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Solid Waste Projection Model: Database User's Guide (Version 1.3)

C. L. Blackburn

November 1991

**Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830**

**Pacific Northwest Laboratory
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Richland, Washington 99352

MASTER

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 1.3 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 instruction in the use of Paradox, the database management system in which the SWPM database is established.

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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 1.3 SWPM Database which contains these 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 listed in the following table:

(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.

Table 1.1. SWPM Documents

<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
Configuration Management and Administrative Plan	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 or 80486 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 set of specially formatted electronic files. These files, called the Reference Data Library (RDL), are 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 hard copy material on which data are initially presented. Operation of the SWPM database requires Paradox 3.5, which can be a single-user copy or the network installation.

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 to support analyses of WHC's developing solid waste management technology. Version 1.3, to which this manual applies, reflects database development efforts completed through fiscal year 1991. This version of the database is to be used in conjunction with Version 1.1 of the Solid Waste Projection Model.

This database has been implemented by PNL using the Paradox database management system, a standard commercial software package produced by Borland International. While the database management software is off-the-shelf, the database design is specific to the SWPM application. This design includes data table structures, data entry screens, menus, report formats, and the custom software that ties all these components together into a system. The database application also includes technical documentation and written procedures covering its use and administration.

The database application has been designed to support the following activities:

- **Data entry of forecast information supplied by waste generator organizations:** This information is received on standardized forms, reviewed by a data analyst, and entered into the database using a series of on-screen forms. Data integrity checks are applied before releasing the data into the database.
- **Maintenance of existing forecast information:** Updated or additional information is entered into the database in a process very similar to the original data entry.
- **Entry and maintenance of treatment, storage and disposal (TSD) data:** This section of the database describes what is done to the forecasted waste streams that enter a proposed treatment system.
- **Notepad maintenance:** During preparation and entry of forecast data, it is often necessary to record assumptions made, shortcomings in the data submissions, and other issues that require consideration or action. The notepad function provides a convenient means to record such information during any data entry or maintenance operation.
- **Reporting of information:** A set of reports addressing the needs of various audiences is provided. Report preparation and production are controlled through the Report Manager feature of the application.
- **Interface to the model:** A set of files, known as a reference data library (RDL), is extracted from the forecast and TSD portions of the database. These files are used by the model to analyze various waste management system scenarios.

This chapter explains how to access the SWPM database application and prepare to perform routine operations in the database. Section 3.1 provides some general warnings for the user, and Sections 3.2 and 3.3 briefly discuss installation and technical requirements. The last part of this chapter, Section 3.4, includes instructions on the actual execution of the database application. Table 3.1 lists most of the common ways in which function keys are used in database operations.

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

Function	Key(s)
Copy value from previous record	[Ctrl-D]
Edit mode (from display mode)	[F9]
Erase current field	[Ctrl-Backsp]
Exit form, save modifications	[F2]
Exit form, undo last modification	[Esc]
Delete record	[Del]
Field View	[Alt-F5]
Help, Table 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]

3.1 WARNINGS

Because of the complex relationships among the types of data stored in the database, the following warnings should be observed:

- Before attempting to enter data, all information should be carefully reviewed, organized, and tagged with waste generator abbreviated names and, if applicable, forecast and scenario ID codes. Once data have been entered, changes to certain key data elements, such as waste generator names, waste categories, and waste classes, are likely to cause inconsistencies and errors. Careful organization and planning and an initial review of the data supplied by the waste generators are very useful in minimizing later problems with the database.
- All data entry and maintenance should be performed using menu selections. Entering data directly into the underlying Paradox tables will often bypass data integrity checks that are useful in catching some of the errors and inconsistencies.

3.2 INSTALLATION

Installation of Version 1.3 of the SWPM database should be done under guidance of the database administrator. Requirements for directory structure, hard disk space, Paradox installation defaults, and other issues are discussed in the SWPM Database Version 1.3 Technical Reference.

3.3 REQUIREMENTS

To provide full operation of the SWPM database, the following system hardware requirements must be satisfied:

- IBM PC, XT, AT, PS/2 or compatible computer
- 640 kilobytes of RAM
- connecting hardware to the PNL network, as described in the SWPM Database Version 1.3 Technical Reference.

The following are recommended for performance, but not required:

- 80386 processor
- 2 megabytes or more of extended or expanded memory
- 10-20 megabytes of free work space on a local or network hard disk.

Operation of the SWPM database requires the following software:

- DOS Version 3.3 or later
- Paradox Version 3.5 or later (stand-alone or accessible from the network) - See the database administrator for information about Paradox setup defaults and network access.
- Network configuration defined to include connections to appropriate servers, as described in the SWPM Database Version 1.3 Technical Reference.

As of the time of writing this manual, the SWPM database application has not been tested as a task running within Windows 3.0. Also, Paradox itself does not run in the OS/2 DOS compatibility window.

3.4 GETTING STARTED

- If necessary, boot DOS on your computer and then execute Paradox.
- Establish the directory containing SWPM files as your working directory. Select **TOOLS MORE DIRECTORY** from the Paradox menu and then enter "J:\SWPMDB91".

- Execute the SWPM startup script. Select **SCRIPTS PLAY** from the menu and then enter the script name "SWPM".
- Select the Version 1.3 database from the opening menu. After entering the correct password, the SWPM application main menu appears. See Figure 3.1 for a diagram of the application menu structure. This diagram shows the main menu options on the left and successively lower level menus to the right. An option executes the function noted if there are no more menu levels below it.

Note: Other versions of the SWPM database operate differently. Specific instructions given in this manual may not be valid for versions other than 1.3.

Figure 3.1. SWPM Menu Structure

4.0 ENTERING AND MAINTAINING FORECAST DATA

This chapter describes the process of entering the annual waste generator forecasts into the SWPM database. These forecasts are provided by the waste generator organizations on data collection forms sent to them each year. The procedures below serve as a guideline when modifying existing forecast data.

Forecast information is entered into the SWPM database through several screens that generally correspond to the structure of the data collection forms. These screens are defined by Paradox data entry forms or by direct views of one or more of the SWPM database tables. Access to the screens is accomplished by choosing the "Forecast" option from the SWPM database application Main Menu. This selection leads to another menu from which other options are chosen, as explained in the detailed procedure in the following sections.

4.1 DEFINING WASTE GENERATORS

The SWPM database application does not accept forecast information unless the waste generator facility to which the forecast applies has been defined. An entry must be made on a master list of waste generators which defines the waste generator in the system and provides some descriptive information about it. The database table containing the list of waste generators is controlled by the database administrator and is not intended to be modified without reviewing the intended changes. Requests for new waste generators must be reviewed by a designated analyst and passed to the database administrator for action. Instructions for maintaining the waste generator table are found in Section 8.3.

4.2 ENTERING AND EDITING FORECASTS

Waste generator forecasts are entered into five tables, each of which has its own menu selection. Forecast entry or update is accomplished using the following steps:

- Select "Forecast" from the main SWPM menu.
- Choose "IDFore" from the next menu. Select a waste generator/forecast combination by highlighting it with the cursor, pressing [F8] or [Esc]. At least initially, there will be only one forecast for each waste generator. All data entry activity following this selection applies to the waste generator selected, until another selection is chosen.
- All but one of the remaining choices on the "Forecast" Menu involve entering or updating data in one of the five tables that hold forecast data. The last choice, "DataVal", produces data verification reports and is explained in Section 4.4 below. The data entry selections are:

ForeVol Enter volumes in cubic feet by waste class.

PCD Enter physical content descriptor percentages for each waste class.

HCD Enter hazardous content descriptor percentages for each mixed or hazardous waste class and PCD type.

Cont Enter container percentages for each waste class and PCD type.

Wt Enter weight data for each waste class.

- If a new forecast is to be entered, select each of these options in the order shown above and complete the data entry before going to the next on the list. The "HCD" selection is not used if the current waste generator does not forecast any mixed or hazardous waste.
- A table will appear containing the data for the selected menu option. Following the order shown is important, since the data to be entered or edited are usually influenced by the content of one or more other tables. For instance, PCD information for waste classes can only be entered for volumes greater than zero in the ForeVol table. After PCD data are entered, enter container and HCD information, but only for waste class/PCD combinations that were established in the PCD table.

Note: When data are incomplete or inconsistent, or issues are raised by the nature of the data, make notes about the situation using the notepad function. See Section 4.3 for instructions.

- Press [F2] to finish. Since editing work is performed in the Paradox COEDIT mode, all changes are posted as soon as work on a row is complete. In the case of Forecast data entry work, however, pressing [Esc] will cause all work on the current table to be discarded.

About interruptions in data entry work -

- Work can be interrupted before completing all data entry for a waste generator. Normally, each of the five forecast data entry processes concludes by storing all data entered within the current screen. As noted above, [Esc] does throw away the current changes, however. Take note of where work was interrupted, because the user is not automatically returned to a previous stopping point in the next session. Also, keep in mind that incomplete data entry for a waste generator may cause inconsistent totals on reports, should any be run before the work is finished.

About data integrity checks -

- In most instances where a name for waste generators, waste classes, container types, PCDs, HCDs or other descriptive label is needed, a list of valid choices is presented. When an appropriate choice is not on the list, the user may decide to escape out of the data entry procedure or else enter data to an "Other" category after making an explanatory entry in the notepad. If the data entry forms are properly prepared and have been reviewed, problems of this type will be rare.
- Some numeric entries are checked. Distribution factors such as PCD, HCD, and container percentages must be entered as decimal fractions, and all entries for a particular item must sum to 1. The user will not be able to exit from a data entry process until the necessary corrections are made unless [Esc] is pressed and all work is discarded. Volume data (entered as cubic feet or meters) are not checked, since there usually is no basis for performing an automated test on such information.

4.3 USING THE NOTEPAD FUNCTION

The notepad function provides a means to make notes while data are being entered or updated. Use of the notepad is at the user's discretion, but should be used under the following circumstances:

- Some aspect of a waste generator forecast is unclear or incomplete, but the forecast is generally complete enough to enter. An example of this would be when a waste generator fails to include weight information but has submitted an otherwise complete forecast. In such a case, a note would be made as a reminder that the waste generator's listed contact person must be called with a request for the missing information.
- A significant change is made to data that requires an audit trail. For example, if a forecast was removed from the database because it duplicated a submission from another organization, an explanatory note should be entered.
- An assumption is needed to complete entry of a forecast before reporting deadlines. If it is necessary, for instance, to define the container used by a waste generator as "55G DRUM" in order to make report totals agree, an entry to the notepad is required to draw attention to the assumption.
- If the data entry operator intentionally enters data differently than it appears on the waste generator forecast form, one or more notes should be entered to explain and justify the differences.
- At any other time when an explanation would be helpful or an issue needs to be raised.

Notes are stored in a separate table and are printed using a report selection in the Report Manager. When notes address issues that need to be resolved, they remain on the report until a resolution is recorded by the database administrator and the entry is removed.

- To invoke the notepad, press [Ctrl-N] any time that a data entry process is awaiting input.
- Enter a note of up to 160 characters in the two-line window that appears at the bottom of the screen.
- Up to 15 notes may be entered during a single data entry process. If more note space is needed, end the process according to the instructions provided for it in the appropriate section of this User's Guide. This causes pending notes to be stored and makes room for a new batch. Resume data entry by reselecting the same Forecast menu option as before.
- When notes are made, the following items are recorded automatically:
 - current table name
 - current field name
 - current field content
 - today's date
 - user ID

Use note space for other pertinent details, such as WG name, waste class, or a brief description of the issues.

4.4 VIEWING FORECAST DATA

In order to fully verify data entered into the SWPM database, visual inspection is required. Internal consistency checking is performed during data entry for some values, but other data cannot be tested automatically. Items needing review include the completeness and accuracy of the waste generator table, the volume and weight amounts of forecasted wastes, and the specific selections of PCDs, containers, and HCDs for each forecast waste class.

For visual inspection, the user may view the data using the data entry/editing processes described in Section 4.2, generate reports from the Report Manager as explained in Section 9, or print data validation reports as follows:

- Choose a waste generator as if data entry were to be performed for it. This is done by selecting option "IDFore" from the Data Entry Menu and choosing the waste generator, as described in Section 4.2.
- Select "DataVal" on the Data Entry Menu.
- Choose the type of report required by making one of the following selections from the DataVal menu:
 - A_Packet All forecast data for low-level waste classes.
 - B_Packet All forecast data for low-level mixed and hazardous waste classes.
 - C_Packet All forecast data for transuranic (TRU) waste classes.
 - D_Packet All forecast data for transuranic mixed (TRUM) waste classes.
 - Every_One All four packets - This process takes 45 minutes or more to complete, depending on factors such as computer type, network traffic, amount of data for the selected waste generator, etc.

After a selection is made, a data extraction process executes, and then reports are automatically sent to the printer.

- The intended audience for these data validation reports includes the waste generator organizations. As a result, the report formats generally correspond to the layout of the data collection forms that the waste generator personnel fill out and return to the SWPM project.

5.0 MAINTAINING TREATMENT, STORAGE, AND DISPOSAL DATA

This chapter provides guidance in entering and maintaining treatment, storage, and disposal (TSD) data. These data describe the details of the solid waste management system to the Solid Waste Projection Model (SWPM). Unlike forecast information, TSD data do not originate with the waste generators. Designers of systems for the treatment and ultimate disposal of waste develop TSD data to guide the model as it simulates the flow of wastes through the waste management system. Forecast data and TSD data are, therefore, two distinct parts of the SWPM database and are generally developed and maintained by different people. Forecast information is viewed as an externally imposed "given," while TSD data can be modified experimentally in the course of searching for waste management solutions. In practice, the TSD database tables are infrequently modified, but serve as a baseline from which copies are made to develop treatment scenarios. Instructions for TSD scenario creation and usage are available in separate documents for those users who are involved in this activity.

Data entry procedures for TSD data are very similar to those used for forecast data: menu options are chosen to select a particular table to work in, and editing procedures conform to standard Paradox usage.

Four tables contain TSD data:

OPER	This table lists the available operations to be performed on waste passing through the system. Attribute fields in this table include cost information and waste classes to which the treatment applies.
DIST_F	This table contains the distribution fractions that are used to apportion the waste from each waste generator to the various treatments. The table contains the waste generator abbreviated name, the fraction itself, the treatment receiving the fraction of waste, and other information.
OPER_FLOW	This table describes the flow of waste from one operation to another. It includes the names of the current and next operations, the fraction of waste to go to the next operation, and other information.
OPERCAP	This table lists the capacities of each operation in the system. It includes the name of the operation, the name of the applicable waste class, the year for which the capacity applies, and the capacity itself.

5.1 THE OPER TABLE

- Select the "TSD" option from the Main Menu.
- Select "Oper" from the TSD Data Entry Menu.
- The table containing operation data appears. Use the [Ins] key to add new items and standard Paradox editing procedures for updating existing ones.

- Press [F2] to finish. Since editing work is performed in the Paradox COEDIT mode, all changes are posted as soon as work on a row is complete. Thus, pressing [Esc] will not cancel inserts, deletes, or updates made during an editing session.

5.2 THE DIST_F TABLE

- Select the "TSD" option from the Main Menu.
- Select "Dist_F" from the TSD Data Entry Menu.
- The table containing distribution fraction data appears. Use the [Ins] key to add new items and standard Paradox editing procedures for updating existing ones.
- Press [F2] to finish. Since editing work is performed in the Paradox COEDIT mode, all changes are posted as soon as work on a row is complete. Thus, pressing [Esc] will not cancel inserts, deletes, or updates made during an editing session.

5.3 THE OPERFLOW TABLE

- Select the "TSD" option from the Main Menu.
- Select "OperFlow" from the TSD Data Entry Menu.
- The table containing operation flow data appears. Use the [Ins] key to add new items and standard Paradox editing procedures for updating existing ones.
- Press [F2] to finish. Since editing work is performed in the Paradox COEDIT mode, all changes are posted as soon as work on a row is complete. Thus, pressing [Esc] will not cancel inserts, deletes, or updates made during an editing session.

5.4 THE OPERCAP TABLE

- Select the "TSD" option from the Main Menu.
- Select "OperCap" from the TSD Data Entry Menu.
- The table containing operation capacity data appears. Use the [Ins] key to add new items and standard Paradox editing procedures for updating existing ones.
- Press [F2] to finish. Since editing work is performed in the Paradox COEDIT mode, all changes are posted as soon as work on a row is complete. Thus, pressing [Esc] will not cancel inserts, deletes, or updates made during an editing session.

6.0 PRODUCING REFERENCE DATA LIBRARY FILES

Reference data library (RDL) files contain data that have been extracted from the SWPM database and reformatted for use by the SWPM. Although this procedure is performed as preparation for model operation, it is included here since RDL processing is conducted within the database application. The RDL generator function described here is of interest only to users who are also involved in making model runs.

6.1 RUNNING THE RDL PROCESS

- Select "RDL" from the main menu.
- Enter an output file name when prompted. The name entered may be up to eight characters in length and must be a valid DOS file name. No file name extension should be specified. If the name entered is already in use, the user must either use another name or approve the overwriting of the existing files.
- Enter responses for "COST UNITS" and "VOLUME UNITS" prompts. These items are used as adjustment factors on model results passed to the output report writer. Each item is set to zero if no other amount is entered or if the entry is non-numeric.
- No further user interaction is needed. A series of messages appears showing the progress of the RDL process. The time required to produce RDL files varies with the size of the database, level of network activity, type of computer in use, and other factors. Most RDL runs will fall within the range of five to twenty minutes in length.

Note: If [Esc] is pressed in response to any prompt for input, the RDL process terminates and the application returns to the main menu.

6.2 RDL FILE LOCATION AND DESCRIPTIONS

RDL library files are created in the RDL subdirectory. If the user is warned that a file already exists as noted in Section 6.1 above, this is where the existing files were found.

File names used by the RDL process:

RDL\file name.RPS - file containing treatment scenario information

RDL\file name.RPF - file containing forecast volume information

- where "file name" is the user's response to the file name prompt in Section 6.1.

6.3 USING RDL FILES

SWPM usage requires that the RDL files be copied into the directory from which the model is to be run. Instructions on model operation can be found in the Solid Waste Projection Model User's Guide.

7.0 UPLOADING/DOWNLOADING

The primary location for SWPM data and application software is the network disk area on PNL5 with share name "SWPM." This drive should be designated as drive "J" for consistency with other users. Also, certain SWPM processes look for "J" when checking network status. The network copy of the database is considered the reference version of the database. Because of its reference status, the database on the network is subject to a number of quality assurance (QA) requirements. These requirements include restricting access to certain network users and assigning privilege levels to users according to their passwords. In addition, users are encouraged to use local copies of the database for certain purposes. Copies of the database are useful for someone who wishes to reconfigure the database itself, change its contents for "what-if" analyses, and when slow network performance hinders productivity.

Performing SWPM database activities, such as forecast data entry on local disk drives, yields a number of benefits. Network traffic and the considerable amount of processing overhead from Paradox data entry software can result in very sluggish system response. Productivity usually suffers when entering data directly to the network database. Also, it may be advantageous at times to divide the data entry workload among multiple users, and this activity goes more quickly on local copies of the database.

When data entry is performed into one or more local databases, and the information collected this way is to be transferred to the network database, significant involvement by the database administrator is required. Users should make a habit of coordinating closely with the SWPM's database administrator when using the procedures described below.

Periodically, the user or users responsible for entering and maintaining forecast data will need to upload data to the network so that the reference database can be updated. The steps required to upload data are detailed in Section 7.1, immediately following.

The download process, explained in Section 7.2 below, provides the means to create local copies of the current version of the software and of the data, the transfer of which occurs in two separate steps.

7.1 UPLOADING DATA TO THE NETWORK

- Notify the database administrator that an upload is to be done. In some cases, the upload process may be initiated by a request from the database administrator to the user. The database administrator will need to make some preparations for the upload. Until these preparations are done, the upload software will refuse to pass data to the network.
- Execute the SWPM database application in the usual way. Select "Upload/Download" from the Main Menu.
- Choose "Upload" from the Upload/Download Menu. Then, select the "Begin" option to initiate the upload.

At this time, a few checks are performed. The availability of the network is verified and the system makes sure that the user is in a local database and not currently accessing the network version. The upload process also checks that files from previous uploads have been removed from the upload directory. This ensures that the database administrator has completed the transfer of data from the last upload into the reference database, and no information will be written over when the next transfer to the network is executed.

The attempt to upload is automatically noted in a log file. This record will help in diagnosing any processing problems and to resolve uncertainties about where the current version of the reference database may have originated.

- At the end of the process, notify the database administrator. Be sure to make it clear whether the uploaded data were intended to be a complete forecast or just an increment to be added to the network forecast database.

The following messages are generated during processing:

<u>Upload Processing Messages</u>	<u>Message Meaning</u>
Network not available	Cannot locate files on network, implying that network connection does not exist.
Cannot upload while on network	The user's working directory is on the network. Change to a directory on a local disk using "Tools More Directory" menu selections.
Network checks OK	Network files were located, processing will proceed normally to the next step.
Logging start of upload...	An entry is made to the upload/download log table recording the beginning of an upload process.
Logging completed	The log entry was made successfully.
Checking upload area...	The program is checking if the upload area is clear of other data.
Upload area not ready, aborting..	The upload area still contains data from the last upload.
Logging attempt to upload...	A note in the log table is made about the unsuccessful upload attempt.
Upload area OK	The upload area was found to be empty and ready to receive new data.
Beginning upload now...	The transfer of local data to the network is beginning.
"Table Name" table copied	The named table has been copied to the network upload area.
Upload Finished	All data were uploaded successfully.
Logging completion of process...	A log entry is being made about the successfully completed upload.
Logging completed	The log entry was made successfully.

7.2 DOWNLOADING FROM THE NETWORK

- No prior approval for downloading is needed from the database administrator. The user should be aware, however, that downloads will write over certain existing files. Unless a user has backups available, a download in which the "Data" selection is made will replace an existing database with no means of retrieving the original information.
- Execute the SWPM database application in the usual way. Select "Upload/Download" from the Main Menu.
- Choose "DownLoad" from the Upload/Download Menu. Then, pick one of the following alternatives:

Software This refers to all tables, forms, scripts, procedures and other database objects that are needed to make the database application execute. Select this option when downloading the first time and whenever the database administrator advises that the software has been updated. No user-entered data are replaced with this selection.

Data This selection copies down all network database tables which contain forecast information. If a local version of the SWPM database exists on the disk drive designated by the user, it is replaced.

Codes All lookup tables and other controlled data that are maintained by the database administrator, including the waste generator table, are copied to the user's local disk drive. Select this option whenever network "Codes"-type data have changed. This class of data consists of the data tables that can be updated using the "Codes" selection of the Main Menu. This process does not replace user-entered forecast data.

Note: To make a fully functional SWPM forecast database application, all three download processes must be performed. Subsequent updates may not require all selections.

- If the selected download process is the first one to be chosen during the current session, the user will be prompted for a disk drive selection. Choose the drive that is to receive the download.

Depending on the user's system, not all of the presented disk drive choices may be valid. If an inappropriate drive is selected, an error message will result. The choices are C_Drive, D_Drive, E_Drive, and F_Drive.

Note: A directory named \SWPMDB91 must exist on the selected drive. Subdirectories will be created as needed, however.

It is possible that some of the above drive choices could be configured as network drives on some workstations, such as on a computer with no hard disks. In such cases, the download process may work but will not lead to the performance gains that use of a local disk drive will.

The download process will work from one local drive to another. This may be appropriate when analysis requires multiple copies of a modified database.

The following messages are generated during processing:

<u>Download Processing Messages</u>	<u>Message Meaning</u>
"Process name" process file not found	Batch file is missing for the currently selected process.
SWPMDB91 dir. must be created first	The application directory must exist. Create using the DOS "MD" command.
Executing 'process' download now...	The chosen process has begun to execute.
Logging start of download...	An entry to the log table has been made that notes that a download process has been started.
Logging completed	The selected process finished normally.
Logging completion of download...	The completion of a process is being recorded in the log table.
Drive has insufficient space or is not ready	The selected drive has too little room or cannot be accessed.
Cannot download to and from same drive	The user tried to download to the drive containing the current working directory.
Space available: "nn.n"mb	The status of the drive to which the download will take place.
Software download complete	This process has been accomplished.
Data download complete	This process has been accomplished.
Codes download complete	This process has been accomplished.

8.0 MAINTAINING CODES (LOOKUP) INFORMATION

The SWPM database contains a number of lookup tables used for the following purposes:

- to validate data, restricting the content of some fields to members of a list
- to allow the grouping of information on reports
- to control the order of printing or appearance on forms
- to trigger subtotal breaks
- to permit the substitution of full names on reports when the underlying database tables carry only abbreviations.

Maintenance requirements for most codes-type tables are very modest. Access to these tables is controlled via passwords. Code table maintenance should be left to the database administrator.

8.1 SELECTING A CODE TABLE FOR MAINTENANCE

- Select "Codes" from the Main Menu.
- Choose one of the following options:

WG	Table of valid waste generator names.
WClass	Submenu of waste class-related tables: WClass Table of valid waste classes. WCat Table of valid waste categories. TSD_WClass Table of valid TSD waste classes.
Types	Submenu of type descriptors: PCD Table of valid physical content descriptors. HCD Table of valid hazardous content descriptors. Cont Table of valid container types.
Groups	Submenu of group definitions: WG_Class Table of valid waste generator classes. WG_Group Table of valid waste generator groups. PCD Table of valid PCD groups. HCD Table of valid HCD groups. Cont Table of valid container groups.
Scenario	Table of available scenarios.

Forecast Table waste generator/scenario combinations.

Dictionary Project dictionary maintenance.

8.2 PERFORMING CODES TABLE MAINTENANCE - GENERAL INSTRUCTIONS

Except for the waste generator table (option "WG"), the editing procedures are generally the same for the tables listed in Section 8.1. Specific instructions for the waste generator table appear in Section 8.3 below. General codes table maintenance instructions are as follows:

- Select the appropriate codes table shown in Section 8.1.
- The table containing the selected data appears. Use the INS key to add new items and standard Paradox editing procedures for updating existing ones.
- Press [F2] to finish. Since editing work is performed in the Paradox COEDIT mode, all changes are posted as soon as work on a row is complete. Thus, pressing [Esc] will not cancel inserts, deletes, or updates made during an editing session.
- Notepad services are available during code table maintenance. See Section 4.3 for instructions.

8.3 PERFORMING CODES TABLE MAINTENANCE - WASTE GENERATOR TABLE INSTRUCTIONS

- Select "Codes" from the Main Menu
- Then, select "WG" from the next menu. The table of existing waste generators appears.
- Press the [Ins] key to begin the insertion process. An insert can be done anywhere in the table, since the order of rows in this table is automatically updated after each insert.
- It may be necessary to press [F9] to enter the COEDIT mode, especially if updates to existing records are to be made. This selection is automatically made when new rows are being inserted.
- When the prompt for it appears, enter the abbreviated name (up to 14 characters) of the waste generator in the WG ABBREV field. The name will be rejected if it already exists. To be consistent with standard usage, the entry will be automatically forced into upper case. As soon as the abbreviation is entered, a new row for it is added to the table in the position dictated by alphabetization.
- Enter the other fields for this new row, such as the long version of the name, the class to which this generator belongs, etc. If there are restrictions to the content of a field, as is the case with the WGCLASS ABBREV field (the abbreviation of the class to which this waste generator belongs), input will be rejected when an invalid value is entered. Pressing [F1] while in the field will display a list of valid values. Move the cursor to the desired value and press [F2] to place it in the original table.

- After data entry is complete, press [F2] to save the updates and return to the menu.
- Unlike some other Paradox editing processes, pressing [Esc] does not discard editing changes. There is no functional difference between exiting with [F2] or [Esc].
- At any time during the editing process, the notepad may be invoked to accept any notes the user wishes to record. For more information about the notepad, see Section 4.3.
- After defining the waste generator, create a forecast record for it. This item is entered into the Forecast table and serves to relate a waste generator to a particular scenario. Select "Forecast" from the Codes Menu, and insert a record according to the general instructions for code table maintenance in Section 8.2. Following this step, the waste generator is available for data entry.

8.4 MAINTAINING THE MODEL VARIABLE DICTIONARY

The model variable dictionary (MVD) contains names, descriptions, and other information about variables used in the SWPM. No special procedures were developed to perform maintenance on the tables involved, since changes are very rare.

In view of the lack of any provision within the SWPM database application for performing maintenance on the MVD, all required updates to this area of the database should be left to the database administrator.

9.0 PRINTING REPORTS FROM THE SWPM DATABASE

Reporting in SWPM is handled through a function called the Report Manager. The Report Manager is a set of Paradox tables, programs, and text files that let a user select a desired report from a list of report names displayed as a table on the screen.

Reports can be generated from the Report Manager in two different ways. In one method, the existing data can be printed with little or no preliminary processing performed. This is useful for getting additional copies of reports or printing reports that were stored previously but not printed. The second method involves transferring the data of interest from the SWPM database into work tables and then printing or storing the resulting reports. This method is appropriate when changes to the database have been made, since the first method usually does not go back to bring in any updated data.

In each of the two methods, the user can select whether output goes directly to the printer or is held in text files. For the sake of consistency, any process that prints also updates the text files to reflect current reports.

9.1 OPERATING THE REPORT MANAGER

- From the Main Menu, select "Report_Mgr."
- When a table of reports appears, the available actions to be taken are shown at the top of the screen. Use [F2] to select the currently highlighted report. Otherwise, press [F8] or [Esc] to terminate the Report Manager. Move up and down the list in the usual way, with [Page Up], [Page Down], and the arrow keys.
- After a report is selected, an information screen appears that shows the following:
 - Processing time: This represents how long this selection took to finish when it was last executed. It is only a guideline, since the time required is highly dependent on the type of computer used, amount of data to manipulate, network traffic, version of Paradox, etc.
 - Report file size: This serves as a rough indication of the amount of paper that the report will generate. This amount varies a little from the way DOS reports file sizes, due to differences in the way Paradox and DOS measure space allocation.
 - Last run date.
- Once a report has been selected by pressing [F2], the following menu selections are available:

PrtNew	Performs necessary processing first, then prints report. The processing time shown on the "Selected Report Information" display applies to this option.
New	Does the same thing as "PrtNew," except that the report goes only to a text file, not to the printer.

Reprint	Prints the contents of the extract table that was created the last time "PrtNew" or "New" was selected. This is useful for printing more copies of a report but will not include updated data from the database. The processing time shown on the information screen does not apply here. Expect the process to take much less time.
Store	Stores the contents of a report to the report text file using existing extract data. As with "Reprint," updates will not be included and time to process is less than shown on the screen.
Table	Returns the user to the report selection screen. Use this to go back and select some other report.
Quit	Ends Report Manager and returns to the SWPM Main Menu.

9.2 OTHER WAYS TO PRINT EXISTING REPORTS

- If you know that the desired report has already been generated, it is not necessary to use Paradox to get a copy of it. The report file can be sent directly to the printer from the DOS prompt. The form of the DOS command is as follows:

```
COPY J:\SWPMDB91\R\rpt abbrev".RPT LPT1
```

- The report abbreviation is usually the report table name appearing on the list of SWPM reports distributed to users. Sometimes, however, more than one report is available from a report table. See the database administrator for assistance in determining report file names. The above command assumes that a printer is hooked up to the LPT1 port. The LPT2 or another port could also substituted. Here is an example of the command to be used to print the forecast summary report for newly generated waste:

```
COPY J:\SWPMDB91\R\FVOLXNEW.RPT LPT1
```

- There are other DOS commands besides COPY that will work. For example, PRINT will also do the job and it does not need "LPT1" on the command line. Do not use PRINT when using DOS in Paradox with [Alt-O] or [Ctrl-O]. PRINT stays memory-resident and will have grabbed memory that Paradox requires once the DOS activity is completed. In such a case, Paradox would abort and may corrupt open tables. Here is the PRINT command for the report file shown in the previous example:

```
PRINT J:\SWPMDB91\R\FVOLXNEW.RPT
```

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