A Research Report for
Westinghouse Hanford Company

**Solid Waste Projection Model:
Database Version 1.0
Technical Reference Manual**

F. Carr
A. Bowman

November 1990

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SOLID WASTE PROJECTION MODEL: DATABASE
VERSION 1.0 TECHNICAL REFERENCE MANUAL

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Richland, Washington 99352

EXECUTIVE SUMMARY

The Solid Waste Projection Model (SWPM) system is an analytical tool developed by Pacific Northwest Laboratory (PNL) for Westinghouse Hanford Company (WHC). The SWPM system provides a modeling and analysis environment that supports decisions in the process of evaluating various solid waste management alternatives.

This document, one of a series describing the SWPM system, contains detailed information regarding the software and data structures utilized in developing the SWPM Version 1.0 Database. This document is intended for use by experienced database specialists and supports database maintenance, utility development, and database enhancement.

Those interested in using the SWPM database should refer to the SWPM Database User's Guide. This document is available from either the PNL project manager (D. L. Stiles, 509-376-4154) or the WHC program monitor (B. C. Anderson, 509-373-2796).

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1.0 INTRODUCTION

The Solid Waste Projection Model (SWPM) system is an analysis tool developed for Westinghouse Hanford Company's Solid Waste Technology Section by Pacific Northwest Laboratory (PNL) to assist analysis of complex waste management issues. The SWPM system provides the ability to develop projections of solid waste volumes and characteristics and evaluate alternative waste treatment and disposal strategies.

A generic representation of the system modeled by SWPM is shown in Figure 1.1. Waste is received from waste generating facilities and is 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. Each operation has an associated storage option to track waste volumes that arrive in excess of defined capacity.

The SWPM system consists of three modules: the database, the user interface, and the model. Figure 1.2 shows how the components of the system interact.

The SWPM database (SWPMDB), which is described in this technical reference manual, performs three important functions for the SWPM system. First, the database provides secure storage for waste volume forecasts and for system characterizations. Second, it writes the Reference Data Library for input to

FIGURE 1.1. The Waste Management System Representation

FIGURE 1.2. The SWPM System

the model. Last, it uses the information to generate data reports for performing studies without the model. Information such as physical attributes of wastes or waste packaging can be summarized using standard data reports. The database reports can also be used to verify or review the information stored in the system.

The database storing information for the SWPM system uses PARADOX database software. Data are entered and maintained through menus and custom data entry screens. There are two distinct types of data in the database. As shown in Figure 1.3, volumes and characteristics that describe the waste from the waste generators, as well as the cost, capacity, and flow instructions for the treatment, storage, and disposal (TSD) operations, are maintained.

The database, with its menu structure and data entry screens, provides the ability to assemble and maintain many different waste volume forecasts and any number of TSD alternatives and to make large-scale changes to this information.

This Database Technical Reference Manual describes Version 1 of the SWPM database, discusses the hardware and software requirements necessary to operate the database, and defines the directory and the data structure in which the information is stored. Five additional documents, which provide instructions in the use, maintenance, and application of the SWPM system, complete

FIGURE 1.3. Data Used to Characterize a Waste Management System

the set of documentation. These documents are the System Overview, Database User's Guide, the Model User's Guide, the Model Technical Reference Manual, and the System Administration Manual. The following is a brief description of each of the six manuals:

- System Overview - provides an overview of the SWPM system and an assessment of potential applications
- Database User's Guide - provides instructions for data entry, maintenance, and reporting
- Model User's Guide - provides instructions for model operation and execution
- Model Technical Reference Manual - describes model software and applications
- Database Technical Reference Manual - describes database software, utilities, and structure
- System Administration Manual - provides instructions for long-term system administration and maintenance.

This Database Technical Reference Manual is provided as a reference guide for a knowledgeable database specialist. Chapter 2 of this manual addresses hardware and software requirements and the structure of the SWPM database. Chapter 3 details the essential operations and functions performed by the database, and the specific routines, tables and scripts which must be accessed and maintained to provide continuing database support.

It is important to note that this manual does not contain any user help information, nor does it attempt to assist the analyst in reporting data or in utilizing SWPM data for analyses. The Database User's Guide and the System Overview will provide the information required for these purposes.

2.0 DATABASE SYSTEM REQUIREMENTS AND STRUCTURE

This chapter provides the database specialist with a description of the SWPM database system and explains the essential structure of the database. Chapter 1 discusses the goals of the SWPM database system. Chapter 2 specifies the hardware and software required to operate the database. Chapter 2 also identifies the file types used to store SWPM data and applications and covers the specific directory structure set up to manage database operation and maintenance. Chapter 3 lists the tables that make up the SWPM database and defines the structure and contents of those tables.

2.1 SOLID WASTE PROJECTION MODEL DATABASE SYSTEM GOAL

The goal of the SWPM database (SWPMDB) is to provide an environment that allows collection and maintenance of the data required for input to SWPM. In addition, the SWPMDB provides forecast data summary reports. The primary processes performed by the SWPMDB are:

- maintain waste generator forecast data
- maintain TSD data
- maintain model variable dictionary data
- maintain feature codes and descriptions
- produce forecast data summary reports
- produce the reference data library files.

Figure 2.1 shows the primary processes performed by the SWPMDB, the flow of information between the processes, and the external sources and destinations for data. The processes shown in this figure correspond to the options available on the SWPMDB main menu.

2.2 HARDWARE REQUIREMENTS

The SWPMDB application works on an IBM PC, AT, XT, or PS2 microcomputer. At least 640k random access memory (RAM) and 10 megabytes (MB) of disk space are needed.

FIGURE 2.1. Primary Processes Performed by the SWPMDB

2.3 SOFTWARE REQUIREMENTS

The SWPMDB application runs under the DOS 3.3 operating system (or later versions). The application requires version 3.0 or later of the PARADOX relational database management system. PARADOX controls the storage and retrieval of information on the computer and provides facilities used by the database developers to create menus and forms. These menus and forms provide the interface for entering information to and receiving information from the database.

2.4 FILE TYPES

Several types of files are used throughout the SWPMDB. File types are identified by use of the file extension, a 1- to 3-character suffix appended to the file name. Descriptions of the types of files used by the SWPMDB are listed below.

- .BAT DOS Batch File. Batch files are used to initiate a series of DOS commands.
- .DB PARADOX Data Table.
- .LIB PARADOX Library. Libraries contain compiled versions of scripts. Each library may have one or more compiled scripts.
- .Fxx PARADOX Form. Forms are used to view and maintain data. They have the same file name as their corresponding data table. The xx is a number from 1 to 14 used to identify the forms for each table. The default form for a table does not have a number.
- .PX PARADOX Primary Index. Each data table may have one primary index. The index has the same file name as its corresponding data table.
- .Rxx PARADOX Report Specification. Report specifications are used to display data to a printer, screen, or file. They have the same file name as their corresponding data table. The xx is a number from 1 to 14 used to identify the reports for each table. The default report for a table does not have a number.
- .SET PARADOX Image Settings. These control numeric precision, column widths, table lengths, and other table or field defaults. They have the same file name as their corresponding data table. There is a maximum of 1 setting file for each data table.

- .SC PARADOX Script. A script is similar to a program or subroutine. Scripts are created using the PARADOX Application Language (PAL).
- .VAL PARADOX Validity Check. Validity check files contain information used to set maximum, minimum, and default values for a field. They also determine if the value for a field must exist elsewhere in the database before it may be used. They have the same file name as their corresponding data table.

2.5 DIRECTORY STRUCTURE

The SWPMDB directory structure is designed to separate data from programs and high-use areas from low-use areas. The directories are drive independent; that is, they may be placed on any drive as long as they are all placed on the same drive. Following is a description of the directories and their contents. A hierarchy chart of the directory structure is shown in Figure 2.2.

\SWPMDB	The SWPMDB directory contains scripts (SC) and batch (BAT) files used to initialize, build, and start the SWPMDB system. The user should be in this directory before starting the SWPMDB system.
\SWPMDB\DATA	The SWPMDB Data directory contains no files; it serves as the parent directory for other data directories.
\SWPMDB\DATA\FORE	The SWPMDB Data Fore directory contains the PARADOX data tables and related files for all forecast data. Forecast data includes both waste generator forecasts and treatment, storage, and disposal forecasts. In addition, feature codes and descriptions are stored in this directory. These tables are updated through the SWPMDB application. They may be updated manually (outside of the menus) in rare circumstances and only with extreme caution.
\SWPMDB\DATA\OPER	This directory contains PARADOX database tables and related files used to produce summary reports on the forecast data. These tables are produced by joining, querying, and sorting the forecast data. They are produced through scripts (programs) in the \SWPMDB\SCRIPTS\... and \SWPMDB\QUERY directories.
\SWPMDB\DATA\MVD	The Data MVD directory contains the PARADOX data tables and related files used for maintenance of the model variable dictionary data. These tables are updated with the SWPMDB application.

FIGURE 2.2. SWPMDB Directory Structure

\SWPMDB\SCRIPTS	The SWPMDB Scripts directory contains the SWPMDB main menu script and serves as the parent directory for other script directories. Each of the scripts appearing in the \SWPMDB\SCRIPTS directory and its subdirectories is a procedure (not query) script. All of the procedure scripts are compiled and written to a library in the SWPMDB\LIB directory. The libraries, not the procedure scripts, are accessed by the SWPMDB application. The scripts in this directory are placed in the SWPMLIB library.
\SWPMDB\SCRIPTS\FORE	This directory contains the procedure scripts associated with the Maintain Waste Generator Forecasts; Maintain Treatment, Storage, and Disposal Forecasts; and Maintain Feature Codes and Description processes. The scripts are compiled and stored in the FORELIB library.
\SWPMDB\SCRIPTS\OPER	The Scripts Oper directory contains the procedure scripts used for the following processes: Produce Reference Data Library, Produce Forecast Data Summary Reports, and Data Integrity Checks (part of the Maintain Waste Generator Forecast process). The scripts are compiled and stored in the OPERLIB library.
\SWPMDB\SCRIPTS\MVD	The Scripts MVD directory contains the procedure scripts used for the Maintain Model Variable Dictionary Data process. The scripts are compiled and stored in the MVDLIB library.
\SWPMDB\QUERY	Query scripts are stored in this directory. Query scripts are played rather than compiled to facilitate ad-hoc querying and maintenance adjustments. Because the scripts are small and do not contain codes that are computationally intensive, no significant performance degradation occurs when they are left in ASCII text format. The majority of these scripts are created with the PARADOX Query/Query Save menu command.
\SWPMDB\LIB	The SWPMDB Lib directory contains the PARADOX procedure libraries. The libraries contain a compiled, binary, packed representation of procedure scripts. The SWPMDB application is set up to search each of the libraries for any of the procedures needed. The libraries in this directory are created by playing the SWPMBLD script in the SWPMDB directory. The SWPMBLD script creates new libraries, compiles all procedure scripts, and stores the compiled procedures in the new libraries.

2.6 DATA STRUCTURE

The data structure for the SWPMDB is derived from discussions held with SWPM project managers and task leaders. The roots of the structure are from the 14 data tables that make up a waste generator forecast and the goal was to create an electronic data processing environment to allow entry of the paper tables from a forecast into a computer. The database is shown in Figures 2.3, 2.4, and 2.5 with entity-relationship (E-R) diagrams. The E-R diagrams graphically display the types of data in the system (entities), the attributes of the entities (elements), and the relationship between the types of data. The E-R diagrams presented here display only the main data tables in the database. Supporting or temporary tables are documented in the data dictionary. The following conventions are used on the diagrams:

- Boxes represent entities. **Waste Generator** is the name of an entity on the Waste Generator Forecast E-R diagram.
- Names within a box are elements or attributes of an entity. **WG Abbrev** is an element of the Waste Generator entity.
- The lines between entities indicate relationships between the types of data. A Waste Generator produces one or more Forecasts. Each Forecast contains one or more Variables.

The database contains one data table for each entity in the diagram. The attributes listed for an entity become the fields or columns for the data table.

2.7 DATA STRUCTURE DICTIONARY

The data structure dictionary is used to provide information on the tables and fields that make up the database. It corresponds to the E-R diagram; however, it contains more detail because all supporting tables are documented in addition to the major tables. Tables 2.1, 2.2, and 2.3 provide descriptions of the data tables. Tables 2.4, 2.5, and 2.6 provide descriptions of the fields or columns in the data tables.

FIGURE 2.3. SWPMDB E-R Diagram for Waste Generator Forecast Data

FIGURE 2.4. SWPMDB E-R Diagram for TSD Data

VARDICT

SUBSDICT

VarSubs

FIGURE 2.5. SWPMDb E-R Diagram Model Variable Dictionary Data

TABLE 2.1. SWPMDb Data Table for Directory: \SWPMDb\DATA\FORe

Table	Description
#Var I	This table contains the Y-axis labels for the Variable I table. These are actually waste categories (CH_LLW, CH_LLMW, etc.).
#Var II	This table contains the Y-axis labels for the Variable II table. These are the four waste categories divided into low, intermediate (int), high, and GTCH classes.
#Var IV(g)	This table contains the Y-axis labels for the Variable IV(g) table. These are the waste categories for hazardous and mixed wastes.
DIST_F	This table holds the waste generator distribution fractions. Each waste generator should have one or more records in this table, defining the operations receiving its wastes and the percentage of waste volume distributed to each operation.
FORE	The attributes for each forecast are stored in this table, one record for each forecast. A waste generator, however, may have one or more forecasts.
OPER	This table is a list of the operations recognized by the SWPM system. The list contains names and associated cost data. Every operation must have a record in this table.
OPERCAP	This table contains the capacities for each of the operations. Each record provides the capacity for one operation during a single year. Every operation defined in the OPER table must have one or more records in this table.
OPERFLOW	This table provides the flow of waste from one operation to another. Each record contains a source operation, a destination operation, and the percentage of source operation waste flowing to the destination operation.
Var	This is the variable attributes table. Each of the 14 variables for each forecast must have a record in this table.
Var I	This variable subscript table contains the data from Variable I. This variable is the basis for all other waste generator forecast data. It contains the volume of waste, in cubic feet per year, by waste category.
Var II	This variable subscript table contains the data from Variable II. This variable provides percentages of waste for the waste categories in Variable I, broken out by waste class categories (low, int, high, GTCH).

TABLE 2.1. (contd)

<u>Table</u>	<u>Description</u>
Var IV(g)	This variable subscript table contains the data from Variable IV(g). This variable provides the weight for hazardous and mixed wastes. Values are provided for held waste for each year from 1990 to 1993. An average is provided for 1994 to 2020.
Var IV(h)	This variable subscript table contains the data from Variable IV(h). This variable provides the plans for treatment for hazardous and mixed wastes by physical content descriptor.
V_CONTR	This variable subscript table contains the data from Variables III(c), III(f), IV(c), and IV(f). These variables show volume percentages by physical/hazardous content descriptor and container.
V_NSP	This variable subscript table contains the data from Variables III(b), III(e), IV(b), and IV(e). These variables show volume percentages for waste not packaged in standard containers.
V_WL	This variable subscript table contains the data from Variables III(a), III(d), IV(a), and IV(d). These variables show volume percentages by physical/hazardous content and waste class.
WG	This lookup table defines the attributes of all waste generators providing data to the SWPMDB system.
{HCD}	This lookup table contains the possible values for hazardous content descriptors. This table should be modified only by the database administrator.
{PCD}	This lookup table contains the possible values for physical content descriptors. This table should be modified only by the database administrator.
{REF}	This lookup table contains the possible values for a reference. References are any external documentation media used to define or explain data provided for entities in the SWPMDB system.
{WCAT}	This lookup table contains the possible values for a waste category. This table should be modified only by the database administrator.
{WC}	This lookup table contains the possible values for a waste class. This table should be modified only by the database administrator.

TABLE 2.1. (contd)

<u>Table</u>	<u>Description</u>
{WGC}	This lookup table contains the possible values for a waste generator class. This table should be modified only by the database administrator.
{WGFVAR}	This lookup table defines the attributes for each of the 14 variables used by the SWPMDB system. This table should be modified only by the database administrator.

TABLE 2.2. SWPMDB Data Tables for Directory: \SWPMDB\DATA\MVD

<u>Table</u>	<u>Description</u>
SUBSDICT	This file contains the definitions for model subscripts. Subscripts are parameters that are passed to a variable. Each subscript should have one record in this file.
VALDICT	This file contains the values that a subscript may have. This is used only for subscripts with discrete (as opposed to continuous) values. Each record describes one value for a specified subscript.
VARDICT	This file contains the definitions for the variables used by the model. Variables represent a type of information (e.g., waste generator volumes or abbreviation lists).
VARSUBS	This is a relational file used to relate variables to subscripts. A variable may contain several subscripts. In addition, a subscript may appear in several variables. This file maintains the subscript-variable relationships.

TABLE 2.3. SWPMDb Data Table for Directory: \SWPMDb\DATA\OPER

<u>Table</u>	<u>Description</u>
\$CAPSUM	This is a condensed version of the capacity summary table. It contains only one record for each operation and provides the start year and capacity.
\$CHKWL	This table is used to contain results from the data integrity check to compare the ForeSum table to the V_WL table.
\$NORII	This file contains a normalized version of the Variable II table.
\$NORWL	This file contains a normalized version of the V_WL table.
\$OPCOMP	This is a compound table containing information from the TSD forecast tables.
\$SUMFLOW	This table is used to store the results of the data integrity checking which checks to ensure that each waste distribution fraction is associated with routine valid operations.
\$VIVII	This table is used for results of the data integrity checking routine which compares the Variable I and Variable II tables.
\$VOLSUM	This table is used to produce the volume summary report.
\$WLCONTR	This table is used for results of the data integrity checking routine which compares the V_WL table with the V_CONTR table.
FORESUM	This table is used to produce the forecast summary report.
SUMDISTF	This table is used for results of the data integrity checking routine which verifies that the WG_Dist_Fs sum to 1.

TABLE 2.4. Fields or Columns in the SWPMDB Data Tables for Directory:
 \SWPMDB\Data\Fore

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
Table: #Var I		This table contains the Y-axis value labels for the Variable I table. These are actually waste categories (CH_LLW, CH_LLMW, etc.).	
1	ORDER	A1	A sequential number used to order the waste category value labels.
2	WC	A12	Name of a waste category.
Table: #Var II		This table contains the Y-axis value labels for the Variable II table. These are the four waste categories, which are further divided into low, intermediate (int), high, and GTCH classes.	
1	ORDER	A1	A sequential number used to order the waste category value labels.
2	WC	A12	Name of a waste category.
Table: #Var IV(g)		This table contains the Y-axis value labels for the Variable IV(g) table. These are the waste categories for hazardous and mixed wastes.	
1	ORDER	A2	A sequential number used to order the waste category value labels.
2	WC	A12	Name of a waste category.
Table: DIST_F		This table has the waste generator distribution fractions. Each waste generator should have one or more records in this table to define the operations to receive its waste and the percentage of waste going to each operation.	
1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	WC	A12	Name of a waste class.
3	OPER_ABBREV	A12	The abbreviation for the operation name.
4	DIST_FRAC	N	The percentage of waste volume from the specified waste generator that is provided to the specified operation.

TABLE 2.4. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
5	DIST_REF	A12	The reference material used to describe the values for this record.

Table: FORE

The attributes for each forecast are stored in this table. There is one record for each forecast. A waste generator, however, may have one or more forecasts.

1	WG_PROC_ABBREV	A12	The abbreviation of the name a waste generator process.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	FORE_ENTRY_DATE	D	The date on which the waste generator forecast is entered.
4	FORE_PARENT_REF	A12	The forecast reference of the forecast from which this forecast is derived.
5	FORE_DESC	A255	A description of the waste generator forecast. This is free form text available for general comments.

Table: OPER

This table is a list of the operations recognized by the SWPM system. The list contains names and associated cost data. Every operation must have a record in this table.

1	OPTYPE_ABBREV	A12	The abbreviation for the operation name.
2	WC	A12	Name of a waste class.
3	OPTYPE_NAME	A30	The name of the operation.
4	TRT/DISP	A3	A flag indicating whether the specified operation is a treatment or disposal.
5	OP_CAT_ABBREV	A12	The abbreviation for an operation category.

TABLE 2.4. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
6	OPER_COST	N	The cost, in dollars per cubic feet, for the specified operation.
7	TRT_RATIO	N	The volume reduction (or increase) ratio for waste flowing in to an operation versus waste leaving an operation.
8	STOR_COST	N	The cost for storage, in dollars per cubic foot, associated with an operation.
9	OPER_REF	A12	The reference material used to describe the values for this record.
10	NEXT_WC	A12	The waste class of the destination operation.

Table: OPERCAP

This table contains the capacities for each of the operations. Each record provides the capacity for one operation during a single year. Every operation defined in the OPER table must have one or more records in this table.

1	OPER_ABBREV	A12	The abbreviation for the operation name.
2	WC	A12	Name of a waste class.
3	YEAR	N	The four-digit year for which the operation capacity is specified.
4	CAPACITY	N	The capacity (cubic feet) of waste that can be processed by a specified treatment or disposal.
5	CAP_REF	A12	The reference material used to describe the values for this record.

Table: OPERFLOW

This table provides the flow of waste from one operation to another. Each record contains a source operation, a destination operation, and the percentage of source operation waste flowing to the destination operation.

1	OPTYPE_ABBREV	A12	The abbreviation for the operation name.
2	WC	A12	Name of a waste class.

TABLE 2.4. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
3	NEXT_OPTYPE_ABBREV	A12	The destination operation abbreviation for the flow of waste from the specified source operation.
4	NEXT_WC	A12	The waste class of the destination operation.
5	FLOW_FRAC	N	The percentage of waste volume that flows from the source operation to the destination operation. For a given source operation, the sum of the percentages used for various destination operations should equal one.
6	FLOW_REF	A12	The reference material used to describe the values for operation flow data records.

Table: Var

This is the variable attributes table. Each of the 14 variables for each forecast must have a record in this table.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	VAR_START_DATE	D	The starting date for the range of time covered by the specified variable.
6	VAR_END_DATE	D	The ending date for the range of time covered by the specified variable.
7	VAR_UNITS	A5	The units of measurement for subscript data entered for the specified variable.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
8	VAR_DESC	A255	A text description of any special features or notes relating to the specified variable.

Table: Var I

This variable subscript table contains the data from Variable I. This variable is the basis for all other waste generator forecast data. It contains the volume of waste, in cubic feet per year, by waste category.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	ORDER	A1	A sequential number assigned to order records within a variable.
6	WC	A12	Name of a waste class.
7	HELD	N	The volume (cubic feet) or weight (pounds) of waste held.
8	1990	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1990.
9	1991	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1991.
10	1992	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1992.
11	1993	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1993.
12	1994	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1994.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
13	1995	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1995.
14	1996	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1996.
15	1997	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1997.
16	1998	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1998.
17	1999	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 1999.
18	2000	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2000.
19	2001	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2001.
20	2002	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2002.
21	2003	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2003.
22	2004	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2004.
23	2005	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2005.
24	2006	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2006.
25	2007	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2007.
26	2008	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2008.
27	2009	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2009.
28	2010	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2010.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
29	2011	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2011.
30	2012	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2012.
31	2013	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2013.
32	2014	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2014.
33	2015	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2015.
34	2016	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2016.
35	2017	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2017.
36	2018	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2018.
37	2019	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2019.
38	2020	N	The volume (cubic feet) or weight (pounds) of waste to be shipped during 2020.

Table: Var II

This variable subscript table contains the data from Variable II. This variable provides percentages of waste for the waste categories in Variable I, broken out by waste class categories (low, int, high, GTCH).

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	ORDER	A1	A sequential number assigned to order records within the specified variable.
6	WC	A12	Name of a waste class.
7	LOW	N	The percentage of waste volume generated in the low waste class.
8	INT	N	The percentage of waste volume generated in the intermediate waste class.
9	HIGH	N	The percentage of waste volume generated in the high waste class.
10	GTCH	N	The percentage of waste volume generated as greater than class high waste.

Table: Var IV(g)

This variable subscript table contains the data from Variable IV(g). This variable provides the weight for hazardous and mixed wastes. Values are provided for held waste for each year from 1990 to 1993. An average is provided for 1994 to 2020.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	ORDER	2	A sequential number used to order records within the specified variable.
6	WC	A12	Name of a waste class.

TABLE 2.4. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
7	HELD	N	The volume (cubic feet) or weight (pounds) of waste held.
8	1990	N	The volume (cubic feet) or weight (pounds) of waste produced during 1990.
9	1991	N	The volume (cubic feet) or weight (pounds) of waste produced during 1991.
10	1992	N	The volume (cubic feet) or weight (pounds) of waste produced during 1992.
11	1993	N	The volume (cubic feet) or weight (pounds) of waste produced during 1993.
12	1994-2020	N	The average weight (pounds) of waste produced from 1994 to 2020.

Table: Var IV(h)

This variable subscript table contains the data from Variable IV(h). This variable provides the plans for treatment for hazardous and mixed wastes by physical content descriptor.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	ORDER	A2	A sequential number used to order records within the specified variable.
6	PCD	A20	A physical content descriptor abbreviation.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
7	CH-LLMW	A1	The processing code for the intended treatment contact-handled low-level mixed waste for a given physical content descriptor.
8	CH-TRUMW	A1	The processing code for the intended treatment contact-handled TRU mixed waste for a given physical content descriptor.
9	CH-HAZ	A1	The processing code for the intended treatment contact-handled hazardous waste for a given physical content descriptor.
10	RH-LLMW	A1	Code indicating treatment of remote-handled low-level waste.
11	RH-TRUMW	A1	Code indicating treatment of remote-handled TRU mixed waste.

Table: V_CONTR

This variable subscript table contains the data from Variables III(c), III(f), IV(c), and IV(f). These variables show volume percentages by physical/hazardous content descriptor and container.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	ORDER	A2	The percentage of waste volume received in dump trucks for a given physical content descriptor.
6	PCD	A20	A physical content descriptor abbreviation.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
7	DRUM	N	The percentage of waste volume received in drums for a given physical content descriptor.
8	BOX	N	The percentage of waste volume received in boxes for a given physical content descriptor.
9	DUMP_TRUCK	N	The percentage of waste volume received in dump trucks for a given physical content descriptor.
10	OTHER_1	N	The percentage of waste volume received in an unspecified container for a given physical content descriptor.
11	OTHER_2	N	The percentage of waste volume received in an unspecified container for a given physical content descriptor.

Table: V_NSP

This variable subscript table contains the data from Variables III(b), III(e), IV(b), and IV(e). These variables show volume percentages for waste not packaged in standard containers.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	WC_ABBREV	A12	Abbreviation of a waste class name.
6	ORDER	A2	The percentage of waste volume placed in dump trucks for a given physical content descriptor.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
7	PCD	A20	A physical content descriptor abbreviation.
8	PERCENTAGE	N	The percentage volume of waste that is placed into the specified nonstandard package.
9	EXPLANATION	A50	An explanation of the waste that does not fit in standard packaging.

Table: V_WL

This variable subscript table contains the data from Variables III(a), III(d), IV(a), and IV(d). These variables show volume percentages by physical/hazardous content and waste class.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	ORDER	A2	A sequential number used to order records within the specified variable.
6	PCD	A20	A physical content descriptor abbreviation.
7	LOW	N	Contains the percentage volume of low-level waste for a specified physical/hazardous content descriptor.
8	INT	N	The percentage of waste volume generated in the intermediate waste class category for the specified waste category.
9	HIGH	N	The percentage of waste volume generated in the high waste class category for the specified waste category.

TABLE 2.4. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
10	GTCH	N	The percentage of waste volume generated in the greater than category high waste class category for the specified waste category.
11	TRU	N	Contains the percentage volume of TRU waste for a specified physical/hazardous content descriptor.
12	HAZ	N	The percentage of waste volume generated in the hazardous waste class category for the specified waste category.

Table: WG

This lookup table defines the attributes of all waste generators providing data to the SWPMDB system.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	WG_NAME	A30	The name of a waste generator.
3	WGC_ORDER	A1	A sequential number assigned to waste generator classes used for ordering on reports.
4	WGC	A12	Name of a waste generator class.
5	WG_ENTRY_DATE	D	The date on which the specified waste generator's attributes were entered into the SWPMDB system.

Table: {HCD}

This lookup table contains the possible values for hazardous content descriptors. This table should be modified only by the database administrator.

1	ORDER	A2	A sequential number used to order records within the specified variable.
2	HCD	A20	The hazardous content descriptor.
3	HCD_ABBREV	A12	The hazardous content descriptor abbreviation.

TABLE 2.4. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
Table: {PCD}		This lookup table contains the possible values for physical content descriptors. This table should be modified only by the database administrator.	
1	ORDER	A2	A sequential number used to order records within the specified variable.
2	PCD	A20	A physical content descriptor abbreviation.
Table: {REF}		This lookup table contains the possible values for a reference. References are any external documentation media used to define or explain data provided for entities in the SWPMDB system.	
1	REF_ID	A12	A unique number assigned to reference material.
2	REF_TITLE	A100	The title of reference material cited by the SWPMDB system.
3	REF_AUTHORS	A100	The authors of reference material cited in the SWPMDB system.
4	REF_PUB_DATE	D	The publishing date for the specified material cited by the SWPMDB system.
5	REF_PUBLISHER	A30	The publisher of reference material cited by the SWPMDB system.
6	REF_STORE_LOC	A30	The location of reference material cited by the SWPMDB system.
7	REF_DOCUMENT_#	A20	A filing number used to locate reference material cited by the SWPMDB system.
Table: {WCAT}		This lookup table contains the possible values for a waste category. This table should be modified only by the database administrator.	
1	WCAT	A12	Name of a waste category.
2	ORDER	A2	A sequential number used to order records within the specified variable.

TABLE 2.4. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
3	CAT_ORDER	N	The sequence number for used for ordering waste categories in a report.
4	CAT_TEXT	A25	The title used for waste categories.
5	HAND_ORDER	N	The sequence number used for ordering handling options on reports.
6	HAND_TEXT	A20	The full text describing a handling option.

Table: {WC}

This lookup table contains the possible values for a waste class. This table should be modified only by the database administrator.

1	WC	A12	Name of a waste class.
2	WCATEGORY	A12	Name of a waste category.
3	WLEVEL	A4	The waste level or waste class category (low, int, high, GTCH).
4	ORDER	A2	A sequential number used to order waste classes for reports.
5	CLASS_TEXT	A25	The title used for waste classes.
6	CATEGORY_TEXT	A25	The title used for waste categories.
7	HANDLING_TEXT	A20	The full text describing a handling option.

Table: {WGC}

This lookup table contains the possible values for a waste generator class. This table should be modified only by the database administrator.

1	WGC_ORDER	A1	A sequential number assigned to waste generator classes used for ordering on reports.
2	WGC	A12	Name of a waste generator class.
3	WGC_TEXT	A25	The title of a waste generator class.

TABLE 2.4. (contd)

No.	Field	Type	Field Description
Table: (WGFVAR)		This lookup table defines the attributes for each of the 14 variables used by the SWPMDB system. This table should be modified only by the database administrator.	
1	VAR_ID	A5	The ID associated with a variable.
2	VAR_NAME	A35	The name of a variable.
3	DISP_TABLE	A8	The name of the table used for input of variable subscript data values for the specified data table.
4	CONTROL_TABLE	A8	The name of the table containing the Y-axis label values for the specified variable.
5	VAR_FORM	N	The form used for entry of subscript data for the specified variable.
6	VAR_DESC	A255	The text describing the specified variable.

TABLE 2.5. Fields or Columns in the SWPMDB Data Tables for Directory:
 \SWPMDB\Data\MVD

No.	Field	Type	Field Description
Table: SUBSDICT			This file contains the definitions for model subscripts. Subscripts are parameters that are passed to a variable. Each subscript should have one record in this file.
1	SUBS_ABBREV	A12	Abbreviation for a subscript name.
2	SUBS_NAME	A30	The name of the subscript.
3	SUBS_SEQ	N	A sequential number assigned to the subscripts to order them within a variable.
4	SUBS_TYPE	A10	The data type of the subscript.
5	SUBS_UNITS	A10	The units in which the value for the subscript is recorded (pounds, inches, cubic feet, etc.).
6	SUBS_MIN_VALUE	N	The minimum value which the subscript may contain. This field is filled for continuous value subscripts.
7	SUBS_MAX_VALUE	N	The maximum value which the subscript may contain. This field is filled for continuous value subscripts.
8	SUBS_COMMENT	A255	A description of the subscript.
Table: VALDICT			This file contains the values a subscript may have. This is used only for subscripts with discrete (as opposed to continuous) values. Each record describes one value for a specified subscript.
1	SUBS_ABBREV	A12	Abbreviation for a subscript name.
2	SUBS_VALUE_SHORT	A12	An abbreviated value which the subscript may contain.
3	SUBS_VALUE_LONG	A40	The full length value which the specified subscript may contain.
4	SUBS_VALUE_DESC	A255	A description of the specified value which a subscript may contain.

TABLE 2.5. (contd)

No.	Field	Type	Field Description
Table: VARDICT			This file contains the definitions for the variables used by the model. Variables represent a type of information (e.g., waste generator volumes or abbreviation lists).
1	VAR_ABBREV	A20	Abbreviation of the name of the variable.
2	VAR_NAME	A50	The name of a variable.
3	VAR_TYPE	A10	The data type for the specified variable.
4	RPF_TYPE	A10	The data type of the field which should be passed to the reference data library files.
5	VAR_RPF_USE	A1	A flag indicating the type of variable (waste generator or treatment).
6	VAR_DICT_USE	A1	A flag indicating whether the variable should be output to the RDL. (Some variables are for comment only).
7	VAR_SPARSE_ARRAY	A1	A flag indicating if the variable is sparsely populated.
8	VAR_DEFAULT_VALUE	A25	The default value for the variable.
9	VAR_COMMENT	A255	A description of the variable.
10	VAR_UPDATE_DATE	D	The date that information for the variable was last updated.
11	VAR_UPDATE_WHO	A3	The person who last updated the variable information.
12	VAR_DELETE_DATE	D	The date that the variable is deleted from use.
13	VAR_DELETE_WHO	A3	Initials of the person deleting the variable from use.
14	VAR_DISP_SEQ	N	A sequential number assigned to variables to order them in reports.

TABLE 2.5. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
Table: VARSUBS			This is a relational file used to relate variables to subscripts. A variable may contain several subscripts. In addition, a subscript may appear in several variables. This file maintains the subscript-variable relationships.
1	VAR_ABBREV	A20	Abbreviation of the name of the variable.
2	VAR_SUBS_SEQ	N	A sequential number assigned to variable-subscript relationships to reflect the order of the subscript list.
3	SUBS_ABBREV	A12	Abbreviation for a subscript name.

TABLE 2.6. Fields or Columns in the SWPMDB Data Tables for Directory:
 \SWPMDB\Data\OPER

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
Table: \$CAPSUM			This is a condensed version of the capacity summary table. It contains only one record for each operation and provides the start year and capacity.
1	OPER_ABBREV	A12	The abbreviation for the operation name.
2	WC	A12	Name of a waste class.
3	CAPACITY	N	The capacity (cubic feet) of waste that can be processed by a specified treatment or disposal.
4	START	N	The initial year in which the operation capacity is valid.
Table: \$CHKWL			This table is used to contain results from the data integrity check to compare the ForeSum table to the V_WL table.
1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	WC	A12	Name of a waste class.
4	WG_ABBREV-1	A12	Waste generator abbreviation from the V_WL table.
5	FORE_REF-1	A12	The forecast reference from the V_WL table.
6	WLEVEL	A12	The waste level or waste class category (low, int, high, GTCH).
7	SUM_OF_VALUE	N	Sum of the percentages for a particular waste class.

TABLE 2.6. (contd)

No.	Field	Type	Field Description
Table: \$NORII		This file contains a normalized version of the Variable II table.	
1	WG_ABBREV	A12*	Abbreviation of a waste generator name.
2	FORE_REF	A12*	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5*	The ID associated with a variable.
4	VAR_VERSION	N*	A sequential version number assigned to variables within a forecast when they are created.
7	WC	A12	Name of a waste class.
8	WLEVEL	A12	The waste level or waste class category (low, int, high, GTCH).
9	VALUE	N	The percentage to be used for a waste class category.
Table: \$NORML		This file contains a normalized version of the V_WL table.	
1	WG_ABBREV	A12*	Abbreviation of a waste generator name.
2	FORE_REF	A12*	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5*	The ID associated with a variable.
4	VAR_VERSION	N*	A sequential version number assigned to variables within a forecast when they are created.
7	PCD	A20	A physical content descriptor abbreviation.

TABLE 2.6. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
8	WLEVEL	A12	The waste level or waste class category (low, int, high, GTCH).

Table: \$OPCOMP

This is a compound table containing information from the TSD forecast tables.

1	OPTYPE_ABBREV	A12	The abbreviation for the operation name.
2	WC	A12	Name of a waste class.
3	OPTYPE_NAME	A30	The name of the operation.
4	TRT/DISP	A1	A flag indicating whether the specified operation is a treatment or disposal.
5	OPER_COST	N	The cost, in dollars per cubic feet, for the specified operation.
6	TRT_RATIO	N	The reduction (or increase) ratio for waste flowing into a process versus waste leaving a process.
7	STOR_COST	N	The cost for storage, in dollars per cubic foot, associated with an operation.
8	START	N	The initial year in which the operation commences.
9	CAPACITY	N	The capacity, in cubic feet, of waste that can be processed by a specified treatment or disposal.
10	NEXT_OPTYPE_ABBREV	A12	The abbreviation for the destination operation for the flow of waste from the specified source operation.
11	NEXT_WC	A12	The waste class of the destination operation.
12	FLOW_FRAC	N	The percentage of waste volume which flows from the source operation to the destination operation. For a given source operation, the sum of the percentages used for various destination operations should equal one.

TABLE 2.6. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
Table: \$SUMFLOW		This table is used for results of the data integrity check to check for operations for WG_Dist_Fs.	
1	WC	A12	Name of a waste class.
2	OPER_ABBREV	A12	The abbreviation for the operation name.
3	OPTYPE_ABBREV	A12	The abbreviation for the operation name.
4	WC-1	A12	
5	SUM OF FLOW_FRAC	N	
Table: \$VIVII		This table is used for results of the data integrity check to compare the Variable I and Variable II tables.	
1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	ORDER	A1	A sequential number used for ordering records on reports.
4	WC	A12	Name of a waste class.
5	WG_ABBREV-1	A12	The waste generator abbreviation from Variable II.
6	FORE_REF-1	A12	The forecast reference from Variable II.
7	WC-1	A12	The waste class from Variable II.
Table: \$VOLSUM		This table is used to produce volume summary report.	
1	WGC_ORDER	A1	A sequential number assigned to waste generator classes used for ordering on reports.

TABLE 2.6. (contd)

No.	Field	Type	Field Description
2	WGC TEXT	A25	The title of a waste generator class.
3	CAT ORDER	N	The sequence number used for ordering waste categories in a report.
4	CAT TEXT	A25	The title used for waste categories.
5	HAND ORDER	N	The sequence number used for ordering handling options on reports.
6	HAND TEXT	A20	The full text describing a handling option.
7	WG_ABBREV	A12	Abbreviation of a waste generator name.
8	HELD	N	The volume (cubic feet) or weight (pounds) of waste held.
9	1990	N	The volume (cubic feet) or weight (pounds) of waste produced during 1990.
10	1991	N	The volume (cubic feet) or weight (pounds) of waste produced during 1991.
11	1992	N	The volume (cubic feet) or weight (pounds) of waste produced during 1992.
12	1993	N	The volume (cubic feet) or weight (pounds) of waste produced during 1993.
13	1994	N	The volume (cubic feet) or weight (pounds) of waste produced during 1994.
14	1995	N	The volume (cubic feet) or weight (pounds) of waste produced during 1995.
15	1996	N	The volume (cubic feet) or weight (pounds) of waste produced during 1996.
16	1997	N	The volume (cubic feet) or weight (pounds) of waste produced during 1997.
17	1998	N	The volume (cubic feet) or weight (pounds) of waste produced during 1998.
18	1999	N	The volume (cubic feet) or weight (pounds) of waste produced during 1999.

TABLE 2.6. (contd)

No.	Field	Type	Field Description
19	2000	N	The volume (cubic feet) or weight (pounds) of waste produced during 2000.
20	2001	N	The volume (cubic feet) or weight (pounds) of waste produced during 2001.
21	2002	N	The volume (cubic feet) or weight (pounds) of waste produced during 2002.
22	2003	N	The volume (cubic feet) or weight (pounds) of waste produced during 2003.
23	2004	N	The volume (cubic feet) or weight (pounds) of waste produced during 2004.
24	2005	N	The volume (cubic feet) or weight (pounds) of waste produced during 2005.
25	2006	N	The volume (cubic feet) or weight (pounds) of waste produced during 2006.
26	2007	N	The volume (cubic feet) or weight (pounds) of waste produced during 2007.
27	2008	N	The volume (cubic feet) or weight (pounds) of waste produced during 2008.
28	2009	N	The volume (cubic feet) or weight (pounds) of waste produced during 2009.
29	2010	N	The volume (cubic feet) or weight (pounds) of waste produced during 2010.
30	2011	N	The volume (cubic feet) or weight (pounds) of waste produced during 2011.
31	2012	N	The volume (cubic feet) or weight (pounds) of waste produced during 2012.
32	2013	N	The volume (cubic feet) or weight (pounds) of waste produced during 2013.
33	2014	N	The volume (cubic feet) or weight (pounds) of waste produced during 2014.
34	2015	N	The volume (cubic feet) or weight (pounds) of waste produced during 2015.

TABLE 2.6. (contd)

No.	Field	Type	Field Description
35	2016	N	The volume (cubic feet) or weight (pounds) of waste produced during 2016.
36	2017	N	The volume (cubic feet) or weight (pounds) of waste produced during 2017.
37	2018	N	The volume (cubic feet) or weight (pounds) of waste produced during 2018.
38	2019	N	The volume (cubic feet) or weight (pounds) of waste produced during 2019.
39	2020	N	The volume (cubic feet) or weight (pounds) of waste produced during 2020.
40	WG_TOTAL	N	The total volume or weight for all of the years in this record.

Table: \$WLCONTR

This table is used for results of the data integrity check to compare the V_WL table with the V_CONTR table.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	VAR_ID	A5	The ID associated with a variable.
4	VAR_VERSION	N	A sequential version number assigned to variables within a forecast when they are created.
5	PCD	A20	A physical content descriptor abbreviation.
6	VAR_ID-1	A5	The waste class from the container table (V_CONTR).
7	PCDSUM	N	The sum of percentages for a physical content descriptor.
8	CONTSUM	N	The sum of percentages for a container type.

TABLE 2.6. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
Table: FORESUM		This table is used to produce the forecast summary report.	
1	WGC_ORDER	A1	A sequential number assigned to waste generator classes used for ordering on reports.
2	WGC	A12	Name of a waste generator class.
3	WG_ABBREV	A12	Abbreviation of a waste generator name.
4	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
5	ORDER	A1	Sequential ordering used for printing reports.
6	WC	A12	Name of a waste class.
7	HELD	N	The volume (cubic feet) or weight (pounds) of waste held.
8	1990	N	The volume (cubic feet) or weight (pounds) of waste produced during 1990.
9	1991	N	The volume (cubic feet) or weight (pounds) of waste produced during 1991.
10	1992	N	The volume (cubic feet) or weight (pounds) of waste produced during 1992.
11	1993	N	The volume (cubic feet) or weight (pounds) of waste produced during 1993.
12	1994	N	The volume (cubic feet) or weight (pounds) of waste produced during 1994.
13	1995	N	The volume (cubic feet) or weight (pounds) of waste produced during 1995.
14	1996	N	The volume (cubic feet) or weight (pounds) of waste produced during 1996.

TABLE 2.6. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
15	1997	N	The volume (cubic feet) or weight (pounds) of waste produced during 1997.
16	1998	N	The volume (cubic feet) or weight (pounds) of waste produced during 1998.
17	1999	N	The volume (cubic feet) or weight (pounds) of waste produced during 1999.
18	2000	N	The volume (cubic feet) or weight (pounds) of waste produced during 2000.
19	2001	N	The volume (cubic feet) or weight (pounds) of waste produced during 2001.
20	2002	N	The volume (cubic feet) or weight (pounds) of waste produced during 2002.
21	2003	N	The volume (cubic feet) or weight (pounds) of waste produced during 2003.
22	2004	N	The volume (cubic feet) or weight (pounds) of waste produced during 2004.
23	2005	N	The volume (cubic feet) or weight (pounds) of waste produced during 2005.
24	2006	N	The volume (cubic feet) or weight (pounds) of waste produced during 2006.
25	2007	N	The volume (cubic feet) or weight (pounds) of waste produced during 2007.
26	2008	N	The volume (cubic feet) or weight (pounds) of waste produced during 2008.
27	2009	N	The volume (cubic feet) or weight (pounds) of waste produced during 2009.
28	2010	N	The volume (cubic feet) or weight (pounds) of waste produced during 2010.
29	2011	N	The volume (cubic feet) or weight (pounds) of waste produced during 2011.
30	2012	N	The volume (cubic feet) or weight (pounds) of waste produced during 2012.

TABLE 2.6. (contd)

No.	Field	Type	Field Description
31	2013	N	The volume (cubic feet) or weight (pounds) of waste produced during 2013.
32	2014	N	The volume (cubic feet) or weight (pounds) of waste produced during 2014.
33	2015	N	The volume (cubic feet) or weight (pounds) of waste produced during 2015.
34	2016	N	The volume (cubic feet) or weight (pounds) of waste produced during 2016.
35	2017	N	The volume (cubic feet) or weight (pounds) of waste produced during 2017.
36	2018	N	The volume (cubic feet) or weight (pounds) of waste produced during 2018.
37	2019	N	The volume (cubic feet) or weight (pounds) of waste produced during 2019.
38	2020	N	The volume (cubic feet) or weight (pounds) of waste produced during 2020.
39	WG_TOTAL	N	A sequential number assigned to waste generator classes used for ordering on reports.
40	VAR_ID	A5	The ID associated with a variable.
41	XORDER	N	A sequential number used for reporting.
42	WLEVEL	A12	The waste level or waste class category (low, int, high, GTCH).
43	VALUE	N	The percentage of waste for a waste category class.

Table: SUMDISTR

This table is used for results of the data integrity check for WG_Dist_Fs summing to 1.

1	WG_ABBREV	A12	Abbreviation of a waste generator name.
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TABLE 2.6. (contd)

<u>No.</u>	<u>Field</u>	<u>Type</u>	<u>Field Description</u>
2	FORE_REF	A12	The forecast reference. A string containing the name of the group of forecasts that this forecast belongs in. In addition, it contains a filing code to determine the forecast's location in project files.
3	WC	A12	Name of a waste class.
4	WG_ABBREV-1	A12	The waste generator from the distribution fraction table.
5	WC-1	A12	The waste class from the distribution fraction table.
6	SUM OF DIST_FRAC	N	The sum of distribution fractions for a waste generator.

3.0 DATABASE PROCESSES AND APPLICATIONS

The primary processes performed by the SWPMDb are shown in Figure 2.1. As mentioned, each of these processes corresponds to a menu option on the main menu. Selecting one of these options displays another menu or initiates some activity. Diagrams showing the submenus, down to the level of initiating an activity, are presented in Figures 3.1 through 3.6. Section 3.1 describes each of the processes shown in these diagrams. Section 3.2 lists the scripts which call the applications to execute these processes.

3.1 PROCESS DICTIONARY

The process dictionary provides a description for each of the processes represented on the data flow diagrams shown in Figures 3.1 through 3.7. The dictionary also provides the name of the script used to perform the process and the name of the data entry form used.

Change Waste Generator/Forecast Name

Main Program: CHGWGFOR.SC
Main Form/Report:
Process Description: Allows the data developer to change the name of a waste generator and/or forecast reference designation.

Check WG_Dist_Fs = 1

Main Program: SUMDIST.SC
Main Form/Report:
Process Description: Initiates the checking routine to insure that the distribution fractions for waste generators sum to 100%.

Check for Operations for WG_Dist_Fs

Main Program: DISTFLOW.SC
Main Form/Report:
Process Description: Initiates the checking routine to insure that the operations specified in the distribution fractions for waste generators do indeed have a corresponding operation in the TSD Oper table.

FIGURE 3.1. SWPM Submenu for Maintaining Waste Generator Data

FIGURE 3.2. SWPM Submenu for Maintaining TSD Data

FIGURE 3.3. SWPM Submenu for Maintaining Model Variable Dictionary Data

FIGURE 3.4. SWPM Submenu for Maintaining Feature Code and Descriptions

FIGURE 3.5. SWPM Submenu for Performing Data Integrity Checks

FIGURE 3.6. SWPM Submenu for Producing Forecast Data Summary Reports

Compare Container Subs to HCD/PCD

Main Program: WLCONTR.SC
Main Form/Report:
Process Description: Initiates the checking routine to insure that waste for waste classes in the V_WL table is distributed into containers in the V_Contr table.

Compare Foresum to Variables HCD/PCD

Main Program: FOREWL.SC
Main Form/Report:
Process Description: Initiates the checking routine to insure that waste specified for waste classes in the ForeSum table is also specified for waste classes in the V_WL table.

Compare Variables I & II

Main Program: VIVII.SC
Main Form/Report:
Process Description: Initiates the checking routine to insure that waste categories represented in Variable I are represented in Variable II.

Enter Operation Attributes

Main Program: TSDMENU.SC
Main Form/Report: OPER.F1
Process Description: Displays a form to allow maintenance of TSD operation attributes.

Enter Operation Capacity Volumes

Main Program: TSOMENU.SC
Main Form/Report: OPERCAP.F1
Process Description: Displays a form to allow maintenance of TSD operation capacities by year.

Enter Operation Distribution Fractions

Main Program: TSDMENU.SC
Main Form/Report: OPERFLOW.F1
Process Description: Displays a form to allow maintenance of TSD operation distribution fractions.

Enter Waste Generator Distribution Fractions

Main Program: TSDMENU.SC
Main Form/Report: DIST F.F1
Process Description: Displays a form to allow maintenance of waste generator distribution fractions.

Insert Subscripts into Dictionary

Main Program: SUBSDICT
Main Form/Report:
Process Description: Initiates a process to insert the unique occurrences of subscripts from the Maintain Variable Dictionary Process into the subscripts table so that the subscript attributes may be edited.

Maintain Contr Lookup Table

Main Program: CODEMENU.SC
Main Form/Report: (CONTR).F1
Process Description: Displays a form to allow maintenance of container-type attributes.

Maintain Feature Codes and Descriptions

Main Program: CODEMENU.SC
Main Form/Report:
Process Description: Displays a menu of the current feature code files.

Maintain HCD Lookup table

Main Program: CODEMENU.SC
Main Form/Report: (HCD).F1
Process Description: Displays a form to allow maintenance of hazardous content descriptor attributes.

Maintain Model Variable Dictionary Data

Main Program: MVDMENU.SC
Main Form/Report:
Process Description: Displays a menu of the options available to maintain the model variable dictionary data.

Maintain PCD Lookup Table

Main Program: CODEMENU.SC
Main Form/Report: {PCD}.F1
Process Description: Displays a form to allow maintenance of physical content descriptor attributes.

Maintain Subscript Data for Variables

Main Program: VAREEDIT.SC
Main Form/Report:
Process Description: Displays the two-dimensional, spreadsheet style data entry form for a specified variable. The process is initiated from within the Maintain Variable Data for Forecast process.

Maintain Subscript Dictionary Data

Main Program: MVDMENU.SC
Main Form/Report: SUBSDICT.F
Process Description: Displays a form to allow maintenance of the model subscripts.

Maintain Treatment, Storage, Disposal Data

Main Program: TSDMENU.SC
Main Form/Report:
Process Description: Displays a menu of the options available to maintain TSD forecast data.

Maintain Variable Data for Forecast

Main Program: VARMAINT.SC
Main Form/Report:
Process Description: Displays the variable attributes associated with a specified forecast. The process is initiated from within the Maintain Waste Generator Forecast Data process.

Maintain Variable Dictionary Data

Main Program: MVDMENU.SC
Main Form/Report: VARDICT.F
Process Description: Displays a form to allow maintenance of the model variables and their associated subscripts.

Maintain WC Lookup Table

Main Program: CODEMENU.SC
Main Form/Report: {WC}.F1
Process Description: Displays a form to allow maintenance of waste class attributes.

Maintain Waste Category Lookup Table

Main Program: CODEMENU.SC
Main Form/Report: {WCAT}.F1
Process Description: Displays a form to allow maintenance of waste category attributes.

Maintain Waste Generator Attributes

Main Program: WGEDIT.SC
Main Form/Report:
Process Description: Displays a form to allow maintenance of waste generator attributes.

Maintain Waste Generator Data

Main Program: WGMENU.SC
Main Form/Report:
Process Description: Displays a menu of the options available to maintain waste generator forecast data.

Maintain Waste Generator Forecast Data

Main Program: FOREEDIT.SC
Main Form/Report:
Process Description: Displays a form to allow selection and maintenance of a specific waste generator forecast.

Perform Data Integrity Checks

Main Program: DIMENU.SC
Main Form/Report:
Process Description: Displays a menu of the waste generator and TSD forecast data integrity checks that may be performed.

Print Reports

Main Program: MVDREP.SC
Main Form/Report:
Process Description: Displays a menu of the model variable dictionary reports that may be printed.

Produce Forecast Data Summary Reports

Main Program: FDSRMENU.SC
Main Form/Report:
Process Description: Displays a menu of the forecast data summary reports that may be produced.

Produce Forecast Summary Data/Report

Main Program: FORSUM.SC
Main Form/Report:
Process Description: Initiates the creation of the Forecast Summary Report and associated data.

Produce Reference Data Library Files

Main Program: WRITERDL.SC
Main Form/Report:
Process Description: Initiates the creation of reference data library files. These are the RPF and RPS files that are produced by the database for input into the model.

Produce Stored Waste Data/Report

Main Program: SW.SC
Main Form/Report:
Process Description: Initiates the creation of the Stored Waste Report and associated data.

Produce Stored Waste Summary Report

Main Program: SWSUM.SC
Main Form/Report:
Process Description: Initiates the creation of the Stored Waste Summary Report.

Produce TSD Summary Data

Main Program: OPCOMP.SC
Main Form/Report:
Process Description: Initiates the creation of a report that combines the TSD operation attributes, capacities, and distribution fractions.

Produce Volume by Waste Class Report

Main Program: FDSRMENU.SC
Main Form/Report: FORSUM.R2
Process Description: Initiates the creation of the Volume by Waste Class Report.

Produce Volume Summary Report

Main Program: VOLSUM.SC
Main Form/Report:
Process Description: Initiates the creation of the Volume Summary Report.

Produce Waste Density Report

Main Program: DENSUM.SC
Main Form/Report:
Process Description: Initiates the creation of the Waste Density Report.

3.2 PROCEDURE SCRIPT DICTIONARY

This section displays the contents of the script dictionary, which provides an alphabetical listing of the names and descriptions of procedure scripts used in the SWPMDB application.

<u>Name</u>	<u>Function</u>
CHGWGFOR.SC	Allows the data developer to change the name of a waste generator and/or forecast reference designation.
CHKWL.SC	Initiates the process to insure that all waste classes shown in the V_WL table are distributed into containers in the V_Contr table.
CODEMENU.SC	Displays a form to allow maintenance of waste category attributes.

<u>Name</u>	<u>Function</u>
DENSUM	Initiates the process to create the Density Summary Report.
DIMENU.SC	Displays a menu of the waste generator and TSD forecast data integrity checks that may be performed.
FOREEDIT.SC	Displays a form to allow selection and maintenance of a specific waste generator forecast.
FORSUM.SC	Initiates the creation of the Forecast Summary Report and associated data.
INST_VAR.SC	Called by VARMAINT to install default variables for a waste generator forecast.
MVDMENU.SC	Displays a form to allow maintenance of the model variables and their associated subscripts.
MVDREP.SC	Displays a menu of the model variable dictionary reports that may be printed.
NORWL.SC	Called during forecast summary processing to normalize the Variable II table.
SUBSDICT.SC	Initiates a process to insert the unique occurrences of subscripts from the Maintain Variable Dictionary Process into the subscripts table so that the subscript attributes may be edited.
SUMDIST.SC	Initiates the process to insure that the distribution fractions for waste generators sum to 100%.
SW	Initiates the process to create the Stored Waste report.
SWSUM	Initiates the process to create the Stored Waste Summary report.
TSDMENU.SC	Displays a menu of the options available to maintain TSD forecast data.
VAREEDIT.SC	Displays the two-dimensional, spreadsheet style data entry form for a specified variable. The process is initiated from within the Maintain Variable Data for Forecast process.
VARMAINT.SC	Displays the variable attributes associated with a specified forecast. The process is initiated from within the Maintain Waste Generator Forecast Data process.

Name	Function
VIVII.SC	Initiates the process to insure that waste categories represented in Variable I are represented in Variable II.
VOLSUM	Initiates the process to create the Volume Summary report.
WGEDIT.SC	Displays a form to allow maintenance of waste generator attributes.
WGMENU.SC	Displays a menu of the options available to maintain waste generator forecast data.
WLCONTR.SC	Initiates the process to insure that waste for waste classes in the V_WL table is distributed into containers in the V_Contr table.
WRITERDL.SC	Initiates the creation of reference data library files. These are the RPF and RPS files which are produced by the database for input into the model.
WRITERPF.SC	Called by WRITERDL to produce the RPF file.
WRITERPS.SC	Called by WRITERDL to produce the RPS file.

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