~{RIGHT}/RNCWP5~~{RIGHT}/RNCWP6~~
{GETLABEL "ENTER DESIGNATION (A-F OR 1-6) FOR STABILITY CATEGORY TO FOLLOW:  ",STAB}
{GETNUMBER "ENTER WIND PROFILE EXPONENT FOR 1ST CATEGORY:  ",WP1}
{GETNUMBER "ENTER WIND PROFILE EXPONENT FOR 2ND CATEGORY:  ",WP2}
{GETNUMBER "ENTER WIND PROFILE EXPONENT FOR 3RD CATEGORY:  ",WP3}
{GETNUMBER "ENTER WIND PROFILE EXPONENT FOR 4TH CATEGORY:  ",WP4}
{GETNUMBER "ENTER WIND PROFILE EXPONENT FOR 5TH CATEGORY:  ",WP5}
{GETNUMBER "ENTER WIND PROFILE EXPONENT FOR 6TH CATEGORY:  ",WP6}
/RNDSTAB~/RNDWP1~/RNDWP2~/RNDWP3~/RNDWP4~/RNDWP5~/RNDWP6~~
{MENUBRANCH  DATA}
```

TEMP GRAD

Specify vert. potential temp gradients

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"ME~{RIGHT}DTHETADZ~{RIGHT}/RNCSTAB~~
{RIGHT}/RNCDTDZ1~~{RIGHT}/RNCDTDZ2~~{RIGHT}/RNCDTDZ3~~{RIGHT}/RNCDTDZ4~~{RIGHT}/RNCDTDZ5~~{RIGHT}/RNCDTDZ6~~
{GETLABEL "ENTER DESIGNATION (A-F OR 1-6) FOR STABILITY CATEGORY TO FOLLOW:  ",STAB}
{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 1ST CATEGORY:  ",DTDZ1}
{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 2ND CATEGORY:  ",DTDZ2}
{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 3RD CATEGORY:  ",DTDZ3}
{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 4TH CATEGORY:  ",DTDZ4}
{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 5TH CATEGORY:  ",DTDZ5}
{GETNUMBER "ENTER VERT. POTENTIAL TEMP GRADIENT FOR 6TH CATEGORY:  ",DTDZ6}
/RNDSTAB~/RNDDTDZ1~/RNDDTDZ2~/RNDDTDZ3~/RNDDTDZ4~/RNDDTDZ5~/RNDDTDZ6~~
{MENUBRANCH  DATA}
```

LONG TERM DATA

Optional long term data adjustments

```
{menubranch data1}
```

RETURN

Return to main ME menu

{menubranch ME}

DATA1

WIND SPEED	AVERAGE TEMPS	MIXING HEIGHTS	RETURN
Specify median Wind speed for each win	Specify average ambient temperatures	Specify average values of mixing height	Return to main ME menu
{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{GOTO}TABLE~{END}{DOWN}{D	{menubranch ME}
{GETNUMBER "ENTER MEDIAN W	{GETLABEL "ENTER KEYWORD FO	{GETLABEL "ENTER KEYWORD FOR THE PERIOD TO BE AVERAGED (SPRING, FALL, ETC): ",AVEPER}	
{GETNUMBER "ENTER MEDIAN W	{GETNUMBER "ENTER THE AVERA	{GETLABEL "ENTER DESIGNATION (A–F OR 1–6) DESIGNATION FOR STABILITY CATEGORY: ",STAB}	
{GETNUMBER "ENTER MEDIAN W	{GETNUMBER "ENTER THE AVERA	{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 1ST CATEGORY: ",TA1}	
{GETNUMBER "ENTER MEDIAN W	{GETNUMBER "ENTER THE AVERA	{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 2ND CATEGORY: ",TA2}	
{GETNUMBER "ENTER MEDIAN W	{GETNUMBER "ENTER THE AVERA	{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 3RD CATEGORY: ",TA3}	
{GETNUMBER "ENTER MEDIAN W	{GETNUMBER "ENTER THE AVERA	{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 4TH CATEGORY: ",TA4}	
/RNDWS1~/RNDWS2~/RNDWS3~/	{GETNUMBER "ENTER THE AVERA	{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 5TH CATEGORY: ",TA5}	
{MENUBRANCH DATA1}	/RNDAVEPER~/RNDTA1~/RNDTA2	{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 6TH CATEGORY: ",TA6}	
	{MENUBRANCH DATA1}	/RNDAVEPER~/RNDTA1~/RNDTA2~/RNDTA3~/RNDTA4~/RNDTA5~/RNDTA6~/RNDSTAB~	
		{MENUBRANCH DATA1}	

WIND SPEED

Specify median Wind speed for each wind speed category

{GOTO}TABLE~{END}{DOWN}{DOWN}"ME~{RIGHT}WINDCATS~
{RIGHT}/RNCWS1~~{RIGHT}/RNCWS2~~{RIGHT}/RNCWS3~~{RIGHT}/RNCWS4~~{RIGHT}/RNCWS5~~{RIGHT}/RNCWS6~~
{GETNUMBER "ENTER MEDIAN WIND SPEED (M/S) FOR 1ST CATEGORY: ",WS1}
{GETNUMBER "ENTER MEDIAN WIND SPEED (M/S) FOR 2ND CATEGORY: ",WS2}
{GETNUMBER "ENTER MEDIAN WIND SPEED (M/S) FOR 3RD CATEGORY: ",WS3}
{GETNUMBER "ENTER MEDIAN WIND SPEED (M/S) FOR 4TH CATEGORY: ",WS4}
{GETNUMBER "ENTER MEDIAN WIND SPEED (M/S) FOR 5TH CATEGORY: ",WS5}
{GETNUMBER "ENTER MEDIAN WIND SPEED (M/S) FOR 6TH CATEGORY: ",WS6}
/RNDWS1~/RNDWS2~/RNDWS3~/RNDWS4~/RNDWS5~/RNDWS6~
{MENUBRANCH DATA1}

AVERAGE TEMPS

Specify average ambient temperatures

{GOTO}TABLE~{END}{DOWN}{DOWN}"ME~{RIGHT}AVETEMPS~{RIGHT}/RNCAVEPER~~
{RIGHT}/RNCTA1~~{RIGHT}/RNCTA2~~{RIGHT}/RNCTA3~~{RIGHT}/RNCTA4~~{RIGHT}/RNCTA5~~{RIGHT}/RNCTA6~~
{GETLABEL "ENTER KEYWORD FOR THE PERIOD TO BE AVERAGED (SPRING, FALL, ETC): ",AVEPER}
{GETNUMBER "ENTER THE AVERAGE AMBIENT TEMPERATURE FOR 1ST CATEGORY: ",TA1}
{GETNUMBER "ENTER THE AVERAGE AMBIENT TEMPERATURE FOR 2ND CATEGORY: ",TA2}
{GETNUMBER "ENTER THE AVERAGE AMBIENT TEMPERATURE FOR 3RD CATEGORY: ",TA3}
{GETNUMBER "ENTER THE AVERAGE AMBIENT TEMPERATURE FOR 4TH CATEGORY: ",TA4}
{GETNUMBER "ENTER THE AVERAGE AMBIENT TEMPERATURE FOR 5TH CATEGORY: ",TA5}
{GETNUMBER "ENTER THE AVERAGE AMBIENT TEMPERATURE FOR 6TH CATEGORY: ",TA6}
/RNDAVEPER~/RNDTA1~/RNDTA2~/RNDTA3~/RNDTA4~/RNDTA5~/RNDTA6~
{MENUBRANCH DATA1}

MIXING HEIGHTS

Specify average values of mixing height

{GOTO}TABLE ~ {END}{DOWN}{DOWN}"ME ~ {RIGHT}AVEMIXHT ~ {RIGHT}/RNCAVEPER ~ ~ {RIGHT}/RNCSTAB ~ ~
{RIGHT}/RNCTA1 ~ ~ {RIGHT}/RNCTA2 ~ ~ {RIGHT}/RNCTA3 ~ ~ {RIGHT}/RNCTA4 ~ ~ {RIGHT}/RNCTA5 ~ ~ {RIGHT}/RNCTA6 ~ ~
{GETLABEL "ENTER KEYWORD FOR THE PERIOD TO BE AVERAGED (SPRING, FALL, ETC): ",AVEPER}
{GETLABEL "ENTER DESIGNATION (A-F OR 1-6) DESIGNATION FOR STABILITY CATEGORY: ",STAB}
{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 1ST CATEGORY: ",TA1}
{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 2ND CATEGORY: ",TA2}
{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 3RD CATEGORY: ",TA3}
{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 4TH CATEGORY: ",TA4}
{GETNUMBER "ENTER THE AVERAGE MIXING HEIGHTS (M) FOR 5TH CATEGORY: ",TA5}
{GETNUMBER "ENTER THE AVERAGE MXING HEIGHTS (M) FOR 6TH CATEGORY: ",TA6}
/RNDAVEPER ~ /RNDTA1 ~ /RNDTA2 ~ /RNDTA3 ~ /RNDTA4 ~ /RNDTA5 ~ /RNDTA6 ~ /RNDSTAB ~
{MENUBRANCH DATA1}

RETURN

Return to main ME menu

{menubranch ME}

EV

PERIOD	CARTESIAN LOCATIO	POLAR LOCATION	ELEVATION	FLAGPOLE	QUIT
Specify event period, data period and sou	Specify event cartesian location informati	Specify event polar location information	Optional terrain elevation for event	Optional receptor height above ground for e	RETURN TO MAIN FUNCTION MENU
{GOTO}TABLE ~{END}{DOWN}{D	{GOTO}TABLE ~{END}{DOWN}{D	{GOTO}TABLE ~{END}{DOWN}{D	{GETNUMBER "ENTER TERRA	{GETNUMBER "ENTER RECEPTOR HE	{MENUBRANCH FUNCTION}
{GETLABEL "ENTER EVENT NAME	{GETLABEL "ENTER EVENT NAME	{GETLABEL "ENTER EVENT NAME	/RNDZELEV ~	/RNDZFLAG ~	
{GETNUMBER "ENTER AVERAGIN	{GETNUMBER "ENTER X-COORDI	{GETNUMBER "ENTER DISTANCE	{MENUBRANCH EV}	{MENUBRANCH EV}	
{GETLABEL "ENTER SOURCE GRO	{GETNUMBER "ENTER Y-COORDI	{GETNUMBER "ENTER RADIAL DIRECTION (DEGREES)FOR EVENT LOCATION: ",YR}			
{GETLABEL "ENTER DATE FOR E	/RNDEVNAME ~ /RNDXR ~ /RNDYR	/RNDEVNAME ~ /RNDXR ~ /RNDYR ~			
/RNDEVNAME ~ /RNDAVEPER ~ /R	{MENUBRANCH EV}	{MENUBRANCH EV}			
{MENUBRANCH EV}					

PERIOD

Specify event period, data period and source group

{GOTO}TABLE ~ {END}{DOWN}{DOWN}"EV ~ {RIGHT}EVENTPER ~ {RIGHT}/RNCEVNAME ~ ~ {RIGHT}/RNCAVEPER ~ ~ {RIGHT}/RNCGRPID ~ ~ {RIGHT}/RNCDATE ~ ~
{GETLABEL "ENTER EVENT NAME (ALPHANUMBERIC STRING OF UP TO 8 CHARACTERS): ",EVNAME}
{GETNUMBER "ENTER AVERAGING PERIOD FOR THE EVENT (IN HOURS): ",AVEPER}
{GETLABEL "ENTER SOURCE GROUP ID (MUST BE DEFINED ON SO PATHWAY): ",GRPID}
{GETLABEL "ENTER DATE FOR ENDING HOUR OF EVENT (IN YYMMDDHH FORM): ",DATE}
/RNDEVNAME ~ /RNDAVEPER ~ /RNDGRPID ~ /RNDDATE ~
{MENUBRANCH EV}

CARTESIAN LOCATION

Specify event cartesian location information

{GOTO}TABLE ~ {END}{DOWN}{DOWN}"EV ~ {RIGHT}EVENTLOC ~ {RIGHT}/RNCEVNAME ~ ~
{RIGHT}/RNCXR ~ ~ {RIGHT}/RNCYR ~ ~ {RIGHT}/RNCZELEV ~ ~ {RIGHT}/RNCZFLAG ~ ~
{GETLABEL "ENTER EVENT NAME (ALPHANUMBERIC STRING OF UP TO 8 CHARACTERS): ",EVNAME}
{GETNUMBER "ENTER X-COORDINATE FOR EVENT LOCATION (IN METERS): ",XR}

{GETNUMBER "ENTER Y-COORDINATE FOR EVENT LOCATION (IN METERS): ",YR}
/RNDEVNAME ~ /RNDXR ~ /RNDYR ~
{MENUBRANCH EV}

POLAR LOCATION

Specify event polar location information
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"EV ~ {RIGHT}EVENTLOC ~ {RIGHT}/RNCEVNAME ~ ~
{RIGHT}/RNCXR ~ ~ {RIGHT}/RNCYR ~ ~ {RIGHT}/RNCZELEV ~ ~ {RIGHT}/RNCZFLAG ~ ~
{GETLABEL "ENTER EVENT NAME (ALPHANUMBERIC STRING OF UP TO 8 CHARACTERS): ",EVNAME}
{GETNUMBER "ENTER DISTANCE RANGE TO ORIGIN 0,0 FOR EVENT LOCATION (IN METERS): ",XR}
{GETNUMBER "ENTER RADIAL DIRECTION (DEGREES) FOR EVENT LOCATION: ",YR}
/RNDEVNAME ~ /RNDXR ~ /RNDYR ~
{MENUBRANCH EV}

ELEVATION

Optional terrain elevation for event location
{GETNUMBER "ENTER TERRAIN ELEVATION FOR EVENT LOCATION (IN METERS): ",zelev}
/RNDZELEV ~
{MENUBRANCH EV}

FLAGPOLE

Optional receptor height above ground for event location
{GETNUMBER "ENTER RECEPTOR HEIGHT FOR EVENT LOCATION (IN METERS): ",ZFLAG}
/RNDZFLAG ~
{MENUBRANCH EV}

QUIT

RETURN TO MAIN FUNCTION MENU
{MENUBRANCH FUNCTION}

OU

TABULAR	SPECIAL PURPOSE	QUIT
Select tabular output options	Select special purpose output options	Return to function menu
{IF <<ar>>TERM=1}{MENUBRA	{MENUBRANCH OU3}	{GOTO}TABLE ~{END}{DOWN}{DOWN}"OU ~{RIGHT}FINISHED ~
{MENUBRANCH OU4}		{menubranch function}

TABULAR

Select tabular output options
{IF <<RISC2>>TERM=1}{MENUBRANCH OU1}
{MENUBRANCH OU4}

SPECIAL PURPOSE
Select special purpose output options
{MENUBRANCH OU3}

QUIT
Return to function menu
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"OU ~ {RIGHT}FINISHED ~
{menubranch function}

OU1

RECEPTOR TABLE	MAXIMUM VALUE TA	CONCURRENT VALUE	RETURN

Specify output options for high value suSpecifies output options for overall maximOptions for tables of concurrent values – Return to previous menu
{GOTO}TABLE ~{END}{DOWN}{D{GOTO}TABLE ~{END}{DOWN}{D{GOTO}TABLE ~{END}{DOWN}{D{menubranch ou}
/RECOMMENTS ~{GOTO}COMME/RECOMMENTS ~{GOTO}COMMEN/RECOMMENTS ~{GOTO}COMMENTS ~
THE SHORT TERM AVERAGING PETHE SHORT TERM AVERAGING PEENTERING THE KEYWORD "ALLAVE"FOR THE SHORT TERM AVARAGING PERIOD ~{DOWN}{DOWN}
(ie. 1, 3, 8, or 24 hrs OR MONTH)   (ie. 1, 3, 8, or 24 hrs OR MONTH) ~WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS ~
FOR WHICH THE RECEPTOR TABFOR WHICH THE RECEPTOR TABL{MENUCALL II}
THE SECONDARY KEYWORDS "FITHE SECONDARY KEYWORD SPEC{MENUBRANCH OU1}
"FIFTH", & "SIXTH" (OR "1ST", "2ND",TO BE SUMMARIZED FOR EACH AVERAGING PERIOD. ~{DOWN}{DOWN}{DOWN}
VALUES ARE TO BE SUMMARIZEENTERING THE KEYWORD "ALLAVE"FOR THE SHORT TERM AVARAGING PERIOD ~{DOWN}{DOWN}
ENTERING THE KEYWORD "ALLAWILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS ~
WILL APPLY THE SAME RECEPTO{GETLABEL "ENTER THE SHORT TERM AVERAGING PERIOD : ",AVEPER}
{GETLABEL "ENTER THE SHORT T{GETNUMBER "ENTER THE NUMBER OF OVERALL MAXIMUM VALUES TO BE SUMMARIZED: ",MAXNUM}
/RNDAVEPER ~   /RNDAVEPER ~
{MENUBRANCH OU2}   {MENUBRANCH OU1}

RECEPTOR TABLE
Specify output options for high value summary tables by receptor
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"OU ~ {RIGHT}RECTABLE ~ {RIGHT}/RNCAVEPER ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
THE SHORT TERM AVERAGING PERIOD IS THE PERIOD ~ {down}{down}
(i.e. 1, 3, 8, or 24 hrs OR MONTH) ~ {DOWN}{DOWN}
FOR WHICH THE RECEPTOR TABLE IS SELECTED. ~ {DOWN}{DOWN}
THE SECONDARY KEYWORDS "FIRST", "SECOND", "THIRD", "FOURTH" ~ {DOWN}{DOWN}
"FIFTH", & "SIXTH" (OR "1ST", "2ND", "3RD" ETC) SPECIFY WHICH HIGH ~ {DOWN}{DOWN}
VALUES ARE TO BE SUMMARIZED BY RECEPTOR FOR THAT AVERAGING PERIOD. ~ {DOWN}{DOWN}{DOWN}
ENTERING THE KEYWORD "ALLAVE" FOR THE SHORT TERM AVARAGING PERIOD ~ {DOWN}{DOWN}
WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS ~
{GETLABEL "ENTER THE SHORT TERM AVERAGING PERIOD : ",AVEPER}
/RNDAVEPER ~
{MENUBRANCH OU2}

MAXIMUM VALUE TABLE
Specifies output options for overall maximum value summary tables
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"OU ~ {RIGHT}MAXTABLE ~ {RIGHT}/RNCAVEPER ~ ~ {RIGHT}/RNCMAXNUM ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
THE SHORT TERM AVERAGING PERIOD IS THE PERIOD ~ {down}{down}
(i.e. 1, 3, 8, or 24 hrs OR MONTH) ~ {DOWN}{DOWN}

FOR WHICH THE RECEPTOR TABLE IS SELECTED ~ {DOWN} {DOWN}
THE SECONDARY KEYWORD SPECIFIES THE NUMBER OF OVERALL MAXIMUM VALUES ~ {DOWN}{DOWN}
TO BE SUMMARIZED FOR EACH AVERAGING PERIOD. ~ {DOWN} {DOWN} {DOWN}
ENTERING THE KEYWORD "ALLAVE" FOR THE SHORT TERM AVARAGING PERIOD ~ {DOWN} {DOWN}
WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS ~
{GETLABEL "ENTER THE SHORT TERM AVERAGING PERIOD : ",AVEPER}
{GETNUMBER "ENTER THE NUMBER OF OVERALL MAXIMUM VALUES TO BE SUMMARIZED: ",MAXNUM}
/RNDAVEPER ~
{MENUBRANCH OU1}

CONCURRENT VALUES
Options for tables of concurrent values - summarized by receptor daily
{GOTO}TABLE ~ {END} {DOWN}{DOWN}"OU ~ {RIGHT} DAYTABLE ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
ENTERING THE KEYWORD "ALLAVE" FOR THE SHORT TERM AVARAGING PERIOD ~ {DOWN} {DOWN}
WILL APPLY THE SAME RECEPTOR TABLE OPTIONS TO ALL AVERAGING PERIODS ~
{MENUCALL II}
{MENUBRANCH OU1}

RETURN
Return to previous menu
{menubranch ou}

OU2

FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	RETURN
HIGH VALUES TO BE SUMMARIES	HIGH VALUES TO BE SUMMARIES	HIGH VALUES TO BE SUMMARIES	HIGH VALUES TO BE SUMMAR	HIGH VALUES TO BE SUMMARIES	HIGH VALUES TO BE SUMMARIES	RETURN TO PREVIOUS MENU
{GOTO}TABLE ~{END}{DOWN}{E	{GOTO}TABLE ~{END}{DOWN}{E	{GOTO}TABLE ~{END}{DOWN}{E	{GOTO}TABLE ~{END}{DOWN	{GOTO}TABLE ~{END}{DOWN}{END	{GOTO}TABLE ~{END}{DOWN}{END}{R	{MENUBRANCH OU1}
{MENUBRANCH OU2}	{MENUBRANCH OU2}	{MENUBRANCH OU2}	{MENUBRANCH OU2}	{MENUBRANCH OU2}	{MENUBRANCH OU2}	

FIRST
HIGH VALUES TO BE SUMMARIES
{GOTO}TABLE ~ {END} {DOWN} {END} {RIGHT} {RIGHT} FIRST ~
{MENUBRANCH OU2}

SECOND
HIGH VALUES TO BE SUMMARIES
{GOTO}TABLE ~ {END} {DOWN} {END} {RIGHT} {RIGHT} SECOND ~
{MENUBRANCH OU2}

THIRD
HIGH VALUES TO BE SUMMARIES
{GOTO}TABLE ~ {END} {DOWN} {END} {RIGHT} {RIGHT} THIRD ~
{MENUBRANCH OU2}

FOURTH

HIGH VALUES TO BE SUMMARIES
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}FOURTH ~
{MENUBRANCH OU2}

FIFTH

HIGH VALUES TO BE SUMMARIES
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}FIFTH ~
{MENUBRANCH OU2}

SIXTH

HIGH VALUES TO BE SUMMARIES
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}SIXTH ~
{MENUBRANCH OU2}

RETURN

RETURN TO PREVIOUS MENU
{MENUBRANCH OU1}

OU3

MAXIMUM VALUES	POST PROCESSING	PLOT FILES	RETURN

```
Produces files of all violations above a usProduces files of concurrent (raw) resultsProduces files of design values to impor tiReturn to previous menu
{GOTO}TABLE ~{END}{DOWN}{D{GOTO}TABLE ~{END}{DOWN}{D{GOTO}TABLE ~{END}{DOWN}{D{menubranch OU}
/RECOMMENTS~{GOTO}COMME/RECOMMENTS~{GOTO}COMMEN/RECOMMENTS~{GOTO}COMMEN/RECOMMENTS~{GOTO}COMMENTS ~
THE SHORT TERM AVERAGING PETHE SHORT TERM AVERAGING PETHE SHORT TERM AVERAGING PERIOD IS THE PERIOD ~{down}{down}
     (ie. 1, 3, 8, or 24 hrs OR MONTH;     (ie. 1, 3, 8, or 24 hrs OR MONTH)'     (ie. 1, 3, 8, or 24 hrs "MONTH" or "PERIOD") ~{DOWN}{DOWN}
FOR WHICH THE RECEPTOR TABFOR WHICH THE RECEPTOR TABLFOR WHICH THE RECEPTOR TABLE IS SELECTED ~{DOWN}{DOWN}
{GETLABEL "ENTER THE SHORT T{GETLABEL "ENTER THE SHORT TE{GETLABEL "ENTER THE SHORT TERM AVERAGING PERIOD : ",AVEPER}
{GETLABEL "ENTER THE ID FOR T{GETLABEL "ENTER THE ID FOR TH{GETLABEL "ENTER THE ID FOR THE SELECTED SOURCE (PG 3-7): ",GRPID}
{GETNUMBER "ENTER THE USER /RECOMMENTS~{GOTO}COMMEN{IF AVEPER="PERIOD"}{BRANCH OUFILE}
{GETLABEL "ENTER THE FILENAMTHE FORMAT PARAMETER SPECIF/RECOMMENTS~{GOTO}COMMENTS ~
{GETnumber "ENTER A 1 FOR OPTIUNIFORM -- INDICATES AN UNIFOTHE HIVALUE SPECIFIES WHICH SHORT TERM HIGH VALUES ARE TO BE OUTPUT. ~{DOWN}{DOWN}
{IF NUM=1}{BRANCH OUF} ~     PLOT -- INDICATES A FORMATTEFIRST -- INDICATES THE FIRST HIGHEST VALUE AT EACH RECEPTOR ~{DOWN}{DOWN}
~/RNDAVEPER ~/RNDGRPID ~/R     SUITABLE FOR PLOTTING COSECOND -- INDICATES THE SECOND HIGHEST VALUE AT EACH RECEPTOR ..ETC ~{DOWN}{DOWN}
{MENUBRANCH OU3}     {GETLABEL "ENTER EITHER UNIFO     HIVALUE IS NOT SPECIFIED FOR "PERIOD" SINCE THERE IS ONLY 1 VALUE ~{DOWN}
{GETLABEL "ENTER SPECIFIED FO{GETLABEL "ENTER THE FILENAM{GETLABEL "ENTER HIVALUE PARAMETER : ",HIVALU}
~/RNDAVEPER ~/RNDGRPID ~/R {GETNUMBER "ENTER A 1 FOR OPT{GETLABEL "ENTER THE FILENAME WHERE THE RESULTS ARE TO BE WRITTEN: ",FILNAM}
{MENUBRANCH OU3}     {IF NUM=1}{BRANCH OUF1} ~     {GETNUMBER "ENTER A 1 FOR OPTIONAL USER-SPECIFIED FORTRAN LOGICAL FILE UNIT ",NUM} ~
     ~/RNDAVEPER ~/RNDGRPID ~/RN{IF NUM=1}{BRANCH OUF2} ~
     {MENUBRANCH OU3}     ~/RNDAVEPER ~/RNDGRPID ~/RNDHIVALU ~/RNDFILNAM ~/RNDFUNIT ~
   1 {GETLABEL "ENTER SPECIFIED FO{MENUBRANCH OU3}
     ~/RNDAVEPER ~/RNDGRPID ~/RN{GETLABEL "ENTER SPECIFIED FORTRAN LOGICAL FILE UNIT ",FUNIT} ~
     {MENUBRANCH OU3}     ~/RNDAVEPER ~/RNDGRPID ~/RNDHIVALU ~/RNDFILNAM ~/RNDFUNIT ~
                                   {MENUBRANCH OU3}
```

MAXIMUM VALUES

Produces files of all violations above a user-specified threshold

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"OU~{RIGHT}MAXIFILE~{RIGHT}/RNCAVEPER~~
{RIGHT}/RNCGRPID~~{RIGHT}/RNCTHRESH~~{RIGHT}/RNCFILNAM~~{RIGHT}{RIGHT}/RNCFUNIT~~
/RECOMMENTS~{GOTO}COMMENTS~
THE SHORT TERM AVERAGING PERIOD IS THE PERIOD ~{down}{down}
     (i.e. 1, 3, 8, or 24 hrs OR MONTH) ~{DOWN}{DOWN}
FOR WHICH THE RECEPTOR TABLE IS SELECTED~{DOWN}{DOWN}
{GETLABEL "ENTER THE SHORT TERM AVERAGING PERIOD: ",AVEPER}
{GETLABEL "ENTER THE ID FOR THE SELECTED SOURCE (PG 3-78): ",GRPID}
{GETNUMBER "ENTER THE USER-SPECIFIED THRESHHOLD VALUE: ",THRESH}
{GETLABEL "ENTER THE FILENAME WHERE THE RESULTS ARE TO BE WRITTEN: ",FILNAM}
{GETnumber "ENTER A 1 FOR OPTIONAL USER-SPECIFIED FORTRAN LOGICAL FILE UNIT ",NUM}
{IF NUM=1}{BRANCH OUF}~
~/RNDAVEPER~/RNDGRPID~/RNDTHRESH~/RNDFILNAM~/RNDFUNIT~
{MENUBRANCH OU3}
{GETLABEL "ENTER SPECIFIED FORTRAN LOGICAL FILE UNIT ",FUNIT}~
~/RNDAVEPER~/RNDGRPID~/RNDTHRESH~/RNDFILNAM~/RNDFUNIT~
{MENUBRANCH OU3}
```

POST PROCESSING

Produces files of concurrent (raw) results at each receptor

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"OU~{RIGHT}POSTFILE~{RIGHT}/RNCAVEPER~~
{RIGHT}/RNCGRPID~~{RIGHT}/RNCFORMAT~~{RIGHT}/RNCFILNAM~~{RIGHT}{RIGHT}/RNCFUNIT~~
/RECOMMENTS~{GOTO}COMMENTS~
THE SHORT TERM AVERAGING PERIOD IS THE PERIOD ~{down}{down}
     (i.e. 1, 3, 8, or 24 hrs OR MONTH) ~{DOWN}{DOWN}
FOR WHICH THE RECEPTOR TABLE IS SELECTED~{DOWN}{DOWN}
{GETLABEL "ENTER THE SHORT TERM AVERAGING PERIOD: ",AVEPER}
{GETLABEL "ENTER THE ID FOR THE SELECTED SOURCE (PG 3-78): ",GRPID}
/RECOMMENTS~{GOTO}COMMENTS~
THE FORMAT PARAMETER SPECIFIES THE FORMAT OF THE POSTFILE OUTPUT.~{DOWN}{DOWN}
UNFORM -- INDICATES AN UNFORMATED CONCENTRATION FILE~{DOWN}{DOWN}
PLOT -- INDICATES A FORMATTED FILE OF RECEPTOR LOCATIONS AND CONCENTRATIONS~{DOWN}{DOWN}
     SUITABLE FOR PLOTTING CONTOURS OF CONCURRENT VALUES~{DOWN}
{GETLABEL "ENTER EITHER UNFORM OR PLOT FORMAT: ",FORMAT}
{GETLABEL "ENTER THE FILENAME WHERE THE RESULTS ARE TO BE WRITTEN: ",FILNAM}
{GETNUMBER "ENTER A 1 FOR OPTIONAL USER-SPECIFIED FORTRAN LOGICAL FILE UNIT ",NUM}
{IF NUM=1}{BRANCH OUF1}~
~/RNDAVEPER~/RNDGRPID~/RNDFORMAT~/RNDFILNAM~/RNDFUNIT~
{MENUBRANCH OU3}
{GETLABEL "ENTER SPECIFIED FORTRAN LOGICAL FILE UNIT ",FUNIT}~
~/RNDAVEPER~/RNDGRPID~/RNDFORMAT~/RNDFILNAM~/RNDFUNIT~
{MENUBRANCH OU3}
```

PLOT FILES

Produces files of design values to import into graphics packages

```
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"OU ~ {RIGHT}PLOTFILE ~ {RIGHT}/RNCAVEPER ~ ~
{RIGHT}/RNCGRPID ~ ~ {RIGHT}/RNCHIVALU ~ ~ {RIGHT}/RNCFILNAM ~ ~ {RIGHT}{RIGHT}/RNCFUNIT ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
THE SHORT TERM AVERAGING PERIOD IS THE PERIOD ~ {down}{down}
      (i.e. 1, 3, 8, or 24 hrs  "MONTH" or "PERIOD") ~ {DOWN}{DOWN}
FOR WHICH THE RECEPTOR TABLE IS SELECTED ~ {DOWN}{DOWN}
{GETLABEL "ENTER THE SHORT TERM AVERAGING PERIOD :  ",AVEPER}
{GETLABEL "ENTER THE ID FOR THE SELECTED SOURCE (PG 3-78):  ",GRPID}
{IF AVEPER="PERIOD"}{BRANCH   OUFILE}
/RECOMMENTS ~ {GOTO}COMMENTS ~
THE HIVALUE SPECIFIES WHICH SHORT TERM HIGH VALUES ARE TO BE OUTPUT. ~ {DOWN}{DOWN}
FIRST -- INDICATES THE FIRST HIGHEST VALUE AT EACH RECEPTOR ~ {DOWN}{DOWN}
SECOND -- INDICATES THE SECOND HIGHEST VALUE AT EACH RECEPTOR .ETC ~ {DOWN}{DOWN}
      HIVALUE IS NOT SPECIFIED FOR "PERIOD" SINCE THERE IS ONLY 1 VALUE ~ {DOWN}
{GETLABEL "ENTER HIVALUE PARAMETER : ",HIVALU}
{GETLABEL "ENTER THE FILENAME WHERE THE RESULTS ARE TO BE WRITTEN:  ",FILNAM}
{GETNUMBER "ENTER A 1 FOR OPTIONAL USER-SPECIFIED FORTRAN LOGICAL FILE UNIT  ",NUM} ~
{IF NUM=1}{BRANCH  OUF2} ~
~ /RNDAVEPER ~ /RNDGRPID ~ /RNDHIVALU ~ /RNDFILNAM ~ /RNDFUNIT ~
{MENUBRANCH  OU3}
{GETLABEL "ENTER SPECIFIED FORTRAN LOGICAL FILE UNIT  ",FUNIT} ~
~ /RNDAVEPER ~ /RNDGRPID ~ /RNDHIVALU ~ /RNDFILNAM ~ /RNDFUNIT ~
{MENUBRANCH  OU3}

/RNDHIVALUE ~ /RNDFILNAM ~ /RNDFUNIT ~
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}{RIGHT}/RNCFILNAM ~ ~ {RIGHT}FUNIT ~ ~
{RETURN}
```

RETURN

Return to previous menu

```
{menubranch OU}
/RECOMMENTS ~ {GOTO}COMMENTS ~
```

OU4

RECEPTOR TABLE	MAXIMUM VALUE TA	PLOT FILE	RETURN

```
Specify output options for high value suSpecifies output options for overall maximProduces files of design values to impor ti Return to previous menu
{GOTO} TABLE ~{END}{DOWN}{ D{GOTO} TABLE ~{END}{DOWN}{ D{GOTO} TABLE ~{END}{DOWN}{ D{MENUBRANCH OU}
/RECOMMENTS ~{GOTO}COMME/RECOMMENTS ~{GOTO}COMMEN/RECOMMENTS ~{GOTO}COMMENTS ~
THE SECONDARYKEYWORD "INE{GETNUMBER "ENTER THE NUMBE{GETLABEL "ENTER THE LONG TERM AVERAGING PERIOD :  ",AVEPER}
INDIVIDUAL SOURCES FOR EACHTHE SECONDARYKEYWORD "INDI{GETLABEL "ENTER THE ID FOR THE SELECTED SOURCE (PG 3-78):  ",GRPID}
THE SECONDARYKEYWORD "SRC INDIVIDUAL SOURCES FOR EACH {GETLABEL "ENTER THE FILENAME WHERE THE RESULTS ARE TO BE WRITTEN:  ",FILNAM}
GROUP VALUES FOR EACH RECEITHE SECONDARYKEYWORD "SRC/RNDAVEPER ~/RNDGRPID ~/RNDHIVALUE ~/RNDFILNAM ~/RNDFUNIT ~
  EITHER OR BOTH OPTIONS MAYGROUP VALUES FOR EACH RECEP{MENUBRANCH OU4}
A COMPLETE SET OF SUMMARY T.  EITHER OR BOTH OPTIONS MAY BE USED IN A GIVEN RUN ~{DOWN}{DOWN}
{MENUBRANCH OU5}              A COMPLETE SET OF SUMMARY TABLES IS OUTPUT FOR EACH "STAR" SUMMARY ~{DOWN}{DOWN}
                              {MENUBRANCH OU6}
```

RECEPTOR TABLE

Specify output options for high value summary tables by receptor
{GOTO}TABLE ~ {END} {DOWN}{DOWN}"OU ~ {RIGHT}RECTABLE ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
THE SECONDARY KEYWORD "INDSRC" SPECIFIES THAT SUMMARIES OF ~ {DOWN} {DOWN}
INDIVIDUAL SOURCES FOR EACH RECEPTOR ARE TO BE OUTPUT. ~ {DOWN} {DOWN}
THE SECONDARY KEYWORD "SRCGRP" SPECIFIES THAT SUMMARIES OF SOURCE ~ {DOWN} {DOWN}
GROUP VALUES FOR EACH RECEPTOR ARE TO BE PROVIDED. ~ {DOWN} {DOWN}
EITHER OR BOTH OPTIONS MAY BE USED IN A GIVEN RUN ~ {DOWN}{DOWN}
A COMPLETE SET OF SUMMARY TABLES IS OUTPUT FOR EACH "STAR" SUMMARY ~ {DOWN} {DOWN}
{MENUBRANCH OU5}

MAXIMUM VALUE TABLE

Specifies output options for overall maximum value summary tables
{GOTO}TABLE ~ {END} {DOWN}{DOWN}"OU ~ {RIGHT}MAXTABLE ~ {RIGHT}/RNCMAXNUM ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
{GETNUMBER "ENTER THE NUMBER OF MAXIMUM VALUES TO SUMMARIZE : "MAXNUM}
THE SECONDARY KEYWORD "INDSRC" SPECIFIES THAT SUMMARIES OF ~ {DOWN} {DOWN}
INDIVIDUAL SOURCES FOR EACH RECEPTOR ARE TO BE OUTPUT. ~ {DOWN} {DOWN}
THE SECONDARY KEYWORD "SRCGRP" SPECIFIES THAT SUMMARIES OF SOURCE ~ {DOWN} {DOWN}
GROUP VALUES FOR EACH RECEPTOR ARE TO BE PROVIDED. ~ {DOWN} {DOWN}
EITHER OR BOTH OPTIONS MAY BE USED IN A GIVEN RUN ~ {DOWN}{DOWN}
A COMPLETE SET OF SUMMARY TABLES IS OUTPUT FOR EACH "STAR" SUMMARY ~ {DOWN} {DOWN}
{MENUBRANCH OU6}

PLOT FILE

Produces files of design values to import into graphics packages
{GOTO}TABLE ~ {END} {DOWN}{DOWN}OU ~ {RIGHT}PLOTFILE ~ {RIGHT}/RNCAVEPER ~ ~ {RIGHT}/RNCGRPID ~ ~ {RIGHT}/RNCFILNAM ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
{GETLABEL "ENTER THE LONG TERM AVERAGING PERIOD : ",AVEPER}
{GETLABEL "ENTER THE ID FOR THE SELECTED SOURCE (PG 3-78): ",GRPID}
{GETLABEL "ENTER THE FILENAME WHERE THE RESULTS ARE TO BE WRITTEN: ",FILNAM}
/RNDAVEPER ~ /RNDGRPID ~ /RNDHIVALUE ~ /RNDFILNAM ~ /RNDFUNIT ~
{MENUBRANCH OU4}

RETURN

Return to previous menu
{MENUBRANCH OU}

OU5

INDSRC	SRCGRP
Select summaries of individual sources f	Select summaries of source group values for each receptor
{GOTO}TABLE ~{END}{DOWN}{E	{GOTO}TABLE ~{END}{DOWN}{END}{RIGHT}SRCGRP ~
{MENUBRANCH OU4}	{MENUBRANCH OU4}

INDSRC

```
Select summaries of individual sources for each receptor
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}INDSRC ~
{MENUBRANCH  OU4}
```

SRCGRP

```
Select summaries of source group values for each receptor
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}SRCGRP ~
{MENUBRANCH  OU4}
```

OU6

INDSRC	SRCGRP	SOCONT
Select summaries of individual sources f	Select summaries of source group values f	Determine contribution from each source to the maximum source group
{GOTO}TABLE ~{END}{DOWN}{E	{GOTO}TABLE ~{END}{DOWN}{EN	{GOTO}TABLE ~{END}{DOWN}{END}{RIGHT}SOCONT ~
{MENUBRANCH OU4}	{MENUBRANCH OU4}	{MENUBRANCH OU4}

INDSRC

```
Select summaries of individual sources for each receptor
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}INDSRC ~
{MENUBRANCH  OU4}
```


SRCGRP

```
Select summaries of source group values for each receptor
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}SRCGRP ~
{MENUBRANCH  OU4}
```

SOCONT

```
Determine contribution from each source to the maximum source group
{GOTO}TABLE ~ {END}{DOWN}{END}{RIGHT}SOCONT ~
{MENUBRANCH  OU4}
```

FILOUT1

```
/RECOMMENTS ~ {GOTO}{COMMENTS}{DOWN} ~
 ~INCLUDE DOS PATH IN EACH FILENAME  ~{DOWN}
{GETLABEL "ENTER FILENAME FOR MODEL INPUT FILE: ",NUM} ~
{GETLABEL "ENTER FILENAME FOR MODEL OUTPUT FILE: ",NUM1} ~
{RETURN}
```

TBLOUT

```
{GOTO}TABLE ~
```

```
/RNCOUTPUT~.{END}{DOWN}{BIGRIGHT}{BIGRIGHT}~
/RECOMMENTS~{GOTO}{COMMENTS}{DOWN}~
```

FILOUT2

```
/PF{ESC}{ESC}
C:\ENVIR\ISC\TEST1.INP
~ROUTPUT~OMNOUQ
AGQ/RNDOUTPUT~
```
{MENUBRANCH SELECT}

FILOUT3

```
/PF{ESC}{ESC}
C:\ENVIR\ISC\TEST1.INP
~q~
/PF{ESC}{ESC}
C:\ENVIR\ISC\TEST1.INP
~RROUTPUT~OMNOUQ
AGQ/RNDOUTPUT~
```
{MENUBRANCH SELECT}

FIL

NAME	SAVE	IMPORT
DESIGNATE MODEL INPUT & OUT	SAVE PREPROCCESOR INFORMATI	IMPORT MODEL OUTPUT FILE FOR FURTHER PROCESSING
{FILOUT1}	/RECOMMENTS~{GOTO}{COMME	/RECOMMENTS~{GOTO}{COMMENTS}{DOWN}~
{MENUBRANCH FIL}	INCLUDE DOS PATH IN EACH FILE	MOVE CURSOR TO UPPER LEFT HAND CORNER OF AREA TO IMPORT FILE DATA~{DOWN}{DOWN}
	{GETLABEL "ENTER FILENAME FO	PRESS ENTER TO CONTINUE~{HOME}
	{GETLABEL "IS THIS A NEW (N) OR	{?}/RNCODATA~~
	/CNUM~<<AIR>>B806~/CNUM~	/RECOMMENTS~{GOTO}{COMMENTS}{DOWN}~
	{TBLOUT}	INCLUDE DOS PATH IN EACH FILENAME ~{DOWN}
	{IF NUM1="N"}{BRANCH FILOUT2}	{GETLABEL "ENTER FILENAME FOR MODEL OUTPUT FILE: ,NUM1}~
	{BRANCH FILOUT3}	/CNUM1 ~<<AIR>>D432~
		/FIT{ESC}{ESC}

NAME

DESIGNATE MODEL INPUT & OUTPUT FILENAMES

{FILOUT1}

{MENUBRANCH FIL}

SAVE

SAVE PREPROCCESOR INFORMATION TO MODEL INPUT FILE

```
/RECOMMENTS~{GOTO}{COMMENTS}{DOWN}~
INCLUDE DOS PATH IN EACH FILENAME ~{DOWN}
{GETLABEL "ENTER FILENAME FOR PREPROCESSER OUTPUT FILE: ",NUM}~
{GETLABEL "IS THIS A NEW (N) OR EXISTING (E) FILE? (ENTER N OR E): ",NUM1}~
/CNUM~<<AIR>>B806~/CNUM~<<AIR>>b813~/CNUM~<<AIR>>B816~
```
{TBLOUT}

```
{IF NUM1="N"}{BRANCH   FILOUT2}
{BRANCH  FILOUT3}
```

IMPORT

```
IMPORT MODEL OUTPUT FILE FOR FURTHER PROCESSING
/RECOMMENTS ~ {GOTO}{COMMENTS}{DOWN} ~
MOVE CURSOR TO UPPER LEFT HAND CORNER OF AREA TO IMPORT FILE DATA ~ {DOWN}{DOWN}
  PRESS ENTER TO CONTINUE ~ {HOME}
{?}/RNCODATA ~ ~
/RECOMMENTS ~ {GOTO}{COMMENTS}{DOWN} ~
INCLUDE DOS PATH IN EACH FILENAME  ~ {DOWN}
{GETLABEL "ENTER FILENAME FOR MODEL OUTPUT FILE: ,NUM1} ~
/CNUM1 ~ <<AIR>>D832 ~
/FIT{ESC}{ESC}

~
```

RUN1

```
{OPEN "C:\123R3\RUN.BAT",W}
{WRITELN "ECHO OFF"}
{WRITELN "CD\ENVIR\ISC"}
{IF <<RISC2>>TERM=1}{BRANCH    ISCST}
{ISCLT}
```

ISCST

```
{WRITE "ISCST2 "}
{WRITE NUM}
{WRITE " "}
{WRITE NUM1}
{CLOSE}
{RETURN}
```

MODRUN

```
{FILOUT1}
{RUN1}
{SYSTEM RUN.BAT}
{RETURN}
```

```
1I
{SUBROUTINE 3I}
{MENUBRANCH T}
{MENUBRANCH III}
```

21
{SUBROUTINE STAR}
{MENUBRANCH ME}
{MENUBRANCH III}

III

MONTHLY	SEASONALY	QUARTERLY	SECONDARY-KEY	RETURN
SELECT SPECIFIC MONTHS TO AV	SELECT SPECIFIC SEASONS TO AV	SELECT SPECIFIC QUARTER TO AV	SELECT SECONDARY AVERAG	Return to main CO menu
{MENUBRANCH IIII}	{MENUBRANCH IIIII}	{MENUBRANCH IIIIIII}	{MENUBRANCH IIIII}	{RETURN}

MONTHLY
SELECT SPECIFIC MONTHS TO AVERAGE
{MENUBRANCH IIII}

SEASONALY
SELECT SPECIFIC SEASONS TO AVERAGE
{MENUBRANCH IIIII}

QUARTERLY
SELECT SPECIFIC QUARTER TO AVERAGE
{MENUBRANCH IIIIIII}

SECONDARY-KEYWORD
SELECT SECONDARY AVERAGING PERIOD
{MENUBRANCH IIIII}

RETURN
Return to main CO menu
{RETURN}

IIII

JAN	FEB	MAR	APR	MAY	JUN	MORE	QUIT
{GOTO}table ~{END}{DOWN}{END	{GOTO}table ~{END}{DOWN}{END}	{GOTO}table ~{END}{DOWN}{END}	{GOTO}table ~{END}{DOWN}{	{GOTO}table ~{END}{DOWN}{END}{	{GOTO}table ~{END}{DOWN}{END}{RIG	{MENUBRANCH IIIIIII}	{MENUBRANCH III}
JAN ~	FEB ~	MAR ~	APR ~	MAY ~	JUN ~		
{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~		
{MENUBRANCH IIII}	{MENUBRANCH IIII}	{MENUBRANCH IIII}	{MENUBRANCH IIII}	{MENUBRANCH IIII}	{MENUBRANCH IIII}		

JAN

{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
JAN ~

```
{GOTO}COMMENTS~
{MENUBRANCH IIII}
```

FEB

```
{GOTO}table~{END}{DOWN}{END}{RIGHT}{RIGHT}
FEB~
{GOTO}COMMENTS~
{MENUBRANCH IIII}
```

MAR

```
{GOTO}table~{END}{DOWN}{END}{RIGHT}{RIGHT}
MAR~
{GOTO}COMMENTS~
{MENUBRANCH IIII}
```

APR

```
{GOTO}table~{END}{DOWN}{END}{RIGHT}{RIGHT}
APR~
{GOTO}COMMENTS~
{MENUBRANCH IIII}
```

MAY

```
{GOTO}table~{END}{DOWN}{END}{RIGHT}{RIGHT}
MAY~
{GOTO}COMMENTS~
{MENUBRANCH IIII}
```

JUN

```
{GOTO}table~{END}{DOWN}{END}{RIGHT}{RIGHT}
JUN~
{GOTO}COMMENTS~
{MENUBRANCH IIII}
```

MORE

```
{MENUBRANCH IIIIII}
```

QUIT

{MENUBRANCH III}

IIIIII

JUL	AUG	SEP	OCT	NOV	DEC	QUIT
{GOTO}table ~{END}{DOWN}{END JUL ~ {GOTO}COMMENTS ~ {MENUBRANCH IIIIII}	{GOTO}table ~{END}{DOWN}{END} AUG ~ {GOTO}COMMENTS ~ {MENUBRANCH IIIIII}	{GOTO}table ~{END}{DOWN}{END} SEP ~ {GOTO}COMMENTS ~ {MENUBRANCH IIIIII}	{GOTO}table ~{END}{DOWN}{ OCT ~ {GOTO}COMMENTS ~ {MENUBRANCH IIIIII}	{GOTO}table ~{END}{DOWN}{END}{ NOV ~ {GOTO}COMMENTS ~ {MENUBRANCH IIIIII}	{GOTO}table ~{END}{DOWN}{END}{RIG DEC ~ {GOTO}COMMENTS ~ {MENUBRANCH IIIIII}	{MENUBRANCH III}

JUL

{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
JUL ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIII}

AUG

{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
AUG ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIII}

SEP

{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
SEP ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIII}

OCT

{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
OCT ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIII}

NOV

{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}

NOV ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIII}

DEC

{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
DEC ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIII}

QUIT

{MENUBRANCH III}

IIIII

WINTER	SPRING	SUMMER	FALL	QUIT
{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{MENUBRANCH III}
SEASONAL AND QUARTERLY SUM	SEASONAL AND QUARTERLY SUM	SEASONAL AND QUARTERLY SUM	SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~	
{GOTO}table ~{END}{DOWN}{END	{GOTO}table ~{END}{DOWN}{END}	{GOTO}table ~{END}{DOWN}{END}	{GOTO}table ~{END}{DOWN}{END}{RIGHT}{RIGHT}	
WINTER ~	SPRING ~	SUMMER ~	FALL ~	
{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	
{MENUBRANCH IIIII}	{MENUBRANCH IIIII}	{MENUBRANCH IIIII}	{MENUBRANCH IIIII}	

WINTER

{GOTO}COMMENTS ~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
WINTER ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIII}

SPRING

{GOTO}COMMENTS ~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
SPRING ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIII}

SUMMER

{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
SUMMER ~
{GOTO}COMMENTS~
{MENUBRANCH IIIII}

FALL

{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
FALL ~
{GOTO}COMMENTS~
{MENUBRANCH IIIII}

QUIT

{MENUBRANCH III}

IIIIIII

QUART1	QUART2	QUART3	QUART4	QUIT
FIRST QUARTER	FIRST QUARTER	FIRST QUARTER	FIRST QUARTER	
{GOTO}COMMENTS~	{GOTO}COMMENTS~	{GOTO}COMMENTS~	{GOTO}COMMENTS~	{MENUBRANCH III}
SEASONAL AND QUARTERLY SUM	SEASONAL AND QUARTERLY SUMI	SEASONAL AND QUARTERLY SUMI	SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~	
{GOTO}table ~{END}{DOWN}{END	{GOTO}table ~{END}{DOWN}{END}	{GOTO}table ~{END}{DOWN}{END}	{GOTO}table ~{END}{DOWN}{END}{RIGHT}{RIGHT}	
QUART1 ~	QUART2 ~	QUART3 ~	QUART4 ~	
{GOTO}COMMENTS~	{GOTO}COMMENTS~	{GOTO}COMMENTS~	{GOTO}COMMENTS~	
{MENUBRANCH IIIIIII}	{MENUBRANCH IIIIIII}	{MENUBRANCH IIIIIII}	{MENUBRANCH IIIIIII}	

QUART1
FIRST QUARTER
{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
QUART1 ~
{GOTO}COMMENTS~
{MENUBRANCH IIIIIII}

QUART2
FIRST QUARTER
{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}

QUART2 ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIIII}

QUART3
FIRST QUARTER
{GOTO}COMMENTS ~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
QUART3 ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIIII}

QUART4
FIRST QUARTER
{GOTO}COMMENTS ~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
QUART4 ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIIII}

QUIT

{MENUBRANCH III}

IIIIII

MONTH	SEASON	QUARTER	ANNUAL	PERIOD	QUIT
{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{MENUBRANCH III}
SEASONAL AND QUARTERLY SU	SEASONAL AND QUARTERLY SUM	SEASONAL AND QUARTERLY SUM	SEASONAL AND QUARTERLY S	SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~	
{GOTO} table ~{END}{DOWN}{END	{GOTO} table ~{END}{DOWN}{END}	{GOTO} table ~{END}{DOWN}{END}	{GOTO} table ~{END}{DOWN}{	{GOTO} table ~{END}{DOWN}{END}{RIGHT}{RIGHT}	
MONTH ~	SEASON ~	QUARTER ~	ANNUAL ~	PERIOD ~	
{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	{GOTO} COMMENTS ~	
{MENUBRANCH IIIII}	{MENUBRANCH IIIII}	{MENUBRANCH IIIII}	{MENUBRANCH IIIII}	{MENUBRANCH IIIII}	

MONTH

{GOTO}COMMENTS ~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
MONTH ~
{GOTO}COMMENTS ~
{MENUBRANCH IIIIII}

SEASON

```
{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
SEASON ~
{GOTO}COMMENTS~
{MENUBRANCH IIIIII}
```

QUARTER

```
{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
QUARTER ~
{GOTO}COMMENTS~
{MENUBRANCH IIIIII}
```

ANNUAL

```
{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
ANNUAL ~
{GOTO}COMMENTS~
{MENUBRANCH IIIIII}
```

PERIOD

```
{GOTO}COMMENTS~
SEASONAL AND QUARTERLY SUMMARIES CAN NOT BE USED TOGETHER ~
{GOTO}table ~ {END}{DOWN}{END}{RIGHT}{RIGHT}
PERIOD ~
{GOTO}COMMENTS~
{MENUBRANCH IIIIII}
```

QUIT

```
{MENUBRANCH III}
```

EMISFACL

SEASONLY	QUARTERLY	MONTHLY	SSTAB	SSPEED	STAR	SSTAR	CONTINUE
EMISSION RATES VARY SEASONA	EMISSION RATES VARY QUARTER	EMISSION RATES VARY MONTHLY	EMISSION RATES VARY BY SE	EMISSION RATES VARY BY SEASON &	EMISSION RATES VARY SPEED & STABI	EMISSION RATES VARY S	RETURN TO SOURCE MENU
{GOTO}TABLE ~{END}{DOWN}{D	{GOTO}TABLE ~{END}{DOWN}{D	{GOTO}TABLE ~{END}{DOWN}{D	{GOTO}TABLE ~{END}{DOWN	{GOTO}TABLE ~{END}{DOWN}{DOW	{GOTO}TABLE ~{END}{DOWN}{DOWN	{GOTO}TABLE ~{END}{D	{MENUBRANCH SO}
EMISFACT ~{RIGHT}/RNCESRCID	EMISFACT ~{RIGHT}/RNCESRCID ~	EMISFACT ~{RIGHT}/RNCESRCID ~	EMISFACT ~{RIGHT}/RNCESR	EMISFACT ~{RIGHT}/RNCESRCID ~ ~	EMISFACT ~{RIGHT}/RNCESRCID ~ ~{R	EMISFACT ~{RIGHT}/RNCESRCID ~ ~{RIGHT}SPEED ~{RIGHT}/RN	
/RECOMMENTS~	/RECOMMENTS~	/RECOMMENTS~	/RECOMMENTS~	/RECOMMENTS~	/RECOMMENTS~	/RECOMMENTS~	
{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	{GOTO}COMMENTS ~	
SOURCE ID MAY BE THE SAME U	SOURCE ID MAY BE THE SAME UNI	SOURCE ID MAY BE THE SAME UNI	SOURCE ID MAY BE THE SAME	SOURCE ID MAY BE THE SAME UNIQ	SOURCE ID MAY BE THE SAME UNIQUE	SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DE	
USER MAY SPECIFY A RANGE OF S	USER MAY SPECIFY A RANGE OF S	USER MAY SPECIFY A RANGE OF S	USER MAY SPECIFY A RANGE	USER MAY SPECIFY A RANGE OF SOU	USER MAY SPECIFY A RANGE OF SOUR	USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDI	
A RANGE OF SOURCES IS SPECIFIE	A RANGE OF SOURCES IS SPECIFIE	A RANGE OF SOURCES IS SPECIFIE	A RANGE OF SOURCES IS SPEC	A RANGE OF SOURCES IS SPECIFIED B	A RANGE OF SOURCES IS SPECIFIED BY	A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SE	
BY A DASH, i.e. STACK1-STACK10	BY A DASH, i.e. STACK1-STACK10.	BY A DASH, i.e. STACK1-STACK10.	BY A DASH, i.e. STACK1-STAC	BY A DASH, i.e. STACK1-STACK10. (N	BY A DASH, i.e. STACK1-STACK10. (NOT	BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S	
{GETLABEL "ENTER SOURCE ID F	{GETLABEL "ENTER SOURCE ID FO	{GETLABEL "ENTER SOURCE ID FO	{GETLABEL "ENTER SOURCE I	{GETLABEL "ENTER SOURCE ID FOR	{GETLABEL "ENTER SOURCE ID FOR SE	{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}	
/RECOMMENTS~{GOTO}COMME	/RECOMMENTS~{GOTO}COMMEN	/RECOMMENTS~{GOTO}COMMEN	/RECOMMENTS~{GOTO}COM	/RECOMMENTS~{GOTO}COMMENTS	/RECOMMENTS~{GOTO}COMMENTS ~	/RECOMMENTS~{GOTO}COMMENTS ~	
FOR THE LONG TERM MODEL --	FOR THE LONG TERM MODEL --	FOR THE LONG TERM MODEL --	FOR THE LONG TERM MODEL	FOR THE LONG TERM MODEL -- ~{	FOR THE LONG TERM MODEL -- ~{D	FOR THE LONG TERM MODEL -- ~{DOWN}{DOWN}	
USER INPUTS 4 SEASONAL EMISSI	USER INPUTS 4 QUARTERLY EMISS	USER INPUTS 12 MONTHLY EMISSI	USER INPUTS 4 SEASONAL EMI	USER INPUTS 4 SEASONAL EMISSION	QUESTION ON INPUT PARAMETERS	QUESTION ON INPUT PARAMETERS	
WINTER, SPRING, SUMMER, FAL	1ST QUARTER, 2ND QUARTER, 3R	JAN, FEB, MAR, APR, MAY, JUNE	WINTER, SPRING, SUMMER, F	WINTER, SPRING, SUMMER, FALL ~{DOWN}			
{GETNUMBER "ENTER WINTER E	{GETNUMBER "ENTER 1ST QUART	{GETNUMBER "ENTER JANUARY E	{GETNUMBER "ENTER WINTE	{GETNUMBER "ENTER WINTER EMISSION SPEED FACTOR : ",WINT}			
{GETNUMBER "ENTER SPRING EM	{GETNUMBER "ENTER 2ND QUART	{GETNUMBER "ENTER FEBRUARY	{GETNUMBER "ENTER SPRING	{GETNUMBER "ENTER SPRING EMISSION SPEED FACTOR : ",SPR}			
{GETNUMBER "ENTER SUMMER E	{GETNUMBER "ENTER 3RD QUART	{GETNUMBER "ENTER MARCH EMI	{GETNUMBER "ENTER SUMME	{GETNUMBER "ENTER SUMMER EMISSION SPEED FACTOR : ",SUM}			
{GETNUMBER "ENTER FALL EMIS	{GETNUMBER "ENTER 4TH QUART	{GETNUMBER "ENTER APRIL EMIS	{GETNUMBER "ENTER FALL E	{GETNUMBER "ENTER FALL EMISSION SPEED FACTOR : ",FALL}			
/RNDESRCID~/RNDWINT~/RNDS	/RNDESRCID~/RNDQUART1~/RND	{GETNUMBER "ENTER MAY EMISSI	/RNDESRCID~/RNDWINT~/R	/RNDESRCID~/RNDWINT~/RNDSPR~/RNDSUM~/RNDFALL~			
{MENUBRANCH SO}	{MENUBRANCH SO}	{GETNUMBER "ENTER JUNE EMISS	{MENUBRANCH SO}	{MENUBRANCH SO}			
		{GETNUMBER "ENTER JULY EMISSION FACTOR : ",JULY}					
		{GETNUMBER "ENTER AUGUST EMISSION FACTOR : ",AUG}					
		{GETNUMBER "ENTER SEPTEMBER EMISSION FACTOR : ",SEPT}					
		{GETNUMBER "ENTER OCTOBER EMISSION FACTOR : ",OCT}					
		{GETNUMBER "ENTER NOVEMBER EMISSION FACTOR : ",NOV}					
		{GETNUMBER "ENTER DECEMBER EMISSION FACTOR : ",DEC}					
		/RNDESRCID~/RNDJAN~/RNDFEB~/RNDMAR~/RNDAPR~/RNDMAY~/RNDJUNE~/RNDJULY~/RNDAUG~/RNDSEPT~/RNDOCT~/RNDNOV~/RNDDEC~					
		{MENUBRANCH SO}					

SEASONLY

EMISSION RATES VARY SEASONALLY
{GOTO}TABLE ~ {END} {DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}SEASON ~ {RIGHT}/RNCWINT ~ ~ {RIGHT}/RNCSPR ~ ~ {RIGHT}/RNCSUM ~ ~ {RIGHT}/RNCFALL ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN} {DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
/RECOMMENTS ~ {GOTO}COMMENTS ~
FOR THE LONG TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 4 SEASONAL EMISSION FACTORS IN THE FOLLOWING ORDER : ~ {DOWN} {DOWN}
WINTER, SPRING, SUMMER, FALL ~ {DOWN}
{GETNUMBER "ENTER WINTER EMISSION FACTOR : ",WINT}
{GETNUMBER "ENTER SPRING EMISSION FACTOR : ",SPR}
{GETNUMBER "ENTER SUMMER EMISSION FACTOR : ",SUM}
{GETNUMBER "ENTER FALL EMISSION FACTOR : ",FALL}
/RNDESRCID ~ /RNDWINT ~ /RNDSPR ~ /RNDSUM ~ /RNDFALL ~
{MENUBRANCH SO}

QUARTERLY

```
EMISSION RATES VARY QUARTERLY
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}QUARTR ~ {RIGHT}/RNCQUART1 ~ ~ {RIGHT}/RNCQUART2 ~ ~ {RIGHT}/RNCQUART3 ~ ~ {RIGHT}/RNCQUART4 ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
/RECOMMENTS ~ {GOTO}COMMENTS ~
FOR THE LONG TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 4 QUARTERLY EMISSION FACTORS IN THE FOLLOWING ORDER : ~ {DOWN}{DOWN}
1ST QUARTER, 2ND QUARTER, 3RD QUARTER, 4TH QUARTER ~ {DOWN}
{GETNUMBER "ENTER 1ST QUARTER EMISSION FACTOR : ",QUART1}
{GETNUMBER "ENTER 2ND QUARTER EMISSION FACTOR : ",QUART2}
{GETNUMBER "ENTER 3RD QUARTER EMISSION FACTOR : ",QUART3}
{GETNUMBER "ENTER 4TH QUARTER EMISSION FACTOR : ",QUART4}
/RNDESRCID ~ /RNDQUART1 ~ /RNDQUART2 ~ /RNDQUART3 ~ /RNDQUART4 ~
{MENUBRANCH SO}
```


MONTHLY

```
EMISSION RATES VARY MONTHLY
{GOTO}TABLE ~ {END}{DOWN}{DOWN}"SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}MONTH ~ {RIGHT}/RNCJAN ~ ~ {RIGHT}/RNCFEB ~ ~ {RIGHT}/RNCMAR ~ ~ {RIGHT}/RNCAPR ~ ~ {RIGHT}/RNCMAY ~ ~
{RIGHT}/RNCJUNE ~ ~ {RIGHT}/RNCJULY ~ ~ {RIGHT}/RNCAUG ~ ~ {RIGHT}/RNCSEPT ~ ~ {RIGHT}/RNCOCT ~ ~ {RIGHT}/RNCNOV ~ ~ {RIGHT}/RNCDEC ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
/RECOMMENTS ~ {GOTO}COMMENTS ~
FOR THE LONG TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 12 MONTHLY EMISSION FACTORS IN THE FOLLOWING ORDER : ~ {DOWN}{DOWN}
JAN, FEB, MAR, APR, MAY, JUNE, JULY, AUG, SEPT, OCT, NOV, DEC ~ {DOWN}
{GETNUMBER "ENTER JANUARY EMISSION FACTOR : ",JAN}
{GETNUMBER "ENTER FEBRUARY EMISSION FACTOR : ",FEB}
{GETNUMBER "ENTER MARCH EMISSION FACTOR : ",MAR}
{GETNUMBER "ENTER APRIL EMISSION FACTOR : ",APR}
{GETNUMBER "ENTER MAY EMISSION FACTOR : ",MAY}
{GETNUMBER "ENTER JUNE EMISSION FACTOR : ",JUNE}
{GETNUMBER "ENTER JULY EMISSION FACTOR : ",JULY}
{GETNUMBER "ENTER AUGUST EMISSION FACTOR : ",AUG}
```

{GETNUMBER "ENTER SEPTEMBER EMISSION FACTOR : ",SEPT}
{GETNUMBER "ENTER OCTOBER EMISSION FACTOR : ",OCT}
{GETNUMBER "ENTER NOVEMBER EMISSION FACTOR : ",NOV}
{GETNUMBER "ENTER DECEMBER EMISSION FACTOR : ",DEC}
/RNDESRCID ~ /RNDJAN ~ /RNDFEB ~ /RNDMAR ~ /RNDAPR ~ /RNDMAY ~ /RNDJUNE ~ /RNDJULY ~ /RNDAUG ~ /RNDSEPT ~ /RNDOCT ~ /RNDNOV ~ /RNDDEC ~
{MENUBRANCH SO}

SSTAB

EMISSION RATES VARY BY SEASON & STABILITY
{GOTO}TABLE ~ {END}{DOWN}{DOWN}'SO ~ {RIGHT}
EMISFACT ~ {RIGHT}/RNCESRCID ~ ~ {RIGHT}SSTAB ~ {RIGHT}/RNCWINT ~ ~ {RIGHT}/RNCSPR ~ ~ {RIGHT}/RNCSUM ~ ~ {RIGHT}/RNCFALL ~ ~
/RECOMMENTS ~
{GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",ESRCID}
/RECOMMENTS ~ {GOTO}COMMENTS ~
FOR THE LONG TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 4 SEASONAL EMISSION STABILITY FACTORS IN THE FOLLOWING ORDER : ~ {DOWN}{DOWN}
WINTER, SPRING, SUMMER, FALL ~ {DOWN}
{GETNUMBER "ENTER WINTER EMISSION STABILITY FACTOR : ",WINT}
{GETNUMBER "ENTER SPRING EMISSION STABILITY FACTOR : ",SPR}
{GETNUMBER "ENTER SUMMER EMISSION STABILITY FACTOR : ",SUM}
{GETNUMBER "ENTER FALL EMISSION STABILITY FACTOR : ",FALL}
/RNDESRCID ~ /RNDWINT ~ /RNDSPR ~ /RNDSUM ~ /RNDFALL ~
{MENUBRANCH SO}

MEL

/RECOMMENTS ~ {GOTO}COMMENTS ~
OPTIONAL FILE FORMATS ~ {down}{down}{down}
BLANK -- Specifies the default ASCII format for "STAR" file. ~ {down}{down}
READ -- Specifies the Fortran READ format for an ASCII "STAR" file. ~ {down}{DOWN}
FREE -- Specifies free-formated READs for an ASCII "STAR" file. ~ {down}{DOWN}
{DOWN}'See Page 3-54 through 3-55 for details ~
{MENUBRANCH MEL1}

MEL1

BLANK	READ	FREE	RETURN
Specifies default format	Specify Fortran read format	use free-formated READS	Return to main ME menu
{BLANKFORM}	{GETLABEL "INPUTFORTRAN "REALETFORM,FREE}		{menubranch ME}
/RNDMETFIL ~ /RNDFORM ~	/RNDMETFIL ~ /RNDFORM ~	/RNDMETFIL ~ /RNDFORM ~	
{menubranch ME}	{menubranch ME}	{menubranch ME}	

BLANK

Specifies default format
{BLANK FORM}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

READ

Specify Fortran read format
{GETLABEL "INPUT FORTRAN "READ" FORMAT WITHIN ( ) : "FORM}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

FREE

use free-formated READS
{LET FORM,FREE}
/RNDMETFIL ~ /RNDFORM ~
{menubranch ME}

RETURN

Return to main ME menu
{menubranch ME}

HTLT

{GOTO}TABLE ~ {END} {DOWN}{DOWN}"SO ~ {RIGHT} BUILDHGT ~ {RIGHT}/RNCDSRCID ~ ~ {RIGHT}/RNCNORTH ~ ~
{RIGHT}/RNCNNE ~ ~ {RIGHT}/RNCNE ~ ~ {RIGHT}/RNCENE ~ ~ {RIGHT}/RNCEAST ~ ~ {RIGHT}/RNCESE ~ ~
/RECOMMENTS ~ {GOTO}COMMENTS ~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION ~ {DOWN} {DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING HEIGHTS APPLY. ~ {DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED ~ {DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S) ~ {DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",DSRCID}
{GOTO}TABLE ~ {END} {DOWN}{DOWN}"SO ~ {RIGHT} BUILDHGT ~ {RIGHT}/RNCDSRCID2 ~ ~ {RIGHT}/RNCSE ~ ~
{RIGHT}/RNCSSE ~ ~ {RIGHT}/RNCSOUTH ~ ~ {RIGHT}/RNCSSW ~ ~ {RIGHT}/RNCSW ~ ~ {RIGHT}/RNCWSW ~ ~
{CONTENTS DSRCID2,DSRID,9,117}/RNDDSRCID2 ~
{GOTO}TABLE ~ {END} {DOWN}{DOWN}"SO ~ {RIGHT} BUILDHGT ~ {RIGHT}/RNCDSRCID2 ~ ~
{RIGHT}/RNCWEST ~ ~ {RIGHT}/RNCWNW ~ ~ {RIGHT}/RNCNW ~ ~ {RIGHT}/RNCNNW ~ ~
{CONTENTS DSRCID2,DSRCID,9,117}
/RECOMMENTS ~ {GOTO}COMMENTS ~
FOR THE LONG TERM MODEL -- ~ {DOWN}{DOWN}
USER INPUTS 16 DIRECTION-SPECIFIC BUILDING HEIGHTS (IN METERS) ~ {DOWN} {DOWN}
BEGINNING WITH THE NORTH FLOW VECTOR (WIND BLOWING TOWARD ~ {DOWN} {DOWN}
THE NORTH) AND INCREMENTING BY 22.5 DEGREES ~ {DOWN}{DOWN}
IN A CLOCKWISE DIRECTION (N-NE, NE, E-NE, EAST ETC) ~ {DOWN}

```
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR NORTH VECTOR : ",NORTH}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR N-NE VECTOR : ",NNE}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR NE VECTOR : ",NE}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR E-NE VECTOR : ",ENE}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR EAST VECTOR : ",EAST}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR E-SE VECTOR : ",ESE}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR SE VECTOR : ",SE}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR S-SE VECTOR : ",SSE}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR SOUTH VECTOR : ",SOUTH}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR S-SW VECTOR : ",SSW}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR SW VECTOR : ",SW}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR W-SW VECTOR : ",WSW}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR WEST VECTOR : ",WEST}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR W-NW VECTOR : ",WNW}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR NW VECTOR : ",NW}
{GETNUMBER "ENTER BUILDING HEIGHT (METERS) FOR N-NW VECTOR : ",NNW}
/RNDDSRCID~/RNDNORTH~/RNDNNE~/RNDNE~/RNDENE~/RNDEAST~/RNDESE~/RNDSE~/RNDSSE~
/RNDSOUTH~/RNDSSW~/RNDSW~/RNDWSW~/RNDWEST~/RNDWNW~/RNDNW~/RNDNNW~
{MENUBRANCH DOWN}
```

WDLT

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}BUILDWID~{RIGHT}/RNCDSRCID~~{RIGHT}/RNCNORTH~~
{RIGHT}/RNCNNE~~{RIGHT}/RNCNE~~{RIGHT}/RNCENE~~{RIGHT}/RNCEAST~~{RIGHT}/RNCESE~~
/RECOMMENTS~{GOTO}COMMENTS~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR WHICH THE BUILDING WIDTHS APPLY.~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",DSRCID}
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}BUILDWID~{RIGHT}/RNCDSRCID2~~
{RIGHT}/RNCSE~~{RIGHT}/RNCSSE~~{RIGHT}/RNCSOUTH~~{RIGHT}/RNCSSW~~{RIGHT}/RNCSW~~{RIGHT}/RNCWSW~~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2~
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}BUILDWID~{RIGHT}/RNCDSRCID2~~
{RIGHT}/RNCWEST~~{RIGHT}/RNCWNW~~{RIGHT}/RNCNW~~{RIGHT}/RNCNNW~~
{CONTENTS DSRCID2,DSRCID,9,117}
/RECOMMENTS~{GOTO}COMMENTS~
FOR THE LONG TERM MODEL --  ~{DOWN}{DOWN}
USER INPUTS 16 DIRECTION-SPECIFIC BUILDING WIDTHS (IN METERS)~{DOWN}{DOWN}
BEGINNING WITH THE NORTH FLOW VECTOR (WIND BLOWING TOWARD~{DOWN}{DOWN}
THE NORTH) AND INCREMENTING BY 22.5 DEGREES~{DOWN}{DOWN}
IN A CLOCKWISE DIRECTION (N-NE, NE, E-NE, EAST ETC)~{DOWN}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR NORTH VECTOR : ",NORTH}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR N-NE VECTOR : ",NNE}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR NE VECTOR : ",NE}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR E-NE VECTOR : ",ENE}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR EAST VECTOR : ",EAST}
```

```
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR E-SE VECTOR : ",ESE}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR SE VECTOR : ",SE}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR S-SE VECTOR : ",SSE}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR SOUTH VECTOR : ",SOUTH}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR S-SW VECTOR : ",SSW}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR SW VECTOR : ",SW}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR W-SW VECTOR : ",WSW}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR WEST VECTOR : ",WEST}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR W-NW VECTOR : ",WNW}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR NW VECTOR : ",NW}
{GETNUMBER "ENTER BUILDING WIDTH (METERS) FOR N-NW VECTOR : ",NNW}
/RNDDSRCID~/RNDNORTH~/RNDNNE~/RNDNE~/RNDENE~/RNDEAST~/RNDESE~/RNDSE~/RNDSSE~
/RNDSOUTH~/RNDSSW~/RNDSW~/RNDWSW~/RNDWEST~/RNDWNW~/RNDNW~/RNDNNW~
{MENUBRANCH DOWN}
```

LBLT

```
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}LOWBOUND~{RIGHT}/RNCDSRCID~~
{RIGHT}/RNCNORTH~~{RIGHT}/RNCNNE~~{RIGHT}/RNCNE~~{RIGHT}/RNCENE~~{RIGHT}/RNCEAST~~{RIGHT}/RNCESE~~
/RECOMMENTS~{GOTO}COMMENTS~
SOURCE ID MAY BE THE SAME UNIQUE IDENTIFIER AS USED TO DENOTE LOCATION~{DOWN}{DOWN}
USER MAY SPECIFY A RANGE OF SOURCES FOR THE LOWER BOUNDS CALCULATIONS.~{DOWN}{DOWN}
A RANGE OF SOURCES IS SPECIFIED BY ENTERING 2 SOURCE ID'S SEPARATED~{DOWN}
BY A DASH, i.e. STACK1-STACK10. (NOTE NO SPACES BETWEEN ID'S)~{DOWN}
{GETLABEL "ENTER SOURCE ID FOR SELECTED SOURCE : ",DSRCID}
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}LOWBOUND~{RIGHT}/RNCDSRCID2~~
{RIGHT}/RNCSE~~{RIGHT}/RNCSSE~~{RIGHT}/RNCSOUTH~~{RIGHT}/RNCSSW~~{RIGHT}/RNCSW~~{RIGHT}/RNCWSW~~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2~
{GOTO}TABLE~{END}{DOWN}{DOWN}"SO~{RIGHT}LOWBOUND~{RIGHT}/RNCDSRCID2~~
{RIGHT}/RNCWEST~~{RIGHT}/RNCWNW~~{RIGHT}/RNCNW~~{RIGHT}/RNCNNW~~
{CONTENTS DSRCID2,DSRCID,9,117}/RNDDSRCID2~
/RECOMMENTS~{GOTO}COMMENTS~
FOR THE LONG TERM MODEL -- ~{DOWN}{DOWN}
USER INPUTS 16 DIRECTION-SPECIFIC LOWER BOUND WAKE OPTIONS SWITCH VALUES~{DOWN}{DOWN}
BEGINNING WITH THE NORTH FLOW VECTOR (WIND BLOWING TOWARD~{DOWN}{DOWN}
THE NORTH) AND INCREMENTING BY 22.5 DEGREES~{DOWN}{DOWN}
IN A CLOCKWISE DIRECTION (N-NE, NE, E-NE, EAST ETC).~{DOWN}{DOWN}{DOWN}
A SWITCH VALUE OF 0 MEANS TO USE THE UPPER BOUND (REGULATORY DEFAULT)~{DOWN}{DOWN}
A SWITCH VALUE OF 1 MEANS TO USE THE LOWER BOUND FOR THAT SECTOR.~{DOWN}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR NORTH VECTOR : ",NORTH}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR N-NE VECTOR : ",NNE}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR NE VECTOR : ",NE}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR E-NE VECTOR : ",ENE}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR EAST VECTOR : ",EAST}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR E-SE VECTOR : ",ESE}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR SE VECTOR : ",SE}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR S-SE VECTOR : ",SSE}
```

```
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR SOUTH VECTOR : ",SOUTH}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR S-SW VECTOR : ",SSW}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR SW VECTOR : ",SW}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR W-SW VECTOR : ",WSW}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR WEST VECTOR : ",WEST}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR W-NW VECTOR : ",WNW}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR NW VECTOR : ",NW}
{GETNUMBER "ENTER SWITCH VALUE OF 0 OR 1 FOR N-NW VECTOR : ",NNW}
/RNDDSRCID~/RNDNORTH~/RNDNNE~/RNDNE~/RNDENE~/RNDEAST~/RNDESE~/RNDSE~/RNDSSE~
/RNDSOUTH~/RNDSSW~/RNDSW~/RNDWSW~/RNDWEST~/RNDWNW~/RNDNW~/RNDNNW~
{MENUBRANCH DOWN}
```

\A
/C<<RISC2>>TERM~<<RISC2A>>TERM~
/WDF
C:\LOTUS\RISC2.WK3~
{PS}
{MENUBRANCH RISK}

RISK

LOAD	SELECT	OUTPUT	ITERATIONS	RUN	VIEW	MAIN	QUIT
LOAD @RISK ADDI	SELECT VARIABLE F	SELECT OUTPUT RA	SELECT NUMBER OF	RUN SELECTED NUM	VIEW SELECTED OU	RETURN TO MAIN RI	QUIT MACRO -- RETURN TO NORMAL W
{ADDIN}SSD{ESC}	{COM}	{COM}	{COM}	{APP1}SSMQQ1MQQ~	{MENUBRANCH VIEW	OBRISC2~	{QUIT}
C:\RISK~	TO SELECTED VARIA	MOVE CURSER TO U	{GETNUMBER "ENTE	{FOR NUM,0,NUM,1,RUN}			
QLRISK.PLC~	{DOWN}{DOWN}	{?}~	{MENUBRANCH RISK}				
1Q	MOVE CURSER TO TH	/RNCOUT~~					
/WGRM~	{?}~	{DOWN}{DOWN}/RNCOUT1~~					
{MENUBRANCH RIS	/RNCDIST~~	{DOWN}/RNCOUT2~~					
	{COM}	{DOWN}/RNCOUT3~~					
	{GETLABEL "ENTER D	{DOWN}/RNCOUT4~~					
	{GOTO}DIST~	{DOWN}{DOWN}{down}{down}/RNCPOST1~~"3HR MAX~					
	{EDIT}{HOME}{DEL}	{RIGHT}/RNCPOST2~~"3HR 2ND~					
	/RNDDIST~	{RIGHT}/RNCPOST3~~"24HR MAX~					
	{MENUBRANCH RISK	{RIGHT}/RNCPOST4~~"24HR 2ND~					
		{RIGHT}{RIGHT}{UP}/RNC3AVG~~AVG 3HR~{DOWN}MAX VALS~{UP}					
		{RIGHT}/RNC3STD~~STD 3HR~{DOWN}MAX VALS~{UP}					
		{RIGHT}/RNC3VAR~~VAR 3HR~{DOWN}MAX VALS~{UP}					
		{RIGHT}{RIGHT}/RNC24AVG~~AVG 24HR~{DOWN}MAX VALS~{UP}					
		{RIGHT}/RNC24STD~~STD 24HR~{DOWN}MAX VALS~{UP}					
		{RIGHT}/RNC24VAR~~VAR 24HR~{DOWN}MAX VALS~					
		{COM}					
		{MENUBRANCH RISK}					

LOAD
LOAD @RISK ADDIN
{ADDIN}SSD{ESC}
C:\RISK~
QLRISK.PLC~
1Q
/WGRM~
{MENUBRANCH RISK}

SELECT
SELECT VARIABLE FOR DISTRIBUTION FUNCTION
{COM}
TO SELECTED VARIABLE FOR WHICH DISTRIBUTION FUNCTION IS TO BE SUBSTITUTED~
{DOWN}{DOWN}
MOVE CURSER TO THE SELECTED VARIABLE AND PRESS ENTER~
{?}~
/RNCDIST~~
{COM}
{GETLABEL "ENTER DISTRIBUTION FUNCTION FOR SELECTED VARIABLE ",DIST}~

```
{GOTO}DIST~
{EDIT}{HOME}{DEL}~
/RNDDIST~
{MENUBRANCH RISK}
```

OUTPUT

```
SELECT OUTPUT RANGE
{COM}
MOVE CURSER TO UPPER LEFT CORNER OF OUTPUT RANGE AND PRESS ENTER~{DOWN}
{?}~
/RNCOUT~~
{DOWN}{DOWN}/RNCOUT1~~
{DOWN}/RNCOUT2~~
{DOWN}/RNCOUT3~~
{DOWN}/RNCOUT4~~
{DOWN}{DOWN}{DOWN}{DOWN}/RNCPOST1~~'3HR MAX~
{RIGHT}/RNCPOST2~~'3HR 2ND~
{RIGHT}/RNCPOST3~~'24HR MAX~
{RIGHT}/RNCPOST4~~'24HR 2ND~
{RIGHT}{RIGHT}{UP}/RNC3AVG~~AVG 3HR~{DOWN}MAX VALS~{UP}
{RIGHT}/RNC3STD~~STD 3HR~{DOWN}MAX VALS~{UP}
{RIGHT}/RNC3VAR~~VAR 3HR~{DOWN}MAX VALS~{UP}
{RIGHT}{RIGHT}/RNC24AVG~~AVG 24HR~{DOWN}MAX VALS~{UP}
{RIGHT}/RNC24STD~~STD 24HR~{DOWN}MAX VALS~{UP}
{RIGHT}/RNC24VAR~~VAR 24HR~{DOWN}MAX VALS~
{RIGHT}/RNC3PROB~~'3HR PROB~{DOWN}MAX VALS~{UP}
{RIGHT}/RNC24PROB~~'24HR PROB~{DOWN}MAX VALS~
{COM}
{MENUBRANCH RISK}
```

COM

```
/RECOMMENTS~
{GOTO}COMMENTS~
```

ITERATIONS

```
SELECT NUMBER OF REALIZATIONS TO BE RUN
{COM}
{GETNUMBER "ENTER THE NUMBER OF REALIZATIONS TO BE RUN ",NUM}
{MENUBRANCH RISK}
```

RUN

```
RUN SELECTED NUMBER OF ITERATIONS
{APP1}SSMQQ1MQQ~
{FOR NUM1,0,NUM,1,RUN}
```

VIEW
VIEW SELECTED OUTPUT RESULTS
{MENUBRANCH VIEW1}

MAIN
RETURN TO MAIN RISC2 MENU
/FOBRISC2~

QUIT
QUIT MACRO - - RETURN TO NORMAL WORKSHEET MODE
{QUIT}

RUN
```
{CALC}
{GOTO}TABLE~
/RNCOUTPUT~.{END}{DOWN}{BIGRIGHT}{BIGRIGHT}~
/PF{ESC}{ESC}
C:\ENVIR\ISC\TEST1.INP
~C~
/PF{ESC}{ESC}
C:\ENVIR\ISC\TEST1.INP
~RROUTPUT~OMNOUQ
AGQ/RNDOUTPUT~
{OPEN "C:\123R3\RUN.BAT",W}
{WRITELN "ECHO OFF"}
{WRITELN "CD\ENVIR\ISC"}
{IF <<RISC2A>>TERM=2}{BRANCH    ISCLT}~
{ISCST}
{SYSTEM RUN.BAT}
{\C}
```

ISCST
```
{WRITE "ISCST2 "}
{WRITE "C:\ENVIR\ISC\TEST1.INP"}
{WRITE " "}
{WRITE "C:\ENVIR\ISC\TEST1.OUT"}
{CLOSE}
```

ISCLT
```
{WRITE "ISCLT2 "}
```

```
{WRITE "C:\ENVIR\ISC\TEST1.INP"}
{WRITE " "}
{WRITE "C:\ENVIR\ISC\TEST1.OUT"}
{CLOSE}

\C
{OPEN "C:\ENVIR\ISC\TEST1.OUT",r}
{READLN OUT}
{IF OUT="                    *** THE SUMMARY OF HIGHEST  3-HR RESULTS ***"}{BRANCH A105}
{BRANCH A102}
{FOR D1,0,8,1,READ}
{READLN OUT2}
{READLN OUT}
{IF OUT="                    *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***"}{BRANCH A110}
{BRANCH A107}
{FOR D1,0,8,1,READ1}
{READLN OUT4}
{PARSE}
{APPEN}

READ
{READLN OUT1}

READ1
{READLN OUT3}

PARSE
{GOTO}OUT1~
/DPRFCI
.{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~
O{DOWN}~G
{GOTO}OUT1~{UP}~
/RE~

APPEN
{GOTO}OUT1~{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}
/RNCHIGH~~
{DOWN}/RNCHIGH2~~
{DOWN}/RNC2HIGH~~
{DOWN}/RNC2HIGH2~~
{APPENDBELOW POST1,HIGH}
{APPENDBELOW POST2,HIGH2}
```

```
{APPENDBELOW POST3,2HIGH}
{APPENDBELOW POST4,2HIGH2}
{STAT}
{GOTO}OUT ~
/RE{BIGRIGHT}{DOWN}{DOWN}{DOWN}{DOWN} ~
```

STAT

```
{GOTO}3AVG ~
{END}{DOWN} ~ {DOWN}
@AVG(POST1) ~
/RV ~ ~
{GOTO}3STD ~
{END}{DOWN} ~ {DOWN}
@STD(POST1) ~
/RV ~ ~
{GOTO}3VAR ~
{END}{DOWN} ~ {DOWN}
@VAR(POST1) ~
/RV ~ ~
{GOTO}24AVG ~
{END}{DOWN} ~ {DOWN}
@AVG(POST3) ~
/RV ~ ~
{GOTO}24STD ~
{END}{DOWN} ~ {DOWN}
@STD(POST3) ~
/RV ~ ~
{GOTO}24VAR ~
{END}{DOWN} ~ {DOWN}
@VAR(POST3) ~
/RV ~ ~
{GOTO}POST1 ~ {END}{DOWN}/RNCTEMP ~ ~
{GOTO}3PROB ~ {END}{DOWN} ~ {DOWN}
/CTEMP ~ ~ /RNDTEMP ~
/RV ~ ~
{GOTO}POST3 ~ {END}{DOWN}/RNCTEMP ~ ~
{GOTO}24PROB ~ {END}{DOWN} ~ {DOWN}
/CTEMP ~ ~ /RNDTEMP ~ ~
/RV ~ ~
/FSRISCOUT ~ R
```

VIEW1

STATISTICS	GRAPHS	RETURN
VIEW STATISTICAL	VIEW GRAPHS OF STA	RETURN TO PREVIOUS MENU
{GOTO} POST1 ~{EN	{GOTO}3AVG ~/RND	{MENUBRANCH RISK}
{DOWN}{DOWN}{D	{GOTO}3STD ~/RND3STD ~	/RNC3STD ~.{END}{DOWN} ~
{RIGHT} STATISICA	{GOTO}3VAR ~ RND3VAR ~	/RNC3VAR ~.{END}{DOWN} ~

```
{LEFT}/RNCSTATS~{GOTO}24AVG~/RND24AVG~/RNC24AVG~.{END}{DOWN}~
MEAN (AVERGE) VA{GOTO}24STD~/RND24STD~/RNC24STD~.{END}{DOWN}~
{RIGHT}{RIGHT}{R{GOTO}24VAR~/RND24VAR~/RNC24VAR~.{END}{DOWN}~
{LEFT}{LEFT}{LEFT{GOTO}COMMENTS~/RECOMMENTS~
STANDARD DEVIAT{MENUBRANCH GRAPHS}
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCSTD3~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
POPULATION VARIANCE OF 3 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCVAR3~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
MEAN (AVERGE) VALUE OF 24 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCAVG24~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
STANDARD DEVIATION OF 24 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCSTD24~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
POPULATION VARIANCE OF 24 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCVAR24~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}{DOWN}
NUMBER OF MODEL ITERATIONS PERFORMED
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCITER~~
{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}{DOWN}
PRESSENTER TO CONTINUE~{DOWN}
{GOTO}3AVG~{END}{DOWN}/C~AVG3~/RNDAVG3~
{GOTO}3STD~{END}{DOWN}/C~STD3~/RNDSTD3~
{GOTO}3VAR~{END}{DOWN}/C~VAR3~/RNDVAR3~
{GOTO}24AVG~{END}{DOWN}/C~AVG24~/RNDAVG24~
{GOTO}24STD~{END}{DOWN}/C~STD24~/RNDSTD24~
{GOTO}24VAR~{END}{DOWN}/C~VAR24~/RNDVAR24~
/CNUM1~ITER~/RNDITER~
{GOTO}STATS~/RNDSTATS~
{?}
{MENUBRANCH VIEW1}
```

STATISTICS

```
VIEW STATISTICAL ANALYSIS OF OUTPUT
{GOTO}POST1~{END}{DOWN}
{DOWN}{DOWN}{DOWN}{DOWN}/RE{BIGRIGHT}{END}{DOWN}~
{RIGHT}STATISICAL ANALYSIS OF MODEL OUTPUT~
{LEFT}/RNCSTATS~~{DOWN}{DOWN}{DOWN}
MEAN (AVERGE) VALUE OF 3 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCAVG3~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
STANDARD DEVIATION OF 3 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCSTD3~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
POPULATION VARIANCE OF 3 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCVAR3~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
MEAN (AVERGE) VALUE OF 24 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCAVG24~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
STANDARD DEVIATION OF 24 HR MAXIMUM VALUES~
```

```
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCSTD24~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}
POPULATION VARIANCE OF 24 HR MAXIMUM VALUES~
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCVAR24~~
{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}{DOWN}
NUMBER OF MODEL ITERATIONS PERFORMED
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCITER~~
{LEFT}{LEFT}{LEFT}{LEFT}{DOWN}{DOWN}{DOWN}
PRESS ENTER TO CONTINUE~{DOWN}
{GOTO}3AVG~{END}{DOWN}/C~AVG3~/RNDAVG3~
{GOTO}3STD~{END}{DOWN}/C~STD3~/RNDSTD3~
{GOTO}3VAR~{END}{DOWN}/C~VAR3~/RNDVAR3~
{GOTO}24AVG~{END}{DOWN}/C~AVG24~/RNDAVG24~
{GOTO}24STD~{END}{DOWN}/C~STD24~/RNDSTD24~
{GOTO}24VAR~{END}{DOWN}/C~VAR24~/RNDVAR24~
/CNUM1~ITER~/RNDITER~
{GOTO}STATS~/RNDSTATS~
{?}
{MENUBRANCH VIEW1}
```

GRAPHS

```
VIEW GRAPHS OF STATISTICAL INFORMATION
{GOTO}3AVG~/RND3AVG~/RNC3AVG~.{END}{DOWN}~
{GOTO}3STD~/RND3STD~/RNC3STD~.{END}{DOWN}~
{GOTO}3VAR~/RND3VAR~/RNC3VAR~.{END}{DOWN}~
{GOTO}24AVG~/RND24AVG~/RNC24AVG~.{END}{DOWN}~
{GOTO}24STD~/RND24STD~/RNC24STD~.{END}{DOWN}~
{GOTO}24VAR~/RND24VAR~/RNC24VAR~.{END}{DOWN}~
{GOTO}3PROB~/RND3PROB~/RNC3PROB~.{END}{DOWN}~
{GOTO}24PROB~/RND24PROB~/RNC24PROB~.{END}{DOWN}~
{RIGHT}{DOWN}{DOWN}/RNCPROB~.{LEFT}{END}{DOWN}{RIGHT}~
{RIGHT}/RNCPROB1~.{LEFT}{LEFT}{END}{DOWN}{RIGHT}{RIGHT}~
/DFPROB~1~1~~
{GOTO}PROB1~+{LEFT}/(@COUNT($PROB)+1)*100~
/C~PROB1~
/DSRD24PROB~P24PROB~A~G
/DSRD3PROB~P3PROB~A~G
{GOTO}COMMENTS~/RECOMMENTS~
{MENUBRANCH GRAPHS}
```

RETURN

```
RETURN TO PREVIOUS MENU
{MENUBRANCH RISK}
```

GRAPHS

3-MEAN	3-STD	3-PROB	24-MEAN	24-STD	24-VAR	RETURN
GRAPH MEAN OF 3 H	GRAPH STANDARD D	GRAPH 3 HR MAXIM	GRAPH MEAN OF 24 H	GRAPH STANDARD D	GRAPH 24 HR MAXIM	RETURN TO PREVIOUS MENU
/GRGTLA3AVG ~	/GRGTLA3STD ~ OTF	/GRGTXA3PROB ~ XP	/GRGTLA24AVG ~ OT	/GRGTLA24STD ~ OTF	/GRGTXA24PROB ~ X	{MENUBRANCH VIEW1}
OTF MEAN OF 3 HO	STANDARD DEVIATI	OTF3 HOUR MAXIMU	MEAN OF 24 HR MAX	STANDARD DEVIATI	OTF 24 HOUR MAXIMUM VALUES VS PROBABILITY ~	
TXITERATIONS ~	TXITERATIONS ~	TXPROBABILITY % ~	TXITERATIONS ~	TXITERATIONS ~	TXPROBABILITY ~	
TYMEAN OF MAXIM	TYSTARDARD DEVIA	TYMAXIMUM CONCE	TYMEAN OF MAXIM	TYSTARDARD DEVIA	TYMAXIMUM CONCENTRATION ~	
QOGHQVQ	QOGHQVQ	QOGBQVQ	QOGHQVQ	QOGHQVQ	QOGBQVQ	
{MENUBRANCH GR	{MENUBRANCH GRA	{MENUBRANCH GRA	{MENUBRANCH GRA	{MENUBRANCH GRA	{MENUBRANCH GRAPHS}	

3-MEAN
GRAPH MEAN OF 3 HR MAXIMUM VALUES VS NUMBER OF ITERATIONS
/GRGTLA3AVG ~
OTF MEAN OF 3 HOUR MAXIMUM VALUES VS NUMBER OF ITERATIONS ~
TXITERATIONS ~
TYMEAN OF MAXIMUM CONCENTRATION ~
QOGHQVQ
{MENUBRANCH GRAPHS}

3-STD
GRAPH STANDARD DEVIATION OF 3 HR MAXIMUM VALUES VS NUMBER OF ITERATIONS
/GRGTLA3STD ~OTF
STANDARD DEVIATION OF 3 HR MAX VALUES vs NUMBER OF ITERATIONS ~
TXITERATIONS ~
TYSTARDARD DEVIATION OF MAXIMUM CONCENTRATION ~
QOGHQVQ
{MENUBRANCH GRAPHS}

3-PROB
GRAPH 3 HR MAXIMUM VALUES VS PROBABILITY
/GRGTXA3PROB ~ XPROB1 ~
OTF3 HOUR MAXIMUM VALUES VS PROBABILITY ~
TXPROBABILITY % ~
TYMAXIMUM CONCENTRATION ~
QOGBQVQ
{MENUBRANCH GRAPHS}
POPULATION VARIANCE OF 3 HR MAX VALUES vs NUMBER OF ITERATIONS ~

24-MEAN
GRAPH MEAN OF 24 HR MAXIMUM VALUES VS NUMBER OF ITERATIONS
/GRGTLA24AVG ~ OTF
MEAN OF 24 HR MAX VALUES vs NUMBER OF ITERATIONS ~
TXITERATIONS ~
TYMEAN OF MAXIMUM CONCENTRATION ~
QOGHQVQ
{MENUBRANCH GRAPHS}

24-STD
GRAPH STANDARD DEVIATION OF 24 HR MAXIMUM VALUES VS NUMBER OF ITERATIONS
/GRGTLA24STD ~ OTF
STANDARD DEVIATION OF 24 HR MAX VALUES vs NUMBER OF ITERATIONS ~
TXITERATIONS ~
TYSTARDARD DEVIATION OF MAXIMUM CONCENTRATION ~
QOGHQVQ
{MENUBRANCH GRAPHS}

24-PROB
GRAPH 24 HR MAXIMUM VALUES VS PROBABILITY
/GRGTXA24PROB ~ XPROB1 ~
OTF24 HOUR MAXIMUM VALUES VS PROBABILITY ~
TXPROBABILITY ~
TYMAXIMUM CONCENTRATION ~
QOGBQVQ
{MENUBRANCH GRAPHS}

RETURN
RETURN TO PREVIOUS MENU
{MENUBRANCH VIEW1}

APPENDIX E

LIST OF PROGRAMMING CODE (MACROS)

FOR <u>COGMOD</u>

\A

```
{HOME}{DOWN}
     MACRO REQUIRES 1 SCREEN AREA FOR COMMENTS AND HELP.~{DOWN}{DOWN}
MOVE CURSOR TO UPPER LEFT CORNER OF AREA TO BE RESERVED FOR COMMENTS~
{DOWN}{DOWN}
  PRESS ENTER TO CONTINUE~{HOME}
{?}~/RNCCOMMENTS~.{PGDN}{up}{BIGRIGHT}~
{HOME}/RE.{PGDN}{UP}{BIGRIGHT}~
{GOTO}COMMENTS~{PGDN}/RNCCOND~~
{RIGHT}/RNCHORZ~~
{RIGHT}/RNCVERT~~
{RIGHT}/RNCSAMP~~
{RIGHT}/RNCNUM~~
{RIGHT}/RNCNUM1~~
{RIGHT}/RNCNUMPTS~~
{GOTO}COMMENTS~
WORKSHEET ASSUMES 3 VARIABLES --~{DOWN}{DOWN}
  A) DISTANCE FROM ORIGIN IN X DIRECTION~{DOWN}{DOWN}
  B) DISTANCE FROM ORIGIN IN Y DIRECTION~{DOWN}{DOWN}
  C) HYDRAULIC CONDUCTIVITY~{DOWN}
```

{MENUBRANCH FUNCTION}

FUNCTION

DATA	STATPAC	COVAR	MOC	KRIGE	RUNMOD	QUIT
CREATE DATA	RUN STATPAC FUN	RUN COVAR	RUN MOC	KRIGE DATA	RUN MULTIPLE CO	RETURN TO LOTUS
{GOTO}COMME	{SYSTEM STAT.BAT	{SYSTEM COVAR.BAT	{SYSTEM MOC.B	{BRANCH KRIGE	{\x}	{QUIT}
{BRANCH DAT	{MENUBRANCH FU	{MENUBRANCH FUN	{MENUBRANCH	{MENUBRANCH	{MENUBRANCH FUNCTION}	
{MENUBRANCH FUNCTION}						

DATA

CREATE DATA FILES
{GOTO}COMMENTS~
{BRANCH DATA}
{MENUBRANCH FUNCTION}

STATPAC

RUN STATPAC FUNCTIONS INCLUDING SEMIVARIOGRAM EVAL
{SYSTEM STAT.BAT}
{MENUBRANCH FUNCTION}

COVAR

RUN COVAR
{SYSTEM COVAR.BAT}
{MENUBRANCH FUNCTION}

MOC

RUN MOC
{SYSTEM MOC.BAT}
{MENUBRANCH FUNCTION}

KRIGE

KRIGE DATA
{BRANCH KRIGE}
{MENUBRANCH FUNCTION}

RUNMOD

RUN MULTIPLE CONDITIONAL SIMULATIONS OF MODEL
{\x}
{MENUBRANCH FUNCTION}

QUIT

RETURN TO LOTUS WORKSHEET
{QUIT}

COM

{GOTO}COMMENTS~
/RECOMMENTS~

DATA

{GETLABEL "DO YOU WISH TO RUN CONDITIONAL SIMULATION? (Y or N) ",COND}
{IF COND="Y"}{BRANCH DATA1}
{BRANCH DATA2}

DATA1

{COM}
STATPAC DATA WILL BE ENTERED DIRECTLY INTO THE STATPAC PROGRAM ~ {DOWN}{DOWN}
"TERFIL" WHICH WILL PROMPT THE USER FOR THE NECESSARY INFORMATION. ~ {DOWN}{DOWN}
FOR MORE INFORMATION ON "TERFIL" SEE STATPAC USER'S INFORMATION. ~ {DOWN}
{GETLABEL "DO YOU WISH TO CREATE A RAW DATA FILE (Y or N) ? ",NUM}
{IF NUM="N"}{BRANCH DAT1}
{?}~
/RECOMMENTS~
{SYSTEM TER.BAT}
{COM}
{DOWN}
TO VIEW THE INPUT DATA FILE ENTER A "Y"~ {HOME}
{GETLABEL "DO YOU WISH TO VIEW INPUT DATA FILE (Y or N)? ",NUM}
{IF NUM="Y"}{BRANCH VDATA}
{COM}{DOWN}
{GETLABEL "DO YOU WISH TO PERFORM BASIC STATISTICS ON THIS DATA NOW (Y or N)?",NUM}
{HOME}
{IF NUM="Y"}{BRANCH BASTAT}
{COM}{DOWN}
TO PERFORM SEMIVARIOGRAM ANALYSIS AT THIS POINT ENTER "Y"~ {HOME}
{GETLABEL "DO YOU WISH TO PERFORM SEMIVARIOGRAM ANALYSIS NOW (Y or N)?",NUM}
{IF NUM="Y"}{BRANCH SEMI}
{COM}{DOWN}
TO CREATE COVAR INPUT FILE NOW ENTER "Y"~ {HOME}
{GETLABEL "DO YOU WISH TO CREATE COVAR INPUT FILE NOW (Y or N) ? ",NUM1}
{IF NUM1="Y"}{BRANCH DATA2}
{IF NUM="N"}{BRANCH PREP}
{MEUNBRANCH FUNCTION}

DATA2

{COM}{DOWN}
CREATE A DATA FILE OF X-Y COORDINATES FOR COVAR PROGRAM ~ {DOWN}{DOWN}{DOWN}
THESE POINTS MUST MATCH THE GRID POINTS USED IN STATPAC KRIGE PROGRAM ~

```
{DOWN}{DOWN}
THE SAMPLE VALUES USED TO CONDITION THE SIMULATION ALSO MUST BE AT~ {DOWN}{DOWN}
MATCHING GRID POINTS. THIS IS IMPERATIVE FOR THE CONDITIONING TO WORK!! ~
{DOWN}{DOWN}
IF POINTS DO NOT COINCIDE -- RETURN TO INPUT DATA FOR STATPAC NOW. ~ {DOWN}
{GETLABEL "DO YOU WISH TO CONTINUE WITH COVAR GRIDINPUT (Y or N)? ",NUM}
{IF NUM="N"}{MENUBRANCH FUNCTION}
{COM}
{DATA3}
```

DATA3

```
{COM}
    INPUT RAW DATA POINTS FROM STATPAC TO COVAR PROGRAM ~ {DOWN}{DOWN}
MOVE CURSOR TO UPPER LEFT CORNER OF RANGE FOR TABLE OF STATPAC VALUES ~
{DOWN}{DOWN}
TO AVOID POTENTIAL RANGE OVERLAP (& LOSS OF DATA!) ~ {DOWN}{DOWN}
NO DATA SHOULD BE BELOW SELECTED RANGE -- PRESS ENTER TO CONTINUE ~ {DOWN}
{?}~
/RNCTAB~.{PGDN}{PGDN}{PGDN}{PGDN}{PGDN}{PGDN}~
{GETLABEL "HAS ASCII FILE OF RAW DATA ALREADY BEEN CREATED (Y or N)? ",SAMP}
{IF SAMP="Y"}{BRANCH DATA3A}
{SYSTEM VDATA.BAT}
{GOTO}TAB~
/FIT{ESC}{ESC}
C:\ENVIR\STATPAK\
TEST.DAT
~{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~
{FOR NUM1,1,(@COUNT(TAB)-4)/2,1,ERAS}
{GOTO}TAB~/RNDTAB~
{DOWN}{DOWN}{DOWN}{DOWN}/RNCTAB~~
/DPRF~I.{END}{DOWN}~O~G~
{GOTO}TAB~{END}{DOWN}/RE~
{GOTO}TAB~{UP}{UP}~"X-COORD~{RIGHT}"Y-COORD~{RIGHT}"COND~
{GOTO}TAB~/RNDTAB~{UP}/RNCTAB~~{RIGHT}/RNCTAB1~~/RNCTABV~~
{DATA4}
```

DATA3A

```
{GOTO}TAB~
/FIT{ESC}{ESC}C:\ENVIR\STATPAK\
TEST.DAT
~{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~
{FOR NUM1,1,(@COUNT(TAB)-4)/2,1,ERAS}
{GOTO}TAB~/RNDTAB~
{DOWN}{DOWN}{DOWN}{DOWN}/RNCTAB~~
/DPRF~I.{END}{DOWN}~O~G~
```

```
{GOTO}TAB~{END}{DOWN}/RE~
{GOTO}TAB~{UP}{UP}~"X-COORD~{RIGHT}"Y-COORD~{RIGHT}"COND~
{GOTO}TAB~/RNDTAB~{UP}/RNCTAB~~{RIGHT}/RNCTAB1~~/RNCTABV~~
{DATA4}
```

DATA4

```
{GETNUMBER "ENTER THE MINIMUM HORIZONTAL (X) DISTANCE BETWEEN POINTS : ",HORZ}
{GETNUMBER "ENTER THE MINIMUM VERTICAL (Y) DISTANCE BETWEEN POINTS : ",VERT}
{GOTO}TAB~{END}{DOWN}{DOWN}{DOWN}{DOWN}
/RNCTABLE3~~
{GRID}
{MENUBRANCH FUNCTION}
```

GRID

```
/RNCX~~{RIGHT}/RNCXY~~{LEFT}
{GOTO}XY~
/WCS13~{GOTO}X~
{GETNUMBER "ENTER X-COORDINATE OF 1ST GRID POINT ",X}~
{EDIT}*.01~
{DOWN}+(X+HORZ)*.01~
{FOR NUM,3,20,1,GRID1}
/RNDX~
{GETNUMBER "ENTER Y-COORDINATE OF 1ST GRID POINT ",XY}~
{GOTO}XY~{EDIT}*.01~{DOWN}+XY~
{FOR NUM,3,20,1,GRID2}
{GOTO}TABLE3~
/RNCXS~.{END}{DOWN}~
{FOR NUM,2,20,1,GRID3}
{FOR NUM,2,20,1,GRID4}
{TBL3OUT}
{GOTO}TABLE3~/RNCTAB5~~
/RVXYDAT~~
{COVRUN}
{GOTO}XY~
/WCS9~
```

TBL3OUT

```
{GOTO}TABLE3~/RFF2~.{END}{DOWN}{RIGHT}{RIGHT}~
/RNCXYDAT~.{END}{DOWN}{RIGHT}~
{COM}{DOWN}~
```

GRID1

{DOWN}+{UP}+HORZ*.01~

GRID2

{DOWN}
+XY~

GRID3

{GOTO}TABLE3~
{END}{DOWN}{DOWN}
/RVXS~~

GRID4

{GOTO}TABLE3~{RIGHT}
{END}{DOWN}/RNCX~~
{FOR NUM,1,20,1,GRID5}
/RNDX~

GRID5

{DOWN}
+X+VERT*.01~

COVRUN

{DATOUT1}
{SYSTEM RUN.BAT}

DATOUT1

/PF{ESC}{ESC}
C:\ENVIR\COVAR\
COVAR.DAT
~RRXYDAT~OMNOUQ
AGQ/RNDXYDAT~
{RETURN}

DAT1

{COM}
{DOWN}
TO VIEW THE INPUT DATA FILE ENTER A "Y"~{HOME}
{GETLABEL "DO YOU WISH TO VIEW INPUT DATA FILE (Y or N)? ",NUM}
{IF NUM="Y"}{BRANCH VDATA}
{COM}{DOWN}

{GETLABEL "DO YOU WISH TO PERFORM BASIC STATISTICS ON THIS DATA NOW (Y or N)?",NUM}
{HOME}
{IF NUM="Y"}{BRANCH BASTAT}
{COM}{DOWN}
TO PERFORM SEMIVARIOGRAM ANALYSIS AT THIS POINT ENTER "Y"~{HOME}
{GETLABEL "DO YOU WISH TO PERFORM SEMIVARIOGRAM ANALYSIS NOW (Y or N)?",NUM}
{IF NUM="Y"}{BRANCH SEMI}
{COM}{DOWN}
TO CREATE COVAR INPUT FILE NOW ENTER "Y"~{HOME}
{GETLABEL "DO YOU WISH TO CREATE COVAR INPUT FILE NOW (Y or N) ? ",NUM1}
{IF NUM1="Y"}{BRANCH DATA2}
{IF NUM="N"}{BRANCH PREP}
{MEUNBRANCH FUNCTION}

VDATA
{SYSTEM VDATA.BAT}
{COM}
{GETLABEL "DO YOU WISH TO CHANGE ANY INPUT DATA (Y or N) ? ",NUM}
{IF NUM="Y"}{BRANCH FIX}
{BRANCH A28}

FIX
{SYSTEM FIX.BAT}
{BRANCH A28}

A28
{COM}{DOWN}
{GETLABEL "DO YOU WISH TO PERFORM BASIC STATISTICS ON THIS DATA NOW (Y or N)?",NUM}
{HOME}
{IF NUM="Y"}{BRANCH BASTAT}
{COM}{DOWN}
TO PERFORM SEMIVARIOGRAM ANALYSIS AT THIS POINT ENTER "Y"~{HOME}
{GETLABEL "DO YOU WISH TO PERFORM SEMIVARIOGRAM ANALYSIS NOW (Y or N)?",NUM}
{IF NUM="Y"}{BRANCH SEMI}
{COM}{DOWN}
TO CREATE COVAR INPUT FILE NOW ENTER "Y"~{HOME}
{GETLABEL "DO YOU WISH TO CREATE COVAR INPUT FILE NOW (Y or N) ? ",NUM1}
{IF NUM1="Y"}{BRANCH DATA2}
{IF NUM="N"}{BRANCH PREP}
{MEUNBRANCH FUNCTION}

BASTAT
{SYSTEM BASTAT.BAT}
{BRANCH A30}

A30

```
{COM}{DOWN}
TO PERFORM SEMIVARIOGRAM ANALYSIS AT THIS POINT ENTER "Y"~{HOME}
{GETLABEL "DO YOU WISH TO PERFORM SEMIVARIOGRAM ANALYSIS NOW (Y or N)?",NUM}
{IF NUM="Y"}{BRANCH SEMI}
{COM}{DOWN}
TO CREATE COVAR INPUT FILE NOW ENTER "Y"~{HOME}
{GETLABEL "DO YOU WISH TO CREATE COVAR INPUT FILE NOW (Y or N) ? ",NUM1}
{IF NUM1="Y"}{BRANCH DATA2}
{IF NUM="N"}{BRANCH PREP}
{MEUNBRANCH FUNCTION}
```

SEMI

```
{PREP}
{SYSTEM VARIO.BAT}
{SYSTEM XVARIO.BAT}
{GETLABEL "DO YOU WISH TO RUN BASIC STATISTICS ON RESULTS (Y or N) ?",NUM}
{IF NUM="Y"}{BRANCH BASTAT}
{RETURN}
```

PREP

```
{COM}
MOVE CURSOR TO UPPER LEFT HAND CORNER OF RANGE FOR TABLE OF INPUT VALUES~
{DOWN}{DOWN}
 PRESS ENTER TO CONTINUE~{HOME}
{?}~
/RNCTABLE~~
{COM}
{DOWN}THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)~
{DOWN}{DOWN}
AND MAY NOT INCLUDE THE EXTENSION (.STP).~{DOWN}
{GETLABEL "ENTER ROOT NAME FOR THE STATPAC INPUT FILE : ",TABLE}
{GOTO}TABLE~{DOWN}/RNCNEXT~~
{GOTO}COMMENTS~
{GETLABEL "ENTER ROOT NAME OF STATPAC OUTPUT FILE : ",NEXT}/RNDNEXT~
{GOTO}TABLE~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ASSUME Y-COORDINATE IS NORTH COORDINATE -- THEN THIS VALUE IS 2~{DOWN}{DOWN}
IF Y IS NOT NORTH -- ENTER APPROPRIATE COLUMN VALUE FROM INPUT FILE.~{DOWN}
{GETLABEL "ENTER COLUMN NUMBER OF NORTH COORDINATE : ",NEXT}/RNDNEXT~
{GOTO}TABLE~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ASSUME X-COORDINATE IS EAST COORDINATE -- THEN THISVALUE IS 1~{DOWN}{DOWN}
```

```
IF X IS NOT EAST -- ENTER APPROPRIATE COLUMN VALUE FROM INPUT FILE. ~ {DOWN}
{GETLABEL "ENTER COLUMN NUMBER OF EAST COORDINATE : ",NEXT}/RNDNEXT ~
{GOTO}TABLE ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{LET NEXT,NO}
/RNDNEXT ~
{GOTO}TABLE ~/RNCOUT ~ .{END}{DOWN}{BIGRIGHT} ~
/PF{ESC}{ESC}
C:\ENVIR\STATPAK\
PREP.FIL
~ RROUT ~ OMNOUQ
AGQ/RNDOUT ~
{SYSTEM PREP.BAT}
```
{CTRL}

CTRL

```
{COM}
MOVE CURSOR TO UPPER LEFT HAND CORNER OF RANGE FOR TABLE OF CONTROL VALUES ~ {DOWN}{DOWN}
 PRESS ENTER TO CONTINUE ~ {HOME}
{?} ~
/RNCCTRLTAB ~ ~
{COM}
{DOWN}THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM) ~ {DOWN}{DOWN}
AND MAY NOT INCLUDE THE EXTENSION . ~ {DOWN}
{GETLABEL "ENTER ROOT NAME FOR THE CONTROL FILE TO BE CREATED : ",CTRLTAB}
{GOTO}CTRLTAB ~ {DOWN}/RNCNEXT ~ ~
{COM}
TITLE MAY BE ANY ALPHANUMERIC COMBINATION OF UP TO 79 CHARACTERS. ~ {DOWN}{DOWN}
TITLE WILL BE INCLUDED AT THE TOP OF EACH PAGE OF OUTPUT FROM SS2DGAMH. ~ {DOWN}
{GETLABEL "ENTER TITLE FOR VARIOGRAM RUN ; ",NEXT}/RNDNEXT ~
{GOTO}CTRLTAB ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
THE LOGARITHMIC CONVERSION OPTION CAN BE USED IF THE VARIABLE IS ~ {DOWN}{DOWN}
LOGNORMALLY DISTRIBUTED.  THE NORMAL RESPONSE IS "NO" ~ {DOWN}{DOWN}
NOTE: THE STATPAC 2-D KRIGING PROGRAMS DO NOT SUPPORT LOGNORMAL KRIGING. ~ {DOWN}
{GETLABEL "IS LOGARITHMIC CONVERSION WANTED (Y or N) ? ",NEXT}/RNDNEXT ~
{GOTO}CTRLTAB ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{LET NEXT,N}
/RNDNEXT ~
{GOTO}CTRLTAB ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
MOMENT CENTER DISPLAY OPTION MAY BE USEFUL WHEN DATA POINTS ARE ~ {DOWN}{DOWN}
HIGHLY CLUSTERED IN SPACE. IN THIS CASE THE MOMENT CENTER MAY BE ~ {DOWN}{DOWN}
QUITE DIFFERENT FROM THE USUAL GAMMA (h) STATISTIC.IN DATA WHICH ~ {DOWN}{DOWN}
EXHIBIT A RANDOM OR NICELY GRIDDED PATTERN, THE MOMENT CENTER ~ {DOWN}{DOWN}
AND GAMMA (h) STATISTICS WILL BE VERY NEARLY THE SAME. ~ {DOWN}
{GETLABEL "IS MOMENT CENTER DISPLAY OPTION WANTED (Y or N) ? ",NEXT}/RNDNEXT ~
```

```
{GOTO}CTRLTAB~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
THE USUAL RESPONSE TO THE AUTOMATIC SCALING QUESTIONIS Y FOR YES.~{DOWN}{DOWN}
{GETLABEL "IS AUTOMATIC SCALING OF THE GRAPH WANTED (Y or N) ? ",NEXT}/RNDNEXT~
{GOTO}CTRLTAB~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
RELATIVE VARIOGRAMS ARE NOT USED WHEN DEALING WITH NORMALLY~{DOWN}{DOWN}
DISTRIBUTED DATA~{DOWN}
{GETLABEL "IS RELATIVE VARIOGRAM WANTED (Y or N) ? ",NEXT}/RNDNEXT~
{GOTO}CTRLTAB~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{LET NEXT,'1}{EDIT}{HOME}{DELETE}
/RNDNEXT~
{GOTO}CTRLTAB~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
CLASS INTERVAL SHOULD BE LARGE ENOUGH TO INCLUDE AT LEAST 30 PAIRS~{DOWN}{DOWN}
OF POINTS IN THE FIRST DISTANCE CLASS.~{DOWN}{DOWN}
THIS MAY TAKE SOME TRIAL AND ERROR RUNS TO DETERMINE THE BESTVALUE.~{DOWN}
{GETLABEL "ENTER CLASS INTERVAL TO GROUP DISTANCES : ",NEXT}/RNDNEXT~
{GOTO}CTRLTAB~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
DIRECTION (IN DECIMAL DEGREES) ALONG WHICH THE VARIOGRAM IS~{DOWN}{DOWN}
TO BE COMPUTED. THE DESIRED DIRECTIONS MAY BE INDICATED AS FOLLOWS:~{DOWN}{DOWN}
{RIGHT}
'0 = EAST-WEST~{DOWN}
'90 = NORTH-SOUTH~{DOWN}
'45 = NORTHEAST-SOUTHWEST~{DOWN}
'-45 = NORTHWEST-SOUTHEAST~{DOWN}{DOWN}{LEFT}
INTERMEDIATE DIRECTIONS ARE ALSO ALLOWED.~{DOWN}
{GETLABEL "ENTER THE DIRECTION ANGLE FOR THE VARIOGRAM : ",NEXT}/RNDNEXT~
{GOTO}CTRLTAB~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
THE VARIOGRAM WINDOW ANGLE IS DETERMINED BY TRIAL AND ERROR.~{DOWN}{DOWN}
AN ALL-DIRECTION VARIOGRAM REQUIRES A WINDOW OF 90 DEGREES.~{DOWN}{DOWN}
WHEN A +-90 DEGREE WINDOW IS SELECTED, IT MAKES LITTLE DIFFERENCE ~{DOWN}{DOWN}
WHAT DIRECTION IS SPECIFIED.~{DOWN}{DOWN}
{GETLABEL "ENTER THE WINDOW ANGLE FOR VARIOGRAM : ",NEXT}/RNDNEXT~
{GOTO}CTRLTAB~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
THE USUAL RESPONSE TO SELECTING COORDINATES IS "N" FOR NO.~{DOWN}{DOWN}
THIS QUESTION REFERS TO WETHER THE VARIOGRAM IS LIMITED TO SPECIFIED~{DOWN}{DOWN}
COORDINATE BOUNDS.~{DOWN}
{GETLABEL "DO YOU WANT TO SELECT COORDINATE LIMITS (Y or N) ? ",NEXT}/RNDNEXT~
```

{CTRL1}

```
{MENUBRANCH FUNCTION}
```

CTRL1

```
{GOTO}CTRLTAB~/RNCCTRLOUT~.{END}{DOWN}~
/PF{ESC}{ESC}
C:\ENVIR\STATPAK\CTRL.FIL
~RRCTRLOUT~OMNOUQ
AGQ/RNDCTRLOUT~
{SYSTEM CTRL.BAT}
```

KRIGE

```
{COM}
{GETLABEL "HAS RAW DATA FILE BEEN CONVERTED (PREPROCESSED) FOR KRIGING (Y or N)? ",NUM}
{IF NUM="N"}{PREP}
{COM}~{DOWN}~
THIS SERIES OF QUESTIONS WILL CREATE A CONTROL FILE FOR THE KRIGE~{DOWN}{DOWN}
SUBROUTINE - THEN RUN THE KRIGE SUBROUTINE 1 TIME ~{DOWN}{DOWN}
MOVE CURSOR TO UPPER LEFT HAND CORNER OF RANGE FOR TABLE OF CONTROL VALUES~{DOWN}{DOWN}
 PRESS ENTER TO CONTINUE~{HOME}
{?}~
/RNCKRIGCTRL~~
{COM}
{DOWN}THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)~{DOWN}{DOWN}
AND MAY NOT INCLUDE THE EXTENSION .~{DOWN}
{GETLABEL "ENTER ROOT NAME FOR THE STATPAC DATA FILE TO BE KRIGED : ",KRIGCTRL}
{GOTO}KRIGCTRL~{DOWN}/RNCNEXT~~
{COM}
IF THIS IS A CONDITIONAL SIMULATION, AN ASCII OUTPUT FILE ~{DOWN}{DOWN}
WILL BE REQUIRED FOR FURTHER PROCESSING.~{DOWN}{DOWN}
{GETLABEL "IS AN ASCII OUTPUT FILE DESIRED (Y or N) ? ",NEXT}
{IF NEXT="N"}{BRANCH A371}
/RNDNEXT~{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~{GOTO}COMMENTS~
{GETLABEL "ENTER ROOT NAME FOR ASCII OUTPUTFILE : ",NEXT}
/RNDNEXT~{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}{DOWN}
THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)~{DOWN}{DOWN}
AND MAY NOT INCLUDE THE EXTENSION .~{DOWN}
{GETLABEL "ENTER ROOT NAME FOR THE KRIGED STATPAC OUTPUT FILE : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ENTER A "1" (one) FOR ORDINARY KRIGING OR ~{DOWN}{DOWN}
  A "2" (two) FOR UNIVERSAL KRIGING~{DOWN}{DOWN}
NORMALLY THIS ANSWER WILL BE 1~{DOWN}
{GETLABEL "ENTER A 1 FOR ORDINARY OR A 2 OR UNIVERSAL KRIGING : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ENTER THE PARAMETERS DETERMINED FROM PREVIOUSVARIOGRAM~{DOWN}{DOWN}
{GETLABEL "ENTER THE NUGGET VALUE FOR VARIOGRAM : ",NEXT}/RNDNEXT~
```

```
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
THE NUGGET IS CONSIDERED A VARIOGRAM FOR THIS PROGRAM.~{DOWN}{DOWN}
THE NUMBER OF "OTHER VARIOGRAMS" DOES NOT INCLUDE THE NUGGET.~{DOWN}
{GETNUMBER "ENTER THE NUMBER OF OTHER VARIOGRAMS (5 MAX) IN THE MODEL : ",NEXT}
{FOR NUM,1,NEXT,1,VAR1}
{GOTO}NEXT~{EDIT}{HOME}'~/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ENTER THE MAXIMUM DISTANCE FROM CENTROID FOR A HOLE TO BE ~{DOWN}{DOWN}
INCLUDED FOR KRIGING~{DOWN}
{GETLABEL "ENTER THE MAXIMUM HOLE DISTANCE FROM THE CENTROID : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE MAXIMUM NUMBER OF HOLES TO BE USED WITHIN NEIGHBORHOOD : ",NEXT}
/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE NUMBER OF NORTH-SOUTH POINTS : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE DISTANCE BETWEEN POINTS IN N-S DIRECTION : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE NUMBER OF EAST-WESTPOINTS : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE DISTANCE BETWEEN POINTS IN E-W DIRECTION : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER NORTHING OF SOUTHWEST CORNER OF GRID : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER EASTING OF SOUTHWEST CORNER OF GRID : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER COLUMN NUMBER OF THE NORTH COORDINATE : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER COLUMN NUMBER OF THE EAST COORDINATE : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER COLUMN NUMBER OF THE CONDUCTIVITY VALUE : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "IS THE ERROR MEASURE OPTION WANTED (Y or N) : ",NEXT}/RNDNEXT~
{KRIGE1}
```

```
{GETLABEL "DO YOU WISH TO PRODUCE MAP OF KRIGED DATA (Y or N) ; ",NUM}
{IF NUM="Y"}{BRANCH KRIGMAP}
{MENUBRANCH FUNCTION}
```

A371

```
/RNDNEXT~{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}{DOWN}
THE ROOT NAME MUST INCLUDE DIRECTORY (IF DIFFERENT THAN PROGRAM)~{DOWN}{DOWN}
AND MAY NOT INCLUDE THE EXTENSION .~{DOWN}
{GETLABEL "ENTER ROOT NAME FOR THE KRIGED STATPAC OUTPUT FILE : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ENTER A "1" (one) FOR ORDINARY KRIGING OR ~{DOWN}{DOWN}
  A "2" (two) FOR UNIVERSAL KRIGING~{DOWN}{DOWN}
NORMALLY THIS ANSWER WILL BE 1
{GETLABEL "ENTER A 1 FOR ORDINARY OR A 2 OR UNIVERSAL KRIGING : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ENTER THE PARAMETERS DETERMINED FROM PREVIOUSVARIOGRAM~{DOWN}{DOWN}
{GETLABEL "ENTER THE NUGGET VALUE FOR VARIOGRAM : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
THE NUGGET IS CONSIDERED A VARIOGRAM FOR THIS PROGRAM.~{DOWN}{DOWN}
THE NUMBER OF "OTHER VARIOGRAMS" DOES NOT INCLUDE THE NUGGET.~{DOWN}
{GETNUMBER "ENTER THE NUMBER OF OTHER VARIOGRAMS (5 MAX) IN THE MODEL : ",NEXT}
{FOR NUM,1,NEXT,1,VAR1}
{GOTO}NEXT~{EDIT}{HOME}'~/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
ENTER THE MAXIMUM DISTANCE FROM CENTROID FOR A HOLE TO BE ~{DOWN}{DOWN}
INCLUDED FOR KRIGING~{DOWN}
{GETLABEL "ENTER THE MAXIMUM HOLE DISTANCE FROM THE CENTROID : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE MAXIMUM NUMBER OF HOLES TO BE USED WITHIN NEIGHBORHOOD : ",NEXT}
/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE NUMBER OF NORTH-SOUTH POINTS : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE DISTANCE BETWEEN POINTS IN N-S DIRECTION : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{GETLABEL "ENTER THE NUMBER OF EAST-WESTPOINTS : ",NEXT}/RNDNEXT~
{GOTO}KRIGCTRL~{END}{DOWN}{DOWN}/RNCNEXT~~
```

```
{COM}
{GETLABEL "ENTER THE DISTANCE BETWEEN POINTS IN E-W DIRECTION : ",NEXT}/RNDNEXT ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
{GETLABEL "ENTER NORTHING OF SOUTHWEST CORNER OF GRID : ",NEXT}/RNDNEXT ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
{GETLABEL "ENTER EASTING OF SOUTHWEST CORNER OF GRID : ",NEXT}/RNDNEXT ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
{GETLABEL "ENTER COLUMN NUMBER OF THE NORTH COORDINATE : ",NEXT}/RNDNEXT ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
{GETLABEL "ENTER COLUMN NUMBER OF THE EAST COORDINATE : ",NEXT}/RNDNEXT ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
{GETLABEL "ENTER COLUMN NUMBER OF THE CONDUCTIVITY VALUE : ",NEXT}/RNDNEXT ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEXT ~ ~
{COM}
{GETLABEL "IS THE ERROR MEASURE OPTION WANTED (Y or N) : ",NEXT}/RNDNEXT ~
{KRIGE1}
{GETLABEL "DO YOU WISH TO PRODUCE MAP OF KRIGED DATA (Y or N) ; ",NUM}
{IF NUM="Y"}{BRANCH KRIGMAP}
{MENUBRANCH FUNCTION}
```

VAR1

```
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEX ~ ~
{COM}
ENTER THE PARAMETERS DETERMINED FROM PREVIOUSVARIOGRAM ~ {DOWN}{DOWN}
  TYPES OF VARIOGRAMS  -- ENTER NUMBER ONLY ~ {DOWN}{DOWN}
    1  - SPHERICAL ~ {DOWN}
    2  - EXPONENTIAL ~ {DOWN}
    3  - LINEAR ~ {DOWN}
    4  - GAUSSIAN ~ {DOWN}
    5  - CUBIC ~ {DOWN}
{GETLABEL "ENTER NUMBER (1 THRU 5) FOR VARIOGRAM TYPE : ",NEX}/RNDNEX ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEX ~ ~
{COM}
{GETLABEL "ENTER C-VALUE FROM VARIOGRAM : ",NEX}/RNDNEX ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEX ~ ~
{COM}
{GETLABEL "ENTER A-VALUE FROM VARIOGRAM : ",NEX}/RNDNEX ~
{GOTO}KRIGCTRL ~ {END}{DOWN}{DOWN}/RNCNEX ~ ~
{COM}
ENTER THE NUMBER 1 (one) FOR ISOTROPIC OR 2 (two) FOR ANISOTROPIC ~ {DOWN}{DOWN}
   VARIOGRAM ~ {DOWN}
```

```
{GETLABEL "IS VARIOGRAM ISOTROPIC (1) OR ANISOTROPIC (2) : ",NEX}/RNDNEX ~
{RETURN}
```

KRIGE1

```
{GOTO}KRIGCTRL ~ /RNCKRIGOUT ~ .{END}{DOWN}{RIGHT} ~
/PF{ESC}{ESC}
C:\ENVIR\STATPAK\KRIGCTRL.FIL
~ RRKRIGOUT ~ OMNOUQ
AGQ/RNDKRIGOUT ~
```
{FGRERASE}
```
{SYSTEM KRIGE.BAT}
{RETURN} ~
```

KRIGMAP

```
{SYSTEM KRIGMAP.BAT}
{RETURN}
```

FGRERASE

```
{COM}
{DOWN}{RIGHT}{RIGHT}{RIGHT}WARNING !! ~ {LEFT}{LEFT}{LEFT}{DOWN}{DOWN}{DOWN}
THE PROGRAM WILL AUTOMATICALLY ERASE ALL OLD KRIGE OUTPUT FILES ~ {DOWN}
UNLESS THE OPERATOR SAVES THEM MANUALLY TO ANOTHER DIRECTORY. ~ {DOWN}{DOWN}
{GETLABEL "DO YOU WANT TO SAVE YOUR EXISTING KRIGE OUTPUT FILES (Y or N) ",NUM}
```
{IF NUM="Y"}{FILSAV}
```
{COM}
{DOWN}
ANY REMAINING KRIGE OUTPUT FILES IN THE STATPAK SUBDIRECTORY ~ {DOWN}{DOWN}
{RIGHT}{RIGHT}WILL BE ERASED ! ~
{GETLABEL " DO YOU WANT TO CONTINUE (Y or N) ",NUM1}
```
{IF NUM1="N"}{FUNCTION}
```
{RETURN}
```

FILSAV

```
/S
```

\X

```
{COM}/RE.{BIGRIGHT}{BIGRIGHT}{END}{DOWN} ~
/RNR ~ /RNCCOMMENTS ~ .{PGDN}{up}{BIGRIGHT} ~
{PGDN}/RNCMAXVAL ~ ~
{RIGHT}/RNCHORZ ~ ~
{RIGHT}/RNCVERT ~ ~
{RIGHT}/RNCSAMP ~ ~
{DOWN}/RNCNUM1 ~ ~
```

```
{LEFT}/RNCNUM~~
{LEFT}/RNCNUMPTS~~
{LEFT}/RNCMINVAL~~
{COM}
     INPUT RAW DATA POINTS FROM STATPAC ~{DOWN}{DOWN}
MOVE CURSOR TO UPPER LEFT CORNER OF RANGE FOR TABLE OF STATPAC VALUES~{DOWN}
{DOWN}TO AVOID POTENTIAL RANGE OVERLAP (& LOSS OF DATA!)~{DOWN}{DOWN}
NO DATA SHOULD BE BELOW SELECTED RANGE -- PRESS ENTER TO CONTINUE~{DOWN}
{?}~
/RNCTAB~.{PGDN}{PGDN}{PGDN}{PGDN}{PGDN}{PGDN}~
{GETLABEL "HAS ASCII FILE OF RAW DATA ALREADY BEEN CREATED (Y or N)? ",SAMP}
{IF SAMP="Y"}{BRANCH A859}
{SYSTEM VDATA.BAT}
{GOTO}TAB~
/FIT{ESC}{ESC}C:\ENVIR\STATPAK\
TEST.DAT
~{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~
{FOR NUM1,1,(@COUNT(TAB)-4)/2,1,ERAS}
{GOTO}TAB~/RNDTAB~
{DOWN}{DOWN}{DOWN}{DOWN}/RNCTAB~~
/DPRF~I.{END}{DOWN}~O~G~
{GOTO}TAB~{END}{DOWN}/RE~
{GOTO}TAB~{UP}/RNCTABI~.{END}{DOWN}{RIGHT}~
{GOTO}TAB~{UP}{UP}~"X-COORD~{RIGHT}"Y-COORD~{RIGHT}"COND~
{GOTO}TAB~/RNDTAB~{UP}/RNCTAB~~
{GOTO}TAB~{END}{DOWN}{DOWN}{DOWN}{DOWN}
/RNCTABLE3~~
/FIT{ESC}{ESC}
C:\ENVIR\COVAR\
COVAR.DAT
~/DPRF~I.{END}{DOWN}~O~G~
{END}{DOWN}/RE~
{UP}{END}{UP}/DSRD.{RIGHT}{END}{DOWN}~P~A~S{RIGHT}~A~G
{GOTO}TABLE3~/RNDTABLE3~{UP}/RNCTABLE3~~
{GOTO}TAB~{UP}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCCRIT~.{RIGHT}{RIGHT}{DOWN}~
X-COOD~{RIGHT}Y-COOD~{RIGHT}COND~{LEFT}{LEFT}~
{DOWN}/RNCCRIT1~~
{DOWN}{DOWN}COND~/RNCOUTPUT~.{DOWN}~
{DOWN}/RNCOUTPUT1~~{GOTO}TAB~
{GOTO}TAB~/RNCTAB~.{END}{DOWN}~
{COVCON1}
{RISK}
```

A859

```
{GOTO}TAB~
/FIT{ESC}{ESC}C:\ENVIR\STATPAK\
```

```
TEST.DAT
~{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~
{FOR NUM1,1,(@COUNT(TAB)-4)/2,1,ERAS}
{GOTO}TAB~/RNDTAB~
{DOWN}{DOWN}{DOWN}{DOWN}/RNCTAB~~
/DPRF~I.{END}{DOWN}~O~G~
{GOTO}TAB~{END}{DOWN}/RE~
{GOTO}TAB~{UP}/RNCTABI~.{END}{DOWN}{RIGHT}~
{GOTO}TAB~{UP}{UP}~"X-COORD~{RIGHT}"Y-COORD~{RIGHT}"COND~
{GOTO}TAB~/RNDTAB~{UP}/RNCTAB~~
{GOTO}TAB~{END}{DOWN}{DOWN}{DOWN}{DOWN}
/RNCTABLE3~~
/FIT{ESC}{ESC}
C:\ENVIR\COVAR\COVAR.DAT~
/DPRF~I.{END}{DOWN}~O~G~
{END}{DOWN}/RE~
{UP}{END}{UP}/DSRD.{RIGHT}{END}{DOWN}~P~A~S{RIGHT}~A~G
{GOTO}TABLE3~/RNDTABLE3~{UP}/RNCTABLE3~~
{GOTO}TAB~{UP}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCCRIT~.{RIGHT}{RIGHT}{DOWN}~
X-COOD~{RIGHT}Y-COOD~{RIGHT}COND~{LEFT}{LEFT}~
{DOWN}/RNCCRIT1~~
{DOWN}{DOWN}COND~/RNCOUTPUT~.{DOWN}~
{DOWN}/RNCOUTPUT1~~{GOTO}TAB~
{GOTO}TAB~/RNCTAB~.{END}{DOWN}~
{COVCON1}
{RISK}
```

COVCON1

```
{GOTO}TABLE3~/RNCTABCON~.{END}{DOWN}~
{FOR HORZ,1,@COUNT(TABCON),1,MULT1}
{GOTO}TABLE3~{RIGHT}~
{FOR HORZ,1,@COUNT(TABCON),1,MULT1}
{GOTO}TABLE3~
/RV.{END}{DOWN}{RIGHT}~~
/RNDTABCON~
```

RISK

```
{COM}
CONDITIONAL SIMULATION REQUIRES MULTIPLE ITERATIONS OF THE MODELS~{DOWN}{DOWN}
THIS PROCESS ASSUMES THAT THE INITIAL SAMPLE DATA HAS BEEN ANALYZED~{DOWN}{DOWN}
AND SATISFACTORLY KRIGED.  IT FURTHER ASSUMES THAT COVAR HAS BEEN RUN~{DOWN}{DOWN}
AND THE REQUIRED NUMBER OF COVAR REALIZATIONS SUCESSFULLY COMPLETED.~{DOWN}{DOWN}
  IF ANY OF THESE CONDITIONS HAVE NOT BEEN MET --~{DOWN}{DOWN}
QUIT CONDITIONAL SIMULATION NOW (SELECTN) TO RETURN TO FUNCTION MENU~{DOWN}
{GETLABEL "DO YOU WISH TO CONTINUE WITH CONDITIONAL SIMULATION (Y OR N)? ",NUM}
```

```
{IF NUM="N"}{MENUBRANCH FUNCTION}
{COM}
THE NUMBER OF ITERATIONS MUST BE =< NUMBER OF COVAR REALIZATIONS ~ {DOWN}
{GETNUMBER "ENTER THE NUMBER OF ITERATIONS FOR THE MODEL ",NUM}
{SYSTEM NEWNAME.BAT}
{MOCVAL}
{INITOUT}
{HEADER}
{OUTPUT}
{FOR SAMP,1,NUM,1,ITER}
```

MOCVAL

```
{COM}
SOME PROGRAMS WILL NOT RUN PROPERLY IF THE TRANSMISSIVITY VALUES IN THE ARRAY ~
{DOWN}
      HAVE TOO LARGE OF A RANGE. ~ {DOWN}{DOWN}
THE RANGE OF VALUES FOR VARIOUS CONSOLIDATED AND UNCONSOLIDATED STRATA ~
{DOWN}
IS AVAILABLE IN THE PROGRAM DOCUMENTATION AND VARIOUS OTHER SOURCES ~ {DOWN}{DOWN}{DOWN}
THE DOCUMENTED VALUES WILL HAVE TO BE MODIFIED BY THE APPROPRIATE ~ {DOWN}
   MULTIPLIER TO DERIVE THE CORRECT RANGE OF ARRAY VALUES ~ {DOWN}
 ie : IF .00001> K >.000000001 & THE ARRAY MULTIPIER IS .00000001 ~ {DOWN}
    THE DESIRED MAXIMUM VALUE WILL BE 1000 -- ~ {DOWN}
    (WHICH MUST BE CHANGED TO 999 TO KEEP WITHIN THE 4 COLUMN FIELD) ~ {DOWN}
               AND ~ {DOWN}
    THE DESIRED MINIMUM VALUE WILL BE .1 ~ {DOWN}{DOWN}{DOWN}
NOTE: IT MAY BE NECESSARY TO DETERMINE THESE VALUES BY TRIAL AND ERROR ~
{GETNUMBER "ENTER MAXIMUM ALLOWABLE HYDRAULIC CONDUCTIVITY",MAXVAL} ~
{GETNUMBER "ENTER MINIMUM HYDRAULIC CONDUCTIVITY",MINVAL} ~
```

INITOUT

```
{GOTO}TABLE3 ~ {END}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN} ~
/RNCINIT ~ ~/FIT{ESC}{ESC}
C:\ENVIR\STATPAK\
INIT.FGR
~ {PGDN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}
/DPRF ~ I.{END}{DOWN} ~O ~ G
/RNDINIT ~ /RNCINIT ~ ~ {END}{DOWN}/RE ~
```

HEADER

```
{GOTO}INIT ~ {PGDN}{PGDN}{END}{DOWN}{DOWN}{DOWN}{DOWN}
/RNCTABLE1 ~ ~ {GOTO}TAB ~ /RNCTABX ~ .{END}{DOWN} ~
{LET TABLE1,TEST:S}
{GOTO}TABLE1 ~ {DOWN}/RNCNEXT ~ ~
```

```
{COM}
{LET NEXT,N:S}/RNDNEXT~
{GOTO}TABLE1~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{LET NEXT,N:S}/RNDNEXT~
{GOTO}TABLE1~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{LET NEXT,@COUNT(TABX):V}{GOTO}NEXT~{EDIT}{HOME}'~/RNDNEXT~
{GOTO}TABLE1~{END}{DOWN}{DOWN}/RNCNEXT~~
{COM}
{LET NEXT,3}{GOTO}NEXT~{EDIT}{HOME}'~/RNDNEXT~
{GOTO}TABLE1~{END}{DOWN}{DOWN}/RNCNEXT~~
{LET NEXT,X-COORD:S}/RNDNEXT~
{GOTO}TABLE1~{END}{DOWN}{DOWN}/RNCNEXT~~
{LET NEXT,Y-COORD:S}/RNDNEXT~
{GOTO}TABLE1~{END}{DOWN}{DOWN}/RNCNEXT~~
{LET NEXT,COND:S}/RNDNEXT~
{GOTO}TABLE1~/RNCTABLE~.{END}{DOWN}{RIGHT}{RIGHT}{RIGHT}~
{GOTO}TABLE1~{END}{DOWN}{DOWN}
'SAMPLE'
~{RIGHT}/RNCSMPL1~~{RIGHT}{RIGHT}/RNCSMPL~~
{FOR NUM1,1,@COUNT(TABX)-1,1,SAMPLE}
/CTABI~SMPL1~/RNDSMPL1~/RNDTABI~
{GOTO}TABLE1~{PGDN}{PGDN}{PGDN}/RNCOUT~~
{DOWN}{DOWN}/RNCREADTAB~~READTAB~
{GOTO}J1~
 REALIZATION NUMBER    1~
{RETURN}
```

SAMPLE

```
{GOTO}TABLE1~{END}{DOWN}{DOWN}"SAMPLE'~
```

ITER

```
{NEWDAT}
{FILI}
{SYSTEM TER1.BAT}
{SYSTEM PREP.BAT}
{SYSTEM KRIGE.BAT}
{KRIGOUT}
```

NEWDAT

```
{COVOUT}
{GOTO}TAB~{RIGHT}{RIGHT}{RIGHT}/RNCNEWD~.{END}{DOWN}~
/CNEWD~SMPL~
/RNDNEWD~
{GOTO}TABLE1~/RNCTAB30~.{END}{DOWN}{RIGHT}{RIGHT}{RIGHT}~
```

FILI

/PF{ESC}{ESC}
C:\ENVIR\STATPAK\
TESTQ.FIL
~RRTAB3O~OMNOUQ
AGQ/RNDTAB3O~

COVOUT

{OPEN "C:\ENVIR\COVAR\COVAR.OUT",R}
{GOTO}READTAB~/RNDREADTAB~/RNCREADTAB~~
{BRANCH READ}
{STAT1}
{DATBAK}

READ

{READLN OUT}
{IF OUT=J1}{BRANCH RITE}
{READ}

RITE

{FOR NUMPTS,1,20,1,RITE1}
{FOR NUMPTS,1,3,1,RITE2}
{CLOSE}
{BRANCH A584}

RITE1

{READLN OUT}
{APPENDBELOW READTAB,OUT}

RITE2

{READLN OUT}
/COUT~J1~
/REOUT~

A584

{STAT1}
{DATBAK}

STAT1

```
{GOTO}READTAB~{DOWN}~
/DPRFCI.{END}{DOWN}~O~G~
{END}{DOWN}/RE~
```
{STATDAT}

STATDAT

```
{GOTO}TABLE3~{END}{RIGHT}{RIGHT}~
/RNCTABO~~
{GOTO}READTAB~{DOWN}
/M.{END}{DOWN}~TABO~
```
{FOR HORZ,2,20,1,STATDAT1}

STATDAT1

```
{GOTO}TABLE3~{END}{RIGHT}
{END}{DOWN}{DOWN}/RNCTABO~~
{GOTO}READTAB~{DOWN}~
```
{FOR VERT,2,HORZ,1,STEP}

```
/M.{END}{DOWN}~TABO~
```

STEP

```
{RIGHT}
```

DATBAK

```
{GOTO}TABLE3~{UP}
X-COOD~{RIGHT}Y-COOD~{RIGHT}COND~{LEFT}{LEFT}~
/RNCINPUT~.{END}{DOWN}{RIGHT}{RIGHT}~
{GOTO}TAB~{UP}
X-COOD~{RIGHT}Y-COOD~{RIGHT}{RIGHT}COND~
{GOTO}TAB~
```
{FOR NUM,1,@COUNT(TAB),1,EXT}

EXT

```
/RNCONEOUT~.{RIGHT}~{RIGHT}{RIGHT}{RIGHT}/RNCTWOOUT~~
/CONEOUT~CRIT1~
/DQIINPUT~OOUTPUT~CCRIT~EQ~
/COUTPUT1~TWOOUT~
{GOTO}ONEOUT~/RNDONEOUT~/RNDTWOOUT~
{DOWN}
```

KRIGOUT

```
{GOTO}READTAB~{PGDN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~
```

```
/RNCKRIGO~ ~/FIT{ESC}{ESC}
C:\ENVIR\STATPAK\
TEST.FGR
~{PGDN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}
/DPRF~I.{END}{DOWN}~O~G
/RNCKRIGC~ ~{END}{DOWN}/WDR~
{IF SAMP=1}{KRIGI}
{GOTO}KRIGC~{RIGHT}{RIGHT}{RIGHT}{RIGHT}
/C.{END}{DOWN}~CONDIT1~
{GOTO}KRIGO~/RE.{PGDN}{PGDN}{END}{DOWN}{END}{RIGHT}~/RNDKRIGO~/RNDKRIGC~
{GOTO}TABLE3~{RIGHT}{RIGHT}/RNCCOVAR1~.{END}{DOWN}~
/CCOVAR1~CONDIT2~
{GOTO}CONDIT2~{RIGHT}@ROUND(+{LEFT}{LEFT}{LEFT}+{LEFT}-{LEFT}{LEFT},0)~
/C~{LEFT}{DOWN}.{END}{DOWN}{RIGHT}.{RIGHT}~
/RECOVAR1~/RNDCOVAR1~
{INITIN}
{ROUND}
{GOTO}CO~/RNCKRIGOUT~.{END}{DOWN}{END}{RIGHT}~
/RNDCO~
```

KRIGI

```
{GOTO}KRIGO~{PGDN}{PGDN}{END}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~
/RNCCONDIT~ ~{UP}{UP}"X-COORD~{RIGHT}"Y-COORD~{RIGHT}
"INIT VAL~{RIGHT}"KRIGE VAL~{RIGHT}"COV VAL~{RIGHT}"CONDIT VALUE~
{GOTO}INIT~{RIGHT}{RIGHT}
/C.{END}{DOWN}{RIGHT}{RIGHT}~CONDIT~
{GOTO}CONDIT~{END}{RIGHT}{RIGHT}/RNCCONDIT1~ ~{RIGHT}/RNCCONDIT2~ ~
```

INITIN

```
{GOTO}CONDIT~
/RNCCO~.{END}{DOWN}~
{GOTO}TAB~{UP}~
/RNCINP1~.{END}{DOWN}{RIGHT}{RIGHT}~
/RFF0~INP1~
{GOTO}CO~
{FOR NUM1,1,@COUNT(CO),1,EXT1}
/RNDINP1~
```

EXT1

```
/RNCONEOUT~.{RIGHT}~{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}/RNCTWOOUT~ ~
/CONEOUT~CRIT1~
/DQIINP1~OOUTPUT~CCRIT~EQ~
{IF OUTPUT1>0}/COUTPUT1~TWOOUT~
{GOTO}ONEOUT~/RNDONEOUT~/RNDTWOOUT~
{DOWN}
```

ROUND

```
{GOTO}CONDIT2~{RIGHT}{RIGHT}@IF(+{LEFT}<$MAXVAL,MAXVAL,
@IF(+{LEFT}<$MINVAL,$MINVAL,@IF(+{LEFT}>100,@ROUND(+{LEFT},0),
@IF(+{LEFT}<10,@ROUND(+{LEFT},0),@ROUND(+{LEFT},0))))) ~
/C~{LEFT}{DOWN}.{END}{DOWN}{RIGHT}.{RIGHT}~
```

VITA

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Candidate for the Degree of

Master of Science

Thesis: THE USE OF SPREADSHEET PLATFORMS TO DEVELOP STOCHASTIC ENVIRONMENTAL SIMULATORS

Major Field: Environmental Engineering

Biographical:

Personal Data: Born in Aberdeen, South Dakota, August 11, 1949, the son of the late Larry J. Lockwood and Jeanne Lockwood. Married to Kathleen Ann Lockwood.

Education: Graduated from Central High School, Aberdeen, South Dakota, in May 1967; received Bachelor of Science Degree in Geological Engineering from South Dakota School of Mines and Technology in January, 1972; Completed requirements for the Master of Science Degree at Oklahoma State University in May, 1995.

Professional Experience: Geophysical Engineer for Geophysical Services Inc. from 1972 to 1974; Production Engineer for El Paso Natural Gas Co. from 1974 to 1981; Drilling and Completion Engineer for Dyco Petroleum from 1981 to 1991; President of Lockwood Energy Limited from 1991 to 1992; Operations Engineer/Manager for Roseland Oil and Gas, Inc. from 1992 to 1994; Project Manager for Sound Environmental, Inc. from February to November, 1994; Independent Consulting from 1994 to present.