A Research Report for Westinghouse Hanford Company

Solid Waste Projection Model: Database User's Guide (Version 1.0)

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January 1991

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EXECUTIVE SUMMARY

The Solid Waste Projection Model (SWPM) system is an analytical tool developed by Pacific Northwest Laboratory (PNL) for Westinghouse Hanford Company (WHC) specifically to address Hanford solid waste management issues.

This document is one of a set of documents supporting the SWPM system and providing instructions in the use and maintenance of SWPM components. This manual contains instructions for preparing to use Version 1 of the SWPM database, for entering and maintaining data, and for performing routine database functions. This document supports only those operations which are specific to SWPM database menus and functions, and does not provide instructions in the use of Paradox, the database management system in which the SWPM database is established.

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SOLID WASTE PROJECTION MODEL: DATABASE USER'S GUIDE

1.0 INTRODUCTION

Waste management is becoming an ever more important topic. Management of current and future solid wastes will require the development of appropriate treatment, storage, and disposal (TSD)^(a) facilities and operations to match the characteristics of the wastes. Inadequate provision of these TSD facilities and operations will surely incur costs in the form of agency fines or excessive handling fees, and may even result in the need to curtail operations. On the other hand, overdevelopment could needlessly commit productive resources and precious capital.

The Solid Waste Projection Model (SWPM) system is an analysis tool developed by Pacific Northwest Laboratory (PNL) for Westinghouse Hanford Company (WHC) specifically to address these issues at the Hanford Central Waste Complex (HCWC). SWPM provides the ability to:

- develop detailed projections of the volumes of wastes to be managed and the characteristics of these wastes
- characterize and evaluate the impact of alternative TSD technologies or operating strategies on facilities and operations
- assess the impact upon TSD cost and capacity requirements when waste volumes or waste characteristics vary
- track actual versus projected quantities of wastes, evaluating waste volume-reduction activities.

This document contains a description of the SWPM system, an explanation of the data needed to run the SWPM system, and instructions for the operation of the Version 1 SWPM Database which contains this data. These instructions address the following activities:

- preparing to use the database
- entering and maintaining data
- using standard SWPM database functions.

This document is part of an integrated set of SWPM system documentation. Five additional documents provide overview information about the SWPM system and detailed instructions in the use, maintenance, and application of the other components of the SWPM system. These documents are as follows:

(a) The terms "treatment," "storage," and "disposal," as used here, do not necessarily correspond to the same terms used under the Resource Conservation and Recovery Act (RCRA). For example, storage, as defined by the model, could correspond to normal process holdup under RCRA.

<u>Title</u>	<u>Description</u>	<u>Primary Audience</u>
System Overview	Overview of the SWPM system and potential applications	Study Managers
Database Technical Reference Manual	Development and maintenance reference manual for database software and utilities	Database Specialist
Model User's Guide	User's instructions for model operation and execution	Analyst
Model Technical Reference Manual	Development and maintenance reference manual for model software and applications	Software Engineer
System Administration Manual	Instruction for long-term system administration, maintenance and configuration management	System Administrator

2.0 SYSTEM DESCRIPTION

This chapter provides the user with a basic understanding of the solid waste management system being modeled, its representation in the SWPM system, the configuration of the individual SWPM system components, and the data required to support the model.

2.1 THE SYSTEM BEING MODELED

A generic representation of the solid waste management system modeled by SWPM is shown in Figure 2.1. Solid wastes of a given type or class are received from a number of facilities and are distributed to various operations. Operations are defined as either treatments or disposals and are linked to other operations to represent a given waste management scheme. At each treatment operation, waste volumes are adjusted or modified to reflect changes in volume and are redistributed to subsequent operations until a final destination is reached (disposal). Because all operations have fixed capacity constraints, each operation has an associated storage option to track any waste distributed to the operation in excess of that capacity. All wastes eventually reach a final disposal operation.

Separate, parallel waste management schemes are defined for each type or class of waste being accepted and processed. Wastes converted from one type or class to another as a result of an operation are then transferred between parallel systems during the subsequent distribution of wastes exiting operations.

2.2 THE SOLID WASTE PROJECTION MODEL (SWPM) SYSTEM

The SWPM system, shown in Figure 2.2, uses a data-driven logistics model to provide detailed analyses of the generic system described above. The main module of SWPM is written in a modeling language developed by PNL. SWPM operates on an 80386 desktop computer in an OS/2 environment and requires a minimum of 8 megabytes of RAM.

Figure 2.1. The Solid Waste Management System

Figure 2.2. The SWPM System

SWPM is supported by a database, which is used to store and maintain waste volume and characteristics projections, as well as the characterizations of the TSD operations and facilities. This information is passed from the database into a specially formatted electronic file. This file, called the Reference Data Library (RDL), is loaded into SWPM's operating environment.

The SWPM database operates using the Paradox database management system. Information is entered into the database through custom formatted data entry forms. These electronic forms reflect the hardcopy material on which data are initially presented. Operation of the SWPM database requires a PC-LAN connection and two megabytes of RAM.

The key to operating SWPM is the graphical user interface, which accesses the RDL and guides the user through the selection of case-specific data sets, providing a complete and reproducible analysis case. Once this case has been specified, a SWPM run may be initiated from the user interface. Any changes or additions made to the RDL in the process of specifying a case are saved in a uniquely identified file called an Incremental Data Library (IDL).

The graphical user interface also prompts the user to select from among several standard output tables. These tables, generated after a model run has finished, provide standard reports for model results. Reports may also be generated for previous cases.

2.3 DATA REQUIRED TO SUPPORT THE MODEL

The various types of data required to support operation of the projection model are shown schematically in Figure 2.3. These data are supplied by two sources:

- The waste receipts data come from solid waste forecasts provided annually by the facilities generating solid wastes and from inventory data for stored Hanford wastes.

Figure 2.3. Input Data Required for Solid Waste Projection Modeling

- The information utilized to represent the treatment, storage, and disposal operations is based on historical information obtained from the R-SWIMS database,^(a) waste generator forecast information, and current design information for the HCWC.

Distribution of incoming waste receipts and of wastes exiting operations is handled by the flow percentages shown in Figure 2.3. These percentages are used to allocate incoming waste volumes to initial operations and to distribute wastes from one operation to the next operation(s). The percentages are based upon waste properties (physical, chemical, radiological, etc.) that define "treatability" and the operating strategy defined for a case.

^(a) Maintained by WHC; not part of the SWPM system developed by PNL.

3.0 PREPARING TO USE THE SWPM DATABASE

The SWPM database has been specifically designed and structured for application to analyses of WHC's waste management system. Version 1, documented here, reflects development efforts completed through fiscal year 1989, and accompanies Version 1 of the model.

The database has been implemented by PNL using the Paradox database management system, a standard software package available from Borland International. While the database utilizes a commercially available database package, the implemented design is specific to the SWPM application. This is accomplished by defining and structuring data tables to store and maintain system data, and by developing custom data entry screens. These screens correspond to the format and content of the standard data definition worksheets developed by WHC analysts, and to the forecast request packets returned by waste generating facilities each year. Development of these custom screens provides data entry "forms" which facilitate accurate data entry.

This chapter explains how to enter the SWPM database and how to begin typical database operations. Section 3.1 provides some general warnings for the user; Section 3.2 addresses the installation of the database system; and Section 3.3 explains how to start the system.

Because the SWPM database utilizes many, but not all, of the standard Paradox function keys, Table 3.1 is included to list the primary Paradox function keys used in operating the SWPM database. However, **this document generally assumes that the user has a fundamental understanding of data entry and database manipulation using Paradox, and is intended to guide the user through the SWPM database application only.** Users who are not familiar with databases, or who require instruction in the use of Paradox menus and forms, should refer to the documentation supplied with the Paradox software.

3.1 WARNINGS

Information is stored in the SWPM database for waste, forecasts, waste characteristics, and TSD data. Due to the complex relationships among these types of data, the following warnings must be heeded:

1. Before attempting to enter forecast or TSD data, all information must be carefully reviewed, organized, and tagged with WG abbreviation and ID codes, forecast ID codes, and scenario ID codes. **Once data have been entered, changes to WG names and SWPM data are very difficult to make without disturbing the syntax required by the model.** Careful organization and planning prior to data entry are paramount.
2. Do not change the name of a waste generator or forecast once it has been established. Instead, create a new waste generator and type in the data for it as if it were new. It is important to develop waste generator names and abbreviations and to ensure that they have been entered correctly before forecast data entry begins.
3. Enter data only through the menu- and forms-driven database screens. Do not try to enter data into the database tables from the Paradox workspace.

Table 3.1. Paradox Function Keys Used in Operating the SWPM Database

<u>Function</u>	<u>Key(s)</u>
Copy value from previous record	[Ctrl-D]
Copy value from previous field	[Ctrl-C]
Edit mode (from display mode)	[F9]
Erase current field	[Ctrl-Backsp]
Exit form, save modifications	[F2]
Exit form, undo modifications	[Esc]
Delete record	[Del]
Field view	[Alt-F5]
Help, Field Value Lookup	[F1]
Insert Record	[Ins]
Move to first field of record	[Ctrl-Left Arrow]
Move to first record in table	[Home]
Move to last field of record	[Ctrl-Right Arrow]
Move to last record in table	[End]
Move to next Field	[Tab]
Move to next image	[F4]
Move to next record (table view)	[Down Arrow]
Move to next record (form view)	[Pg Down]
Move to previous field	[Shift-Tab]
Move to previous image	[F3]
Move to previous record (table view)	[Up Arrow]
Move to previous record (form view)	[Pg Up]
Find first occurrence of a value	[Ctrl-Z]
Find next occurrence of a value	[Alt-Z]
Undo last change	[Ctrl-U]

3.2 INSTALLATION

PNL staff have developed and installed Release 1 of the SWPM database software. There are no generalized installation procedures for subsequent installation. Do not try to copy the software to different directories or rename the directories that contain the SWPM database because Paradox "hard codes" many file locations. Installation on another machine will work if only an identical directory structure is used and should only be attempted after consulting with PNL database analysts.

3.3 GETTING STARTED

The computing machinery on which SWPM is installed allows the user to select either the OS/2 operating system or MS-DOS. The SWPM database is operated under MS-DOS Version 3.3 or higher, while Version 1.0 of the model operates under the OS/2 standard operating system, Version 1.1. To prepare to use the database, turn on the computer and select the MS-DOS operating system (rather than OS/2).

To start the database from the DOS prompt, get into the "SWPMDB" directory on the "J:" drive, type "start DB," and press [Enter]. The SWPM main menu appears on the top two lines of the screen; the top line contains the available options, and the bottom line contains a description of the highlighted option which changes as different options are highlighted. To perform an activity, highlight the corresponding option on the menu and press [Enter]. Each Main Menu option supports specific functions such as data entry, data maintenance, data definition, or data reporting.

Selecting the "WG_Data" option from the Main Menu allows the user to define waste generators and enter waste forecast information for those generators. The various data tables which comprise a waste generator forecast are discussed in detail in Chapter 4.

Selecting the "TSD_Data" option from the Main Menu allows the user to define TSD operations and enter the data which represent a waste management system. The various data tables which comprise a waste management system description are discussed in detail in Chapter 5.

The "Codes" and "MVD" options allow the user to enter the tables which define various system parameters. The "Codes" option provides access to the tables which define the coded names used in the rows and columns of the data tables used under the "WG_Data" and "TSD_Data" options. The user may define, view and edit model variable and subscript names in the model variable dictionary, which is accessed through the "MVD" option. These tables are discussed in further detail in Chapter 6.

The user may execute the programs which generate the RDL and the forecast data summary report (FDSR) using the Main Menu options "RDL" and "FDSR." These options are also addressed in Chapter 5.

The "Leave" option moves the user from any menu to a previous, higher-level, menu. This option exists at every menu and sub-menu level, and returns the user to the DOS system prompt when chosen at the Main Menu. See Table 3.1 for the commands used to return to a menu from a data table.

4.0 ENTERING AND MAINTAINING FORECAST DATA

This chapter describes the process of entering the annual waste generator forecasts, provided via hardcopy forms, into the SWPM database. These procedures are also followed when modifying existing forecast data.

Forecast information is entered into the SWPM database through several formatted screens, called data entry forms, which reflect the structure of the hardcopy forms. These electronic data entry forms are accessed from the SWPM database's Main Menu by selecting the "WG_Data" option. Selection of this option takes the user to a sub-menu which lists the various data entry forms available.

Each waste volume forecast is associated with a unique waste generator and these waste generators must be identified and labeled before any volume projections can be entered. The "WG_Attrib" option (discussed in Section 4.1) allows the user to enter waste generator names into the database and to define some attributes of the waste generator such as a description or a location.

The user may begin entering information from the accompanying hardcopy forecast, once a waste generator has been defined, by selecting the "WG_Fore" option, addressed in Section 4.2. After completing entry of the forecast data, numerous data consistency checks may be performed automatically using the "Data_Cks" option, which is covered in Section 4.3.

4.1 DEFINING WASTE GENERATORS

Before a forecast may be entered into the SWPM database, the waste generating facility associated with the forecast must be uniquely identified and defined in the database. Select the "WG_Attrib" option from the "WG_Data" menu to view the form for entry of waste generator descriptions.

The first step in defining a waste generator is to assign it a name, beginning with a 12-character abbreviated name, which is entered into the first column of the form. A longer, more descriptive, name may be entered into the second column for clarity or further definition, but only the abbreviated name will be passed to the model due to memory constraints.

The WGC_Order column allows the user to assign the waste generator to a specific group of associated facilities, such as "Off Site" waste generators. Pressing [F1] while in the WGC_Order column displays a table of allowable codes that may be used. When a code is entered, the next column, the WGC field, is automatically filled. The last column, the WG_Entry_date field, is filled with the current date by pressing [Enter].

After entries are complete, a report of the contents of the waste generator table may be obtained by pressing [Alt-P], and the user may save any added records or changes, and return to the WG_Data menu, using [F2].

4.2 EDITING FORECASTS

Waste generator forecasts consist of 16 data tables labeled I, II, IIIa-f, and IVa-h. Forecasts are received from waste generators, verified, labeled with the correct waste generator abbreviation from the waste generator attributes file, and labeled with a forecast identification. The forecast data are then entered into database files through a series of data entry. The following steps are required to select and enter forecast attributes:

To begin entering forecast data, select "Fore_Attrib" from the Waste Generator Forecasts menu. The data entry form for forecast attributes appears. The top portion of the form consists of the forecast identification table, and the bottom part consists of the 16 data tables.

To enter a new forecast:

- Press [Insert] to open a new record or go to the bottom of the form.
- Move the cursor to the WG_PROC_ABBREV field and type in the name of the waste generator, or use [F1] to look up the names of waste generators.
- Enter the forecast name, entry date, and a description or notes for the forecast. (Pressing [Enter] enters the current date automatically.)

To modify an existing forecast for a waste generator:

- Move the cursor to the WG_PROC_ABBREV field and press [Ctrl-Z] to bring up the "Value" prompt at the top of the screen.
- Enter the name of the waste generator (use the wildcard "." if necessary) and press [Enter]. If the waste generator forecast exists, it will be brought to the screen; otherwise, a message will appear at the bottom of the screen indicating that the record is not found. DO NOT CHANGE the WG_PROC_ABBREV or FORE_REF information once it is entered.

Once the data form is opened, the user may enter forecast identification information. This includes the IDs of variables provided in the forecast, their version number, start date, end date, units of measurement, and a description.

Once this information has been entered, press [F4] to move from the Enter Forecast Information form to the Variables For Forecast form. If this is a new forecast, the records for all 16 variables may be created by selecting the default option, [Alt-D]. The system works for a while, then returns to the variable table. The variable ID and version numbers are filled in automatically.

If an additional version of a variable needs to be added (for example, if the projections for years 2010-2020 are different from the first 10 years), then i) press [Insert] to create a new record, and ii) use [F1] to look up and fill the Var_ID field. The variable version field is computed automatically.

Currently there is no way to delete a variable. Deleting a variable must be handled by the database developer (see Chapter 7).

The 16 data tables have different formats, and detailed information about entering data into these tables is provided in Sections 4.2.1 through 4.2.3. However, the method for opening each data entry form is the same for all tables.

- Press [F4] to move from the Enter Forecast Information part of the form to Variables For Forecast.
- Select the variable for processing. Place the cursor on the record corresponding to the variable and press [Alt-E]. The appropriate data entry screen will appear.
- Enter the data for the variable, as explained in Sections 4.2.1 through 4.2.3.
- Return to the Variable For Forecast form by pressing [F2].
- Return to the Enter Forecast Information form by pressing [F3].

4.2.1 Entering Values For Variable I: Waste Volume By Year, Waste Category

Variable I provides the volume of waste by year and waste category. The years range from 1990 to 2020, with an extra column for the waste held prior to 1990. Paradox does not support horizontal scrolling in multi-table forms, and there is too much data to fit on one form. Therefore, date ranges are used to select the portions of Variable I to process. The user must select the date range to be processed, enter volumes for each year in that range, then select the next range to be filled.

Entering the data values from the paper forms into the database uses basic Paradox forms editing. Use the cursor control keys to position the cursor in the cell in the proper year column and waste category row, then type in the value. Press [Enter], or use the cursor control keys to move to the next cell. The "copy value from previous record" [Ctrl-D] and "copy value from previous cell" [Ctrl-C] functions may reduce the amount of typing required. When all of the values for a range of dates have been entered, save the information and return to the menu of date ranges by pressing [F2]. Remember, volumes must be expressed in cubic feet.

To return to the Variables For Forecast form, select "Leave" from the menu of date ranges. The cursor is returned to the Variables For Forecast form, and values for other variables may be entered.

4.2.2 Entering Values For Variables II, IIIa, IIIc, IIId, IIIf, IVa, IVc, IVd, IVf, IVg, and IVh

Entering the values for these variables follows the same procedure as for Variable I. Use the cursor control keys to position the cursor in the cell on the database form that corresponds to the block on the paper form. Type in the value shown on the paper form. Press [Enter], or use the cursor control keys to move to the next cell. The "copy value from previous record" [Ctrl-D] and "copy value from previous cell" [Ctrl-C] functions may reduce the amount of typing required. When all of the values for this variable have been entered, pressing [F2] saves the information and returns to the Variables For Forecast form.

4.2.3 Entering Values For Variables IIIB, IIIE, IVb, and IVE

Variables IIIB, IIIE, IVb, and IVE provide estimated percentages of the waste in nonstandard packaging by physical content and waste class. The same data entry form is used for all four variables.

The data entry form for nonstandard packaging is implemented differently from the other variable data entry forms. The differences were necessary to handle data that are not reflected on the paper form. For example, if nonstandard packaging is used on waste of a given physical content in multiple waste classes (categories), no line is provided on the paper form for recording of the multiple waste classes for a single content descriptor.

After selecting variable IIIB, IIIE, IVb, or IVE to edit, the Subscript Data Entry Form for the selected variable of the current waste generator/forecast is displayed.

Entering the data values from the paper forms into the database uses basic Paradox forms editing functions. However, this form requires that the values for content descriptor and waste class be provided explicitly, rather than being pre-defined by the form.

To enter the content descriptor, the cursor is positioned in the first record. If no data have been entered yet, the record is blank. To enter a content descriptor in the field, type in the name or use the "Help" function to display a list of content descriptors. (Press [F1] while the cursor is in the content descriptor field. Select a content descriptor from the list by using the cursor control keys to place the cursor on the descriptor and pressing [F2]. The subscript data entry form reappears, and the name of the selected content descriptor is placed in the field automatically.) Enter the percentage in the next field.

The waste class is entered by following the same procedure for the help/lookup. Make sure the cursor is in the waste class field before pressing [F1]. Enter an explanation to accompany the value. If there are additional records to enter, pressing [Insert] creates a new record.

These steps are repeated for each variable. After all data for the variable are entered, press [F2] to return to the Variables For Forecast form.

5.0 MAINTAINING TREATMENT, STORAGE, AND DISPOSAL DATA

This chapter describes the process of entering the data which describes the solid waste management system. These procedures are also followed when modifying existing forecast data.

The data defining the Solid Waste Management System and its operations is entered into the SWPM database through several formatted screens, called data entry forms. These electronic data entry forms are accessed from the SWPM database's Main Menu by selecting the "TSD_Data" option. Selection of this option takes the user to a sub-menu which lists the various data entry forms available.

The first step in entering TSD data is to define all operations. This is accomplished using the Operations Table, discussed in Section 5.1. After the operations have been defined, the annual capacity of each operation is set in the Operations Capacity Table, addressed in Section 5.2. The flow of waste between operations is defined in the Operations Flow Table, detailed in Section 5.3, and the distribution of wastes from waste generators to first treatments are set in the Distribution Fractions Table, discussed in Section 5.4.

There are four TSD data tables in the database: OPER, DIST_F, OPERFLOW, and OPERCAP.

The OPER table drives the other TSD data tables. It contains the operation attributes: Operation Type Abbreviation, Waste Class, Operation Type Name, Treatment/Disposal Flag, Operation Cost, Treatment Ratio, Storage Cost, and Operation Reference ID.

The DIST_F table contains distribution functions. The data input to this table includes the Waste Generator Abbreviation, Waste Class, Operation Type Abbreviation, Distribution Fraction, and Distribution Reference.

The OPERFLOW table describes the flow of waste from one process to another. The attributes in this table include Operation Type Abbreviation, Waste Class, Next Operation Type Abbreviation, Next Waste Class, Flow Fraction, and Flow Reference.

The operation capacities are described in the OPERCAP table. Attributes include Operation Type Abbreviation, Waste Class, Year, Capacity, and Capacity Reference.

To enter data in these tables, select the "TSD_Data" option from the Main Menu. The Maintain Non Forecast (T/S/D) Data menu will appear, containing the following options: Oper, Dist_F, OperCap, OperFlow, Reports, and Leave. Select the option corresponding to the TSD data table to be edited.

5.1 THE OPERATIONS TABLE

Enter data into the data entry form for the Operations Table, as follows:

- Type in the Operation Type Abbreviation (OATYPE_ABBREV). This is assigned by the data developers.
- Either type in or use the help/lookup ([F1]) facility to enter the name of the waste class for which this operation is used. If the same operation is used on multiple waste classes, enter a record for each operation and waste class occurrence.

- Type in the Operation Type Name (OPTYPE_NAME). This is assigned by the data developers.
- In the Treatment/Disposal Flag (TRT_DISP) field, enter a T if the operation is a treatment, D if the operation is a disposal.
- Type in the Operation Cost in dollars per cubic foot.
- Enter the ratio of volume out to volume in (volume reduction percentage) as a decimal.
- Type in the storage cost in dollars per cubic foot.
- If a reference exists describing the operation and/or the determination of costs and ratios, either type or use the help/lookup ([F1]) feature to enter the reference ID. Reference codes and information must be entered prior to entering the ID in this table.
- Enter the remainder of the operation attributes. Then return to the TSD menu by pressing [F2].

5.2 THE OPERATIONS CAPACITY TABLE

For the Operations Capacity Table (OPERCAP), enter the information as follows:

- Either type in or use the help/lookup ([F1]) facility to enter the name of the operation that will process the waste from the waste generator. The corresponding waste class (determined by the OPER table) is filled in automatically.
- Type in the year for which the capacity is going to be provided.
- Type in the capacity for the operation/year in cubic feet.
- If a reference describing or clarifying the operation capacity is available, either type or use the help/lookup ([F1]) feature to enter the reference ID. Reference codes and information must be entered prior to entering their ID in this table.
- Enter the remainder of the operation capacity attributes. Return to the TSD menu by pressing [F2].

5.3 THE OPERATIONS FLOW TABLE

For the Operations Flow Table (OPERFLOW), enter the information as follows:

- Either type in or use the help/lookup ([F1]) facility to enter the name of the operation which will process the waste from the waste generator. The corresponding waste class (determined by the OPER table) is filled in automatically.
- In the same way, enter the name of the next operation to receive the output from the operation just entered.

- Enter the next waste class for the output waste class for which this operation is used.
- Type in the Flow Fraction (FLOW_FRAC) for the fraction of waste that is to flow from the starting operation to the next operation. The fraction should be entered as a decimal in the range from 0.0 to 1.0.
- If a reference describing the operation is available, either type or use the help/lookup ([F1]) feature to enter the reference ID. Reference codes and information must be entered prior to entering their ID in this table.
- Enter the remainder of the operation flow attributes. Return to the TSD menu by pressing [F2].

5.4 THE DISTRIBUTION FRACTIONS TABLE

For the Distribution Fraction Table (DIST_F), information is entered as follows:

- Either type in or use the help/lookup ([F1]) facility to enter the name of the waste generator abbreviation (WG_ABBREV) from which waste is obtained.
- In the same way, enter the name of the waste class of waste from the waste generator. If the same waste generator generates waste in multiple waste classes, enter a record for each waste class.
- Enter the name of the operation that will process the waste from the waste generator.
- Type in the Distribution Fraction (DIST_F) for the fraction of waste in the given waste class that is provided to the operation. The fraction should be entered as a decimal in the range from 0.0 to 1.0.
- If a reference describing the distribution fraction exists, either type or use the help/lookup ([F1]) feature to enter the reference ID. Reference codes and information must be entered prior to entering their ID in this table.
- Enter the remainder of the distribution fraction attributes. Return to the TSD menu by pressing [F2].

6.0 USING STANDARD REPORTING AND MAINTENANCE FUNCTIONS

This chapter discusses the data reporting and database maintenance operations supported by standard SWPM database functions. Section 6.1 describes the content and procedure for generating the standard tabular data reports that are produced routinely. Section 6.2 provides the procedure for transferring SWPM data from the database to the modeling environment. Sections 6.3 and 6.4 contain instructions for maintaining the variable dictionary and SWPM reference information, respectively.

6.1 PRODUCING TABULAR DATA REPORTS

Version 1.0 of the SWPM database provides several tabular data reports, each of which may be selected and generated from the Database Reports menu, accessed via the "DB_Reports" option in the Main Menu. The following reports may be selected from the Database Reports menu:

- Forecast Summary Report: lists annual forecast volumes for each waste class for each waste generator.
- Stored Waste Summary: lists the waste classification and volume of stored wastes.
- Waste Class Volume Summary: provides a summary for each waste class of waste volumes held, first year of forecast, and subsequent 5- or 10-year increments.
- Annual Waste Form Summary: provides a listing of annual forecasted volume of each waste form for each waste class.
- Annual Waste Container Summary: provides a listing of annual forecasted volume of waste containers for each waste class.
- Density Summary: provides a summary of densities of waste volumes held, the first four years of the forecast, and an average for all subsequent years for each of the mixed waste classes.

These reports are generated by selecting the desired report from the Database Reports menu and answering any prompts that appear:

- "Do you want to generate a new set of data (Y/N)?" prompt: The SWPM database uses a normalized data table for reporting purposes. If the data has been updated or changed in any way since the last session, the user should answer "Y" at this prompt, which causes the database to update the data stored in the data reporting table to reflect the data changes. A "N" response at this prompt will report the data that were in use in the previous session.
- "Do you want to print the report (Y/N)?" prompt: A "Y" response to this prompt results in data stored in a text file and in a printed data report. A "N" response results in data being stored in an electronic text file for future uses.

The time required to process a report varies from 2 to 20 minutes. When report processing is complete, the Waste Generator Forecasts menu reappears. All reports are formatted for an HP Laserjet III printer.

6.2 PRODUCING MODEL INPUT DATA FILES

One of the key objectives of the SWPM database is to transfer a stored data set, or the "Reference Data Library" (RDL), to the model operating environment for case selection and model execution. This important function is accomplished by a standard routine programmed in Paradox and appearing as the "RDL" option in the Main Menu. Selection of this option generates a data file in the \SWPMDB\ directory and can require up to 45 minutes to complete.

6.3 MAINTAINING THE VARIABLE DICTIONARY

The variable dictionary portion of the SWPM database is made available so that the analyst may store descriptions and definitions of data elements used by the model. This is important because the analyst may create new waste generators, new treatment operations, or new disposal operations when defining a case. These new variables need to be defined and stored for future reference. The "MVD" option from the Main Menu provides the following options for recording model variable definitions:

1. **Edit_Var_Dict:** This option allows the user to enter attributes for model variables into a data entry form. Subscripts associated with the variable may also be listed on the form.
2. **Insert_Sub:** This option copies the subscripts associated with variables from the Var_Dict into a file of subscript attributes. In addition, the program ensures that the subscript attributes file contains only subscripts associated with a variable. The only user interaction in this activity is pressing [Enter] periodically to continue processing.
3. **Edit_Sub_Dict:** When this option is selected, a data entry form appears that allows the user to enter the attributes of the subscripts.
4. **Print Reports:** This option displays another menu that lists reports used to document the contents of the variable dictionary. To print a report, the following steps are required:
 - a. Select "Reports" from the Model Variable Dictionary menu. The Model Variable Dictionary Reports menu will appear.
 - b. Use the cursor control keys to highlight the report to be printed, and press [Enter]. The report will be sent to printer Port 1, and the report menu will reappear.
 - c. If desired, more reports may be printed. Select "Leave" to return to the Model Variable Dictionary menu.
5. **Leave:** Select "Leave" to return to the Main Menu.

6.4 EDITING REFERENCE INFORMATION

References can be anything used to define the source of data stored in the database, such as notes from meetings or phone calls, published reports, or memos. The file to contain attributes of these references, such as title, author, publication date, or storage location, is accessed through the Codes option on the Main Menu

by selecting the "Reference" option. Reference information may be entered into this table and later assigned to elements in the database via a reference ID, which is assigned by the user. The following procedures are used to enter reference attributes:

1. Select "Codes" from the Main Menu; the Codes menu will appear.
2. Select "Reference" from the Codes menu; the reference information data entry form will appear.
3. Type in the Reference ID (REF_ID) that has been assigned to the reference by the data developers.
4. Type in the Title (Ref_Title), Authors (Ref_Authors), Publisher (Ref_Publisher), Publish Date (Ref_Pub_Date), and Document Number (Ref_Document_#) for the reference.
5. Type in the storage location for the reference. This may be "Greg's office," "Project File," or any description that makes sense to the data developers.
6. Additional references may be entered. Then press [F2] to save the entries and return to the Waste Generator Forecasts menu.

There are several options on the Codes menu. Only the References option allows entry or modification of information. The other options are used only to view codes in their respective tables.

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