Federal Emergency Management Information System (FEMIS)

Data Management Guide FEMIS: Phase 1

Version 1.1u

June 1995

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**Pacific Northwest Laboratory
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FEDERAL EMERGENCY MANAGEMENT INFORMATION SYSTEM (FEMIS)

DATA MANAGEMENT GUIDE FEMIS: PHASE I

Version 1.1u

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BW-Connect Beame and Whiteside Software.

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Oracle7 ®, SQL*Net ®, and PRO*FORTRAN ® Oracle Corporation

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Solaris SunSoft

UNIX UNIX System Laboratories

WordPerfect ® for Windows WordPerfect Corporation.

FEMIS integrates the following government-furnished software products.

D2PC (July 94) US Army ERDEC

PARDOS v2.1 US Army ERDEC

Evacuation Simulation Model (ESIM v1.0) Oak Ridge National Laboratories

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Preface

The Federal Emergency Management System is an emergency management planning and analysis tool. The following documents were developed to support system users. The audience for each is identified.

This *FEMIS Data Management Guide* provides the information needed to manage the data files and database used to support the administrative, user-environment, database management, and operational capabilities of the FEMIS. **Audience:** chiefly database administrators and system administrators, but also emergency management planners and analysts who want to know details of the emergency management data.

The *FEMIS System Administration Guide* defines FEMIS hardware and software requirements and gives instructions for installing, FEMIS software package. **Audience:** system administrators and system managers.

The *FEMIS Online Help System* explains how to start and use the FEMIS program, which is designed to help civilian emergency management personnel to plan for and support their responses to a chemical-releasing event at a military chemical stockpile.^(a) **Audience:** all users of FEMIS, especially emergency management planners and analysts.

^(a) The FEMIS program is being developed by the Pacific Northwest Laboratory (PNL) as part of the U.S. Army's Chemical Stockpile Emergency Preparedness Program (CSEPP). PNL is operated for the U.S. Department of Energy by Battelle Memorial Institute under Contract DE-AC06-76RLO 1830.

About This Guide

Purpose

The Federal Emergency Management Information System (FEMIS) is an emergency management planning and analysis tool that is being developed under the direction of the U.S. Army Chemical and Biological Defense Command. The *FEMIS Data Management Guide* provides the background, as well as the operations and procedures needed to generate and maintain the data resources in the system.

Scope

Database administrators, system administrators, and general users can use this guide to manage the data files and databases that support the administrative, user-environment, database management, and operational capabilities of FEMIS. This document provides a description of the relational and spatial information present in FEMIS. It describes how the data was assembled, how it is loaded, and how it is managed while the system is in operation. For details on installing FEMIS, see the *FEMIS System Administration Guide*.

Because you will be using the prerelease versions of the FEMIS software and documentation, we encourage you contact us with suggestions or to ask questions. You can contact us by mail, telephone, fax, or E-mail:

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Audience

This guide is addressed chiefly to database administrators and system administrators. It will also be of value to emergency management planners and analysts who want to know details of the emergency management data. Users of this guide are expected to be familiar with the *FEMIS System Administration Guide*, and with the FEMIS itself.

Prerequisites

This guide assumes the database administrators have some knowledge of the Oracle database management system. Additional training may be required to understand the distributed database components of FEMIS. A complete set of *Oracle7* documents should be available to the database administrator.

Organization

This document is organized into eight sections and three appendices that contain supporting information.

- Section 1.0 - contains of the Introduction
- Section 2.0 - lists documents referenced or used as resources for this document.
- Section 3.0 - describes how the initial information is compiled and how the relational data and spatial data are initially loaded.
- Section 4.0 - discusses how relational data is managed during system operation.
- Section 5.0 - describes how the spatial data is managed after it is installed.
- Section 6.0 - discusses how the real-time Met data is managed.
- Section 7.0 - describes how exercise data is managed.
- Section 8.0 - discusses how the model data is managed. The data model includes the D2 dispersion model. Subsections describe opening, saving, importing and exporting a D2 case.
- Appendix A - consists of database data model figures for the Main, Spatial, and D2 models.
- Appendix B - consists of the Site Survey forms that will be used to collect an essential set of site parameters needed to preset the site database for each site.
- Appendix C - consists of the Relational Database Dictionary which will be supplied as a separate volume.

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Acronyms and Definitions

AAT	Arc attribute table
COTS	Commercial Off-The-Shelf
CFCC	Census feature class code
CLA	Chemical Limited Area
CSEPP	Chemical Stockpile Emergency Preparedness Program
DBMS	Database management system
DLG	Digital Line Graph
E-mail	Electronic mail
EMIS	Emergency Management Information System
EOC	Emergency Operations Center
ESF	Emergency Support Functions
FEMIS	Federal Emergency Management Information System
FIPS Code	Federal Information Processing Systems Code
GIS	Geographic information system
IBS	Integrated Baseline System
IEM	Innovative Emergency Management, Inc.
IRZ	Immediate Response Zone
LAN	Local area network
MCE	Maximum Credible Event
MET	Meteorological
ORNL	Oak Ridge National Laboratory
PAT	Point/polygon attribute table
PC	Personal computer
PNL	Pacific Northwest Laboratory
PRZ	Protective Action Zone
SQL	Structured Query Language
SQL script	Sequence of SQL statements that perform database operations
TCP	Traffic Control Point
TIFF	Tagged Image File Format
USGS	United States Geological Survey

1.0 Introduction

The Federal Emergency Management Information System (FEMIS) Phase I system information resources are described in this *FEMIS Data Management Guide*. To comprehend what types of data are present, where the data is located, and how it is managed during the life span of the system, a basic understanding of the FEMIS architecture is necessary. The Phase I system is being developed by Pacific Northwest Laboratory (PNL)^(a) and is designed for a single Chemical Stockpile Emergency Preparedness Program (CSEPP) site that has multiple Emergency Operations Centers (EOCs). The capability to connect to remote CSEPP sites and share information will be present in a future release.

Each EOC has between 5 and 25 personal computers (PCs) that emergency planners and operations personnel interact with to do their jobs. These PCs are connected via a local area network (LAN) to servers that provide efficient EOC-wide services. Each EOC is interconnected to other EOCs via telecommunications links.

FEMIS is a client/server system where much of the application software is located in the clients (PCs). This client software comprises a graphical user interface based on Visual Basic, a government furnished dispersion model, and Commercial Off-The-Shelf (COTS) tools such as the ArcView geographic information system (GIS), Microsoft Project Manager, and GroupWise electronic mail (E-mail).

A UNIX server provides data management services, Arc/Info GIS capabilities, electronic mail, and basic file management services. A PC communication (Comm) server is available to interface with external subsystems. For Phase I, the weather collection system (Met) is the only external subsystem. An evacuation model will be added in a later release.

Figure 1.1 illustrates a conceptual view of Phase I of FEMIS and the types of information required. Much of this information is located in the Oracle database management system (DBMS). Between EOCs, the DBMSs cooperate to share data, which allows multiple users to share the information while maintaining the integrity and persistence of the data. Table 1.1 summarizes the types of relational data and the general use of the data.

Other information exists in the UNIX file system, the E-mail server, and the command server. COTS tool information is present in the client file system.

NOTE: See sections in the *FEMIS System Administration Guide* for assistance with Creating the Database, Validation and Troubleshooting Notes, Installing the Oracle Server, and Relational Database Management System.

^(a) PNL is operated for the U.S. Department of Energy by Battelle Memorial Institute under Contract DE-AC06-76RLO 1830.

Figure 1.1. Conceptual View of FEMIS Phase I

Table 1.1. Types of Relational Data and General Use Description

Data Type	Data Use Description
D2 Data	Relational data tables used by the dispersion model
Electronic Plan Data	Supporting electronic planning information
Facility Data	Facilities and shelters information
Met Data	Weather conditions and tower information
Personnel Data	Person and organization information and user control data
Population Data	Population information including special populations
Resource Data	Resources and Memoranda of Understanding information
Risk Data	Plumes, wedges, threatened areas, and PAD/PARs information
Site Data	CSEPP site information including EOC data
Source Data	Chemical agents, munitions, bunkers, events, and casualties
Spatial Data	Relational data supporting the GIS
Work Plan Data	Work plans, MCE data, the journal, and case management data
Zone Data	Information about emergency planning zones

2.0 Resource Documents

FEMIS Software Design Document - An appendix in this document contains a detailed description of the relational database used in FEMIS. A graphical Entity/Relationship data model is provided to show the attribute information contained and how this is organized into table structures. A detailed data dictionary describes each attribute's data format, domain values, and description.

FEMIS System Administration Guide - This document contains a detailed description of the system administration interface.

Integrated Baseline System (IBS) Data Management Guide, Version 2.1 - This document contains a full description of the data files present in the IBS system.

3.0 Building the Initial Information

After FEMIS is installed, information is present in the database to enable the immediate use of the system. For example, the database tables used for validation are preset with the correct values, base maps are present in the spatial data, and facility data is present. This section describes how this initial information is obtained and loaded into the system as part of the installation.

The initial information can be grouped into the following three classes:

- CSEPP global - All FEMIS systems will contain identical information. Examples are the relational tables named State and Hazard_Site. This data is available from PNL for new installations.
- Site global - All EOCs at a given site will contain identical information. Examples are the relational tables named Zone and Accident_Class. This data is obtained from existing sources in electronic form or manually entered.
- EOC specific - Each EOC at the site will have distinct information. Examples are the relational tables named Facility and Memo_Understanding. Like the site global data, some of this information is available in electronic form and some will be gathered and entered manually.

The latter two classes of data prepared for a site have to be tailored to conditions present at that site. Factors to consider are the number and type of EOCs that will be deployed, the objectives of the site, and the area of interest for map and GIS theme coverage. Another consideration is the amount of information contained in active Emergency Management Information System (EMIS) and Integrated Baseline System (IBS) databases that can be extracted for the new FEMIS system.

Figure 3.1 illustrates the general process of data preparation at a high level. The detailed steps to accomplish this will be described in future versions of this guide. During Phase II, these operations will be formalized and made available along with user documentation.

EMIS is currently being used by the U.S. Army as the onpost automation system at most CSEPP sites. EMIS has a centralized database using the Oracle DBMS, and it also has a GIS that is used somewhat in the same manner as ArcView is used in FEMIS. Therefore, EMIS is a source for onpost relational data, such as igloos, and spatial information, such as base maps tailored to the site environment.

Figure 3.1. General Process of Data Preparation at a High Level

IBS is used at some CSEPP sites for offpost EOC automation at the county and state levels. The IBS EOCs tend to operate autonomously so each contains information that is unique. The data contained in IBS is in ASCII files and unformatted bit maps for the spatial information. In general, data must be extracted from each IBS system deployed at the site. Then parts of this data have to be merged to ensure that common information is consistent. IBS is a source for offpost facility, personnel, and resource information.

Because FEMIS encompasses more functionality than IBS and EMIS, some essential information is not present electronically. This type of information is obtained during the Site Survey. Also, the Site Survey is used to validate some of the data captured from IBS and EMIS; more details are provided in Section 3.1, Site Survey.

The extraction and post processing required for relational and spatial data are discussed in Sections 3.2 and 3.3. In general, each relational table or spatial data file requires individualized processing.

Census data and TIGER/Line data provided by the government are important external data sources. As shown in Figure 3.1, subsets of information from these sources are extracted and used for both spatial and relational databases. Section 3.3, Building Spatial Data, discusses how this is accomplished.

The validation step shown in Figure 3.1 is very important. It is accomplished after the spatial and relational databases are implemented. Even though some validation is done during the import processing, the final validation is needed to ensure consistency between the inter-related tables and files comprising the FEMIS database.

3.1 Site Survey

Although much of the information needed to preset the FEMIS database is available in soft copy, some information is not. Therefore, a means to collect a varied set of parameters that are not available in IBS, EMIS, or the government-furnished external sources is needed. All sites will require a common set of parameters obtained from the Site Survey. Depending on how widely IBS and EMIS are used at a given site, additional information may be required.

A Site Survey packet for the basic information has been prepared and is included in Appendix B. This packet, including electronic copies of survey forms, will be sent to each EOC site for completion. When complete, the packet will be returned to PNL for analysis of compatibility with other information. An onsite follow up meeting at each EOC is anticipated to resolve questions and ensure consensus at the site.

A set of assumptions are stated on the first part of the Site Survey that govern data collection and extraction activities. For example, the area of interest for map coverage is 75 miles from the center of the Chemical Limited Area (CLA). The reviewers should review these basic assumptions and note any variances that may be required. The Site Survey also provides default and recommended values in many cases. The EOC personnel should review the data provided and modify it directly on the form. The electronic Site Survey forms will use a computer spreadsheet (Excel) for capturing extensive amounts of data.

3.2 Building Relational Data

The relational database in FEMIS is managed by Oracle7, a commercial DBMS. The distributed processing features of Oracle are utilized to produce a multi-server distributed data architecture. Data replication is widely used to provide a local copy of most shared tables. This replication is important because it allows an EOC to operate autonomously in case the links to other EOCs are not operational. Also, performance is enhanced because the local tables are located on the local database.

In Phase I, over 150 tables comprise the FEMIS relational database. Three logical data models (Main, Spatial, and D2) describe graphically what information is present and how the data objects are interrelated. The Main data model represents a large collection of general purpose tables, the Spatial data model contains tables used by the GIS, and the D2 model contains tables used by the dispersion model. Diagrams of all three models are included in Appendix A. Additional detailed information about the data models is available in the *FEMIS Software Design Document*.

Based on Phase I design efforts and testing results, each relational database table is local to an EOC or shared with the other EOCs. Data in the local tables can be accessed only from users logged in to that EOC. The data in shared tables is available to several EOCs. Details of data placement are made transparent to the FEMIS users, so the FEMIS database appears to be a single, unified collection of tables. This physical design of the Oracle database is provided as a part of database implementation and should be applicable to all CSEPP sites.

Approximately one-half of the tables do not contain any information when the system is installed. These are tables, such as the Situation Summary table, that will contain information about the current conditions at the site. As the system is used, data will accumulate in these tables and become a useful resource. The management of these tables will be discussed in Section 4.0, Managing Relational Data.

The remaining tables are preset with data as part of the system installation process over the life-cycle of FEMIS. Some of the data in this class of tables may require updates after installation and will be discussed in Section 4.0. How preset data is collected and processed to become part of the delivered database is the subject of the remainder of this section.

Tables containing preset information that is universal to all sites are called CSEPP Global tables. During Phase I, information was assembled from various sources and loaded into this class of tables. As indicated in Table 3.1, the 31 Oracle tables are in this class; also shown is the data model where the table appears, the table name, whether the table is global or local, what type of user interface manages the data in the table, (all of these tables are managed by the FEMIS Data Manager called DATA MGR) and comments.

Table 3.1. Global FEMIS Tables

Table #	Model	Table Name	Global/Local	User Interface	Comments
1	Main	ACCIDENT_CLASS	Global	DATA MGR	
2	Main	ACTIVITY	Global	DATA MGR	
3	Main	AGENT_MUNITION	Global	DATA MGR	
4	Main	CHEMICAL_AGENT	Global	DATA MGR	
5	Main	CONTROL_POINT	Global	DATA MGR	Read Only
6	Main	DOSAGE	Global	DATA MGR	
7	EVAC	EP_ERROR_CODES	Local	DATA MGR	Read Only
8	Main	FACILITY_TYPE	Global	DATA MGR	
9	Main	GOAL	Local	DATA MGR	
10	Main	HAZARD	Global	DATA MGR	
11	Main	HAZARD_SITE	Global	DATA MGR	
12	Main	LOCATION_TYPE	Global	DATA MGR	Read Only
13	Main	MEASUREMENT_DEFN	Global	DATA MGR	
14	Main	MEASUREMENT_TYPE	Global	DATA MGR	
15	Main	MET_PARAMETER	Global	DATA MGR	
16	Main	MUNITION	Global	DATA MGR	
17	GIS	OBJECT_SUBTYPE	Global	DATA MGR	
18	Main	PD_LEVEL	Global	DATA MGR	
19	Main	PLAN_DETAIL	Local	DATA MGR	
20	Main	PLAN_HEADER	Local	DATA MGR	
21	Main	PRIVILEGE	Global	DATA MGR	Read Only
22	Main	PROTECTIVE_ACTION	Global	DATA MGR	
23	Main	SHELTER_DEFINITION	Global	DATA MGR	
24	Main	STATE	Global	DATA MGR	Read Only
25	Main	SYSTEM_MODE	Global	DATA MGR	Read Only
26	Main	SYSTEM_PHASE	Global	DATA MGR	Read Only
27	Main	SYSTEM_STAGE	Local	DATA MGR	
28	Main	VAL_LIST	Global	DATA MGR	
29	Main	VAL_LIST_DATA	Global	DATA MGR	
30	GIS	VAL_LOCATION_TYPE	Global	DATA MGR	
31	Main	ZONE_TYPE	Global	DATA MGR	

Table 3.2. illustrates the source of the information, the filename (if appropriate), the loading strategy, and the contents of the information in the table, and comments. A PNL source means that the information was assembled from various sources available to PNL.

The other two table classes with preset information contain site-specific and EOC- specific data. Table 3.3 lists the 42 tables in these two classes (similar to Table 3.1) illustrating the data model where the table appears, the table name, whether it is global or local, what type of user interface manages the data in the table, and comments. More complete details for gathering and loading these tables are provided in Table 3.4.

Table 3.2. Global Preset Database Tables

Table Loaded	Source	Filename	Load Strategy	Contents
ACCIDENT_CLASS	PNL	None	SQL load using data acquired during development	Global validation for Accident classes and descriptions
ACTIVITY	PNL	None	SQL load using data acquired during development	Global validation for Activity Codes and descriptions
AGENT_MUNITION	EMIS	AGENT_MN.DAT	SQL load using EMIS data	Global Agents, Munitions and Quantities per munition
CHEMICAL_AGENT	PNL	None	SQL load using data acquired during development	Global Agent codes and types
CONTROL_POINT	PNL	None	SQL load using software control points	Global Control Point names and Descriptions
DOSAGE	PNL	None	SQL load using normal D2 dosages	Dosage levels and descriptions from D2 model
EP_ERROR_CODES	PNL	ERROR.DAT	SQL load EMIS user manual error codes	Error code with description of error
FACILITY_TYPE	PNL/IBS	FACIL.DAT	SQL load from both the PNL data and the facility_type field within the Facility data file	Global Facility types and their descriptions
GOAL	PNL	None	SQL load with data based on user advisory board	"Save lives, protect property"
HAZARD	PNL	None	SQL load using data acquired during development	Global Hazard type and description
HAZARD_SITE	PNL	None	SQL load using data acquired during development	Compilation of the names, locations, and description for the CSEPP sites
LOCATION_TYPE	IBS	LOC_TYPE.DAT	SQL load with control data file. To generate the control file, the original data file from IBS must be edited to remove extra unrelated data.	Global validation for Location Types and Descriptions
MEASUREMENT_DEFN	PNL	None	SQL load using data acquired during development	Global validation for Measurement Classes
MEASUREMENT_TYPE	PNL	None	SQL load using data acquired during development	Global validation for Measurement types and description
MET_PARAMETER	PNL	None	SQL load using data acquired during development	Global validation for parameter codes and descriptions
MUNITION	PNL	None	SQL load using normal D2 munitions	Global Munitions and descriptions

Table 3.2. Global Preset Database Tables (continued)

Table Loaded	Source	Filename	Load Strategy	Contents
OBJECT_SUBTYPE	PNL/IBS	FACIL.DAT	SQL load from both the PNL control data and the facility_type field within the Facility data file	Global validation for location types and FEMIS object subtypes
PD_LEVEL	PNL	None	SQL load using data acquired during development	Plan level name and number
PLAN_DETAIL	PNL	None	SQL load using data acquired during development	Plan reference ID, responsible parties, start, finish, and duration times
PLAN_HEADER	PNL	None	SQL load with plan data template	Plan reference ID, name, status, descriptions for initial plan template
PRIVILEGE	PNL	None	SQL Plus query based on Control_Point table	Global privilege numbers and flags for assigned privileges based on control points
PROTECTIVE_ACTION	PNL	None	SQL load using data acquired during development	Global validation for Protective Actions and descriptions
SHELTER_DEFINITION	PNL	None	SQL load using data acquired during development	Global validation for Shelter Types and descriptions
STATE	PNL	None	SQL load using data acquired during development	Global validation for state codes and names
SYSTEM_MODE	PNL	None	SQL load using data based on user advisory board	Global system modes, default flags and description
SYSTEM_PHASE	PNL	None	SQL load using data based on user advisory board	Global phase names, flags and descriptions
SYSTEM_STAGE	PNL	None	SQL load using data based on user advisory board	Modes, Phases, and Stages
VAL_LIST	PNL	None	SQL load using data acquired during development	Validation list names and descriptions for Visual Basic Applications
VAL_LIST_DATA	PNL	None	SQL load using data acquired during development	Validation lists data and text
VAL_LOCATION_TYPE	PNL	None	SQL load using data acquired during development	Global validation table for location types
ZONE_TYPE	PNL	None	SQL load using data acquired during development	Global validation for zones and descriptions

Table 3.3. Site-Specific and EOC-Specific FEMIS Tables

Table #	Model	Table Name	Global/Local	User Interface	Comments
1	Main	AGENCY	Global	DATA MGR	
2	Main	BUNKER	Global	GIS	Spatial considerations
3	Main	CENSUS BLOCK	Global	DATA MGR	Read only
4	Main	CENSUS SUBDIVISION	Global	DATA MGR	Read only
5	Main	CENSUS TRACT	Global	DATA MGR	Read only
6	Main	COUNTY	Global	DATA MGR	
7	Main	DEPARTMENT	Global	DATA MGR	
8	Main	EMERGENCY SUPPORT	Global	DATA MGR	
9	Main	EOC	Global		
10	Main	EOC OBJECTIVE	Local	DATA MGR	
11	Main	EOC ZONE	Global	DATA MGR	
12	Main	FACILITY	Global	FACILITY UI	
13	Main	FEMIS OBJECT	Global		
14	Main	FEMIS USER	Local	MANAGE USER	
15	GIS	GIS LAYER	Global		Data captured with GIS load
16	GIS	GIS LAYER DEFINITION	Global	DATA MGR	
17	GIS	GIS OBJECT	Global	DATA MGR	Data captured with GIS load, export
18	Main	MET TOWER	Global		Compatibility to Met towers onsite
19	Main	MODE ROLE	Local		Read only
20	GIS	NAME SUBSTITUTION	Global	DATA MGR	
21	Main	PA UNIT	Global		
22	Main	PERSON	Local	PERSON FORM	
23	Main	POPULATION CONDITION	Global	DATA MGR	Set up for normal weekday night
24	Main	POPULATION DEFINITION	Global	DATA MGR	
25	Main	POPULATION LOCATION	Global	DATA MGR	
26	Main	POSITION	Local	DATA MGR	
27	Main	POSITION ASSIGNMENT	Local	DATA MGR	
28	Main	POSITION MODE	Local	SA UI	
29	Main	RESOURCE CATEGORY	Global	DATA MGR	
30	Main	RESOURCE DEFINITION	Global	DATA MGR	
31	Main	RESOURCE FACILITY	Local	FAC UI	
32	Main	RESOURCE LOCATION	Local	FAC UI	
33	Main	ROLE	Local	SA UI	
34	Main	ROLE MAP	Local	SA UI	PNL generates default roles
35	Main	ROLE PRIV	Local	SA UI	PNL generates default roles
36	Main	STORED AGENT	Global	DATA MGR	
37	Main	USER MODE PRIV	Local	DATA MGR	
38	Main	VAL POSITION	Global	DATA MGR	
39	Main	WK POSITION	Global	DATA MGR	
40	Main	ZONE	Global		
41	Main	ZONE IN GROUP	Global	RA UI	
42	Main	ZONE RISK GROUP	Global	DATA MGR	

Table 3.4. Site-Specific and EOC-Specific Preset Database Tables

Table Loaded	Source	Filename	Load Strategy	Contents
AGENCY	IBS	AGENCY_LOOKUP.DAT	SQL load with validated data	Agency codes and their associated agency names
BUNKER	EMIS	GISIGL.DAT (onpost)	SQL load with validated data	Igloo names and codes specific to the site
CENSUS_BLOCK	Census	STF1B tape files	SQL load with census data	State and county FIPS codes and Block name
CENSUS_SUBDIVISION	Census	STF1B tape files	SQL load with census data	State and county FIPS codes and Subdivision name
CENSUS_TRACT	Census	STF1B tape files	SQL load with census data	State, and county FIPS codes and Tract name
COUNTY	PNL	None	SQL load with preset data Use Site Survey results if different	State, county and FIPS codes
DEPARTMENT	PNL and Site Survey	None	SQL load with Department code = Agency code or Site Survey	Department and Agency codes. IBS does not have Department code so this is generated.
EMERGENCY_SUPPORT	IBS and Site Survey	EF.DAT	SQL load with preset data Use Site Survey results if different	Emergency support functions and descriptions
EOC	IBS and Site Survey	None	SQL load with preset data. Use Site Survey results if different.	EOC names, types number, description
EOC_OBJECTIVE	Site Survey	None	SQL load with data from Site Survey	EOC name, notify, decision and goal times, description and dose levels
EOC_ZONE	PNL	None	Preloaded list of zones associated with an EOC. Use Site Survey results if different.	EOC and Zone names
FACILITY	IBS and Site Survey	FACIL.DAT	See Facility Note	Facility names, capacity, description
FEMIS_OBJECT	IBS, PNL, and EMIS	None	See Femis Object Note	Femis object names, types, subtypes, x and y points
FEMIS_USER	Site Survey	None	SQL load with data from Site Survey	User code with encrypted password, account status
GIS_LAYER	PNL	None	SQL load with preset data	Data for basic GIS themes

Table 3.4. Site-Specific and EOC-Specific Preset Database Tables (continued)

Table Loaded	Source	Filename	Load Strategy	Contents
GIS_LAYER_DEFINITION	PNL	None	SQL load with preset data	Data for defining themes
GIS_OBJECT	PNL	None	SQL load with preset data	Data for all spatial objects
MET_TOWER	Site Survey	METTOWER.DAT	SQL load with data from the Site Survey	Names and locations of met towers
MODE_ROLE	PNL	None	SQL load with preset data	Definition of general user roles
NAME_SUBSTITUTION	PNL	None	SQL load with preset data	Standard case naming
PA_UNIT	Site Survey	None	SQL Plus query based on tables Zone and Facility	Protective action units, type and zone or facility name
PERSON	IBS	PERSON.DAT	See Person Note	Person reference number, name, address
POPULATION_CONDITION	PNL	None	SQL load with data for normal conditions	Population condition names, locations, descriptions
POPULATION_DEFINITION	PNL	None	SQL load with data based on IEM document	Population categories based on age, sex, household types
POPULATION_LOCATION	PNL	None	SQL load with data based on census blocks, subdivisions, and tracts	Population categories with locations, descriptions, and counts
POSITION (EOC)	Site Survey	None	SQL load with data from Site Survey	Position code with address, phone and description
POSITION_ASSIGNMENT	Site Survey	None	SQL load with data from Site Survey	Persons who are users
POSITION_MODE	PNL	None	SQL load with data from Site Survey	Position code with EOC name and mode name
RESOURCE_CATEGORY	IBS and Site Survey	RESOURCE.DAT	SQL load with data from Site Survey	The category and its description
RESOURCE_DEFINITION	IBS and Site Survey	RESOURCE.DAT	SQL load with data from Site Survey	Resource reference number, name, description
RESOURCE_FACILITY	IBS	RESOURCE.DAT	See Person Note	Resource reference number, name, description

Table 3.4. Site-Specific and EOC-Specific Preset Database Tables (continued)

Table Loaded	Source	Filename	Load Strategy	Contents
RESOURCE_LOCATION	IBS	None	SQL Plus query based on Resource_Facility table	Location of the resource at the facility
ROLE	PNL	None	SQL load with preset data	Role names and descriptions
ROLE_MAP	PNL	None	SQL load with preset data	Defines role hierarchy
ROLE_PRIV	PNL	None	SQL load with preset data	Role names with control points and privilege numbers
STORED_AGENT	EMIS	GISGL.DAT	SQL load with validated data	Bunker name, Agent Code and Munition type
USER_MODE_PRIV	Site Survey	None	SQL Plus query based on tables Person, Privilege and System_Mode	Control Point names, privilege numbers, user_codes, and mode_names
VAL_POSITION	Site Survey	VAL_POS.DAT	SQL load with preset data	Position codes and names
WK_POSITION	IBS	POSITION_LOOKUP.DAT	SQL load with validated data	Agency, Department, and title of position
ZONE	IBS	Spatial data files	SQL load with validated data	Zone name and type
ZONE_IN_GROUP	Site Survey	None	SQL load with data from Site Survey	List of zones in risk groups
ZONE_RISK_GROUP	Site Survey	None	SQL load with data from Site Survey	Name of risk groups
<p>Facility Note: A temporary table, T_Facility is created, loaded and updated with the data in Facil.Dat. The data load is completed when the data is copied from the T_Facility table to the Facility table. Updates from the Site Survey will be included.</p> <p>FEMIS Object Note: Since the Femis_Object table data represents geographical coordinates for many objects represented in the relational portions of the database it has several different SQL Loader control scripts which load data into the table. Examples include the Facilities from each EOC, igloos, zones, blocks, tracks, subdivisions, and counties.</p> <p>Person Note: Two temporary tables, T_Person and T_Agency are created, loaded and updated with the data from Person.Dat. The data load is completed when the data is copied from the T_Person table to the Person table. Updates from the Site Survey will be included.</p> <p>Resource Note: A temporary table, T_Resource_Facility is created, loaded and updated with the data in Resource.Dat. The data load is completed when the data is copied from the T_Resource_Facility table to the Resource_Facility table.</p>				

3.3 Building Spatial Data

FEMIS spatial data contains location information in the form of geographic coordinates of points, lines, and polygons that represent physical features and non-physical area boundaries on the surface of the earth. Within FEMIS, this location information is stored as ArcView themes which are accessed by FEMIS applications via the ArcView GIS software. Each theme represents a coherent set of similar geographic features (e.g., roads, facility locations, census tract boundaries). FEMIS spatial data also contains attribute information that is associated with the geographic features that make up the themes. These attribute values are stored and maintained in the FEMIS relational database. They are attached to the features within the ArcView themes as required by the FEMIS applications.

Figure 3.2 shows the general approach to building the initial FEMIS spatial and relational databases. Data from various information sources must be processed by the appropriate FEMIS data import software programs to extract the required data elements and place them into the proper data structures for storage in the FEMIS relational and spatial databases. All required attributes associated with both geographic and non-geographic data objects are stored in the FEMIS relational database. The geographic coordinates of the spatial features, together with selected attributes of those features, are stored as ArcView themes in the FEMIS spatial database.

3.3.1 Data Sources and Import Processing

The five major sources of FEMIS spatial data are discussed below:

1. **EMIS (Emergency Management Information System).** EMIS was developed for the U.S. Army as an interim onpost emergency management system. EMIS stores and manages spatial data and related attributes for onpost geographic features, model results, and raster image background maps. Most of the attribute information is stored in Oracle relational database tables.
2. **IBS (Integrated Baseline System).** IBS was developed as an interim offpost emergency management system. IBS stores and manages spatial data and related attributes for offpost geographic features and model results. The information is stored in a file system developed specifically for IBS. Most of the data is available in the form of ASCII text files.
3. **TIGER/Line Data.** The U.S. Bureau of the Census provides TIGER/Line data files that contain detailed location and attribute information for a variety of physical and non-physical features such as roads, railroads, streams and water bodies, facilities, landmarks, state and county boundaries, census unit boundaries, and other political and administrative boundaries. These ASCII files are organized into 12 record types at the county level (or equivalent to the county level for all states in the United States). Import processing of TIGER/Line data is discussed in detail in Section 3.3.2, TIGER/Line Data.

4. **1990 Census Statistical Data.** The U.S. Bureau of the Census provides statistical census data files that contain demographic information from the 1990 decennial census. This data consists of large ASCII files which contain population, family, and household counts within various demographic groupings (i.e., by age, sex, race, household type, income, and other social and economic factors). The information is reported at several geographic levels (e.g., county, subdivision, census tract, block group, block). Selected portions of this data are required by FEMIS applications and must be extracted and attached as attributes to the corresponding TIGER/Line census area polygons.
5. **Site Configuration Data.** Some spatial data related to planning decisions made at the site (e.g., accident-based planning category boundaries) may not be available from EMIS or any other existing data system. This data must be obtained directly from site personnel and must be entered into ASCII files prior to FEMIS import processing.

The FEMIS spatial data themes are listed and characterized in Table 3.5. They can be divided into three categories and discussed below: system spatial datasets, user-modifiable spatial datasets, and model-related spatial datasets.

- 1) **System spatial datasets** change infrequently and are managed and controlled by the system data administrator. Users cannot modify the spatial information contained in these datasets. Examples of system spatial datasets are roads; census blocks, tracts, and subdivisions; and emergency planning zone boundaries. All of these themes must be initially loaded into the FEMIS spatial database.
- 2) **User-modifiable spatial datasets** are the themes that can be modified by users from within certain FEMIS modules. User modifications are restricted to adding new features to an existing theme. The system data administrator retains control over modification and deletion of existing features in these themes. User-modifiable themes include facilities, known points, and accident-based planning wedges. The facilities theme is initially loaded with the locations of buildings and other facilities that are known to be of interest for emergency planning purposes. Users can then add other facilities to this theme. Known points are other locations that users may wish to include as named reference points for locating a hypothetical or real event, or for other purposes. The known points theme is not initially loaded. Similarly, the accident-based planning wedge theme is not initially loaded, as these hazard wedges are generated by the emergency planners.
- 3) **Model-related spatial datasets** are created by the hazard model for each model case that is run. These themes are created and stored on the user's PC and can be copied to the server for access by other users. These themes are generated entirely by the users and are thus not initially loaded.

The following paragraphs briefly discuss the data sources and import processing for each of the FEMIS spatial themes that must be initially loaded.

Table 3.5. Spatial Data Theme Descriptions

Generic Theme (Layer) Description	Data Source	User Directory	Filename	Data Type	User Modify	FEMIS Object ^(a)	Number of Themes
Facilities	IBS, FEMIS App	FA_<eoc_code>	<eoc_code>_FA	Vector - Point	Yes	Yes	1 per EOC
Known Points	IBS, FEMIS App	KP_<eoc_code>	<eoc_code>_KP	Vector - Point	Yes	Yes	1 per EOC
Accident Based Planning Wedges	FEMIS App	WA_<eoc_code>	<eoc_code>_WA	Vector - Polygon	Yes	Yes	1 per EOC
D2 Track (dose)	FEMIS App	D2_<eoc_code>	D<case_id(7)>	Vector - Polygon	Yes	Yes	1 per EOC and case
D2 Track (conc.)	FEMIS App	D2_<eoc_code>	K<case_id(7)>	Vector - Polygon	Yes	Yes	1 per EOC and case
D2 Wedge	FEMIS App	D2_<eoc_code>	W<case_id(7)>	Vector - Polygon	Yes	Yes	1 per EOC and case
Census Blocks	TIGER Line	CEDBLOCK	site_code_TB ^(a)	Vector - Polygon	No	Yes	1
Census Subdivisions	TIGER Line	CEDSUBDV	site_code_TD	Vector - Polygon	No	Yes	1
Census Tracts	TIGER Line	CEDTRACT	site_code_TT	Vector - Polygon	No	Yes	1
State & County Boundaries	TIGER Line	STCOUNTY	site_code_SC	Vector - Polygon	No	Yes	1
Accident-Based Planning Categories	Site Config	ABPC	site_code_PC	Vector - Polygon	No	Yes	1
Bunkers (point)	EMIS	BUNKER_P	site_code_BP	Vector - Point	No	Yes	1
Bunkers (area)	EMIS	BUNKER_A	site_code_BA	Vector - Polygon	No	Yes	1
Zones	IBS	ZONE	site_code_EZ	Vector - Polygon	No	Yes	1
Met Towers	Site Config	METTOWER	site_code_MT	Vector - Point	No	Yes	1
Administrative Boundaries	IBS	ADMINBND	site_code_AB	Vector - Polygon	No	No	1
All Roads	TIGER Line	ROADALL	site_code_RA ^(a)	Vector - Line	No	No	1
Major Roads	TIGER Line	ROADMAJ	site_code_RM ^(a)	Vector - Line	No	No	1
Streams, Water Bodies	TIGER Line	STREAM	site_code_SA ^(a)	Vector - Line, Polygon	No	No	1
Image Maps	EMIS	IM_<scale>	<site_code> <scale> ^(b)	Image	No	No	1 per scale
(a) ArcView Library file (contains multiple shape files, one per state/county)							
(b) ArcView Image Library file, one for each scale (each library contains multiple image files, one file per tile)							
(c) Contains entries in FEMIS.OBJECT table to link spatial and relational data.							

3.3.1.1 Accident-Based Planning Categories

For planning purposes, the Accident Based Planning Review Group at each CSEPP site determines the geographic boundaries of several categories of potential accidents. The categories represent different levels of impact severity and are typically represented geographically by concentric circles of differing radii centered on the site's Chemical Limited Area. Given the number of categories and the center and radius of each circle, the theme is generated by running an ArcView/Avenue script using the appropriate input parameters.

3.3.1.2 Administrative Boundaries

Administrative boundaries (e.g., national forests or state parks) are obtained from the IBS Administrative Boundaries data layer. An ASCII file containing the spatial coordinates and attributes to be attached to the spatial data is used to create the ArcView theme.

3.3.1.3 Census Blocks, Tracts, and Subdivisions

The Arc/Info TIGERTOOL command (see Section 3.3.2) is used to convert TIGER/Line data files into Arc/Info coverages for the counties surrounding the hazard site. Census enumeration district boundaries are then extracted from the Arc/Info coverages, and separate Arc/Info coverages are created for census blocks, tracts, and subdivisions. These coverages are then exported to ArcView themes using Arc/Info's EXPORT command and ArcView's IMPORT utility. Census demographic data (e.g., population counts) are extracted from the STF-1B census statistical data files and stored in the relational database for each census block, tract, and subdivision. These demographic attributes can then be attached to an ArcView census theme by converting the themes to ASCII files, appending the demographic attributes as new columns, and reconverting the modified ASCII files back to an ArcView theme.

3.3.1.4 Emergency Planning Zones

Emergency planning zone boundaries and attributes are obtained from ASCII files that are extracted from the IBS dms (spatial data) zone files. An SQL script is used to load the data from the IBS ASCII files into the appropriate relational database tables. Another ASCII file containing the spatial coordinates and attributes to be attached to the spatial data is then used to create the ArcView theme.

3.3.1.5 Igloos (point and area)

Igloo location and attribute data are obtained from EMIS. A Structured Query Language (SQL) query is used to extract the data from the EMIS relational database tables and create an ASCII file. A loader script is then used to load the data from the ASCII files into the appropriate relational database tables. The ASCII file containing the spatial coordinates and attributes to be attached to the spatial data is used to create the ArcView theme.

3.3.1.6 Image Maps

Background image maps of the area surrounding the hazard site are obtained from the original Sunraster format images used to create the EMIS background image library. Images at two different scales (1:24,000 and 1:500,000) are currently being incorporated into the FEMIS spatial database. The Arc/Info GIS is used to register each image to another FEMIS data layer, such as roads or streams. The image must then be converted to a TIFF graphics file format, integrated with other images of the same scale, and exported to ArcView.

3.3.1.7 Met Towers

Meteorological monitoring tower data is obtained from the Met subsystem's METTOWER.DAT file (see Section 6.0, Managing Meteorological [Met] Data). An SQL script is then used to load the data from the ASCII file into the appropriate relational database tables. The ASCII file containing the spatial coordinates and attributes to be attached to the spatial data is also used to create the ArcView theme.

3.3.1.8 Road Themes (All, Major)

The Arc/Info TIGERTOOL command is used to convert TIGER/Line data files into Arc/Info coverages for the counties surrounding the hazard site. Road features are then extracted from the full Arc/Info coverages, and separate Arc/Info coverages are created for all roads (line segments with a Census Feature Class Code [CFCC] that begins with "A") and major roads (CFCC begins with "A1" or "A2"). These coverages are then exported to ArcView themes using Arc/Info's EXPORT command and ArcView's IMPORT utility.

3.3.1.9 State and County Boundaries

The Arc/Info TIGERTOOL command is used to convert TIGER/Line data files into Arc/Info coverages for the counties surrounding the hazard site. State and county boundaries are then extracted from the full TIGER/Line Arc/Info coverages and stored in a new Arc/Info coverage. This coverage is then exported to an ArcView theme using Arc/Info's EXPORT command and ArcView's IMPORT utility.

3.3.1.10 Streams and Water Bodies

The Arc/Info TIGERTOOL command is used to convert TIGER/Line data files into Arc/Info coverages for the counties surrounding the hazard site. Stream and water body features (CFCC begins with "H") are then extracted from the full TIGER/Line Arc/Info coverages and stored in a new Arc/Info coverage. This coverage is then exported to an ArcView theme using Arc/Info's EXPORT command and ArcView's IMPORT utility.

3.3.1.11 Facilities

Facility locations and attributes are obtained from the IBS "known points" ASCII files. (A known point in IBS is a facility in FEMIS.) An SQL script is used to load the data from the ASCII files into the appropriate relational database tables. The ASCII file containing the spatial coordinates and attributes to be attached to the spatial data is also used to create the ArcView theme.

3.3.2 TIGER/Line Data

The TIGER/Line files, available on CD ROM, contain coordinates of points, lines, and polygons that represent physical features (e.g., roads, streams and water bodies, landmarks) and non-physical boundaries (e.g., states and counties, 1990 census tracts and blocks, state parks). The files also contain attribute information (e.g., feature name, feature type, census unit identifier) associated with each point, line, and polygon feature. The attribute information can be used by the Arc/Info GIS software to select individual features by name or to select a group of features by feature type (e.g., interstate highways). The TIGER/Line files also contain topological information (left and right area identifiers for a line segment) that allows Arc/Info to construct polygons and to link the polygon areas to their associated arcs, label points, and area attributes. TIGER/Line files do not contain statistical census demographic data.

Each TIGER/Line dataset represents one county in a given state and may contain up to 12 different record (file) types. Some of the record types are optional, and thus not all county datasets have all 12 files. The format and content of these 12 file types are documented in the *Technical Documentation for TIGER/Line Census Files, 1990* (U.S. Dept. of Commerce, Bureau of the Census, Washington, D.C., 1991).

Arc/Info provides two commands that can be used to convert TIGER/Line data to Arc coverages and associated Info attribute files. The TIGERARC command performs the basic conversion of point, line, and attribute data and completes the conversion rather quickly (usually about 3 to 5 minutes). The TIGERTOOL command performs a comprehensive conversion using a macro supplied with Arc/Info, version 6.0 and higher. TIGERTOOL runs TIGERARC and also builds the line and polygon coverages, relates those coverages to the Info files that contain the various attributes associated with the geographic objects, and checks for and reports detectable errors or inconsistencies in the data. TIGERTOOL takes approximately 15 to 20 minutes to complete for a typical county dataset.

The syntax for the TIGERTOOL command for use within FEMIS is as follows:

```
TIGERTOOL <tiger_line_file_prefix> <out_cover_prefix> VTD
```

Each TIGER/Line county dataset contains a set of files with names that are identical except for the last character in the filename. The second item in the command line, <tiger_line_file_prefix>, should be set to this common part of the filename. The last character appended to the common filename indicates the file type. The 12 file types are described via an example dataset in the following paragraphs. Similarly, <out_cover_prefix> is the filename prefix to be used to identify the output coverages to be created by TIGERTOOL. The VTD option instructs TIGERTOOL to extract and store the Voting Tabulation District boundaries.

The set of TIGER/Line files for Gilliam County, Oregon (State FIPS Code 41, County FIPS Code 021) is given below as an example.

Note: The filenames contain a common prefix (tgr41021.f4) followed by a single character denoting the file type.

tgr41021.f41 - Type 1: Basic data records
tgr41021.f42 - Type 2: Shape coordinate points
tgr41021.f43 - Type 3: Additional census geographic area codes
tgr41021.f44 - Type 4: Index to alternate feature names
tgr41021.f45 - Type 5: Feature name list
tgr41021.f47 - Type 7: Landmark features
tgr41021.f48 - Type 8: Area landmarks
tgr41021.f4a - Type A: Additional polygon geographic area codes
tgr41021.f4i - Type I: Area boundaries
tgr41021.f4p - Type P: Polygon locations (internal points)
tgr41021.f4r - Type R: Record number ranges

There was no Type 6 data file (additional address range and ZIP code information) available for Gilliam County. Because the TIGERTOOL user documentation suggests that Type 4, 5, and 6 files should not be converted if the information in them is not needed, these files can be renamed so TIGERTOOL will not find them under the input file prefix "tgr41021.f4".

TIGERTOOL creates three output coverages:

1. <outcover_prefix> 1 - contains arc (line) coordinates and polygon topology extracted from the basic data records (Type 1) and the shape coordinate points (Type 2)
2. <outcover_prefix> 2 - point coverage containing polygon label points from Type P records
3. <outcover_prefix> 3 - point coverage containing point landmark features from Type 7 records.

In addition, TIGERTOOL creates a collection of Info attribute files that contain the attributes of points, lines, and polygons contained in the three GIS coverages. TIGERTOOL also builds a set of "relates" (relational joins) to link these Info attribute files to the arc attribute table (AAT) and point/polygon attribute table (PAT) files of the coverages. These "relate" definitions are named and stored in a file named <outcover_prefix>.rel and can be activated in Arc/Info by using the "RELATE RESTORE <file_name>" command. Items (columns) in the related attribute files can then be accessed in Arc/Info commands as though they were an item in the PAT or AAT file by using the syntax "<relate_name> // <item_name>". The attribute files created by TIGERTOOL and their associated relate names are listed below.

1. <outcover_prefix> 1.acode - arc attributes from Type 1 records. Relate name: ACODE.
2. <outcover_prefix> 1.type3 - additional census geographic area codes, including voter tabulation districts, from Type 3 records. Relate name: TYPE3.
3. <outcover_prefix> 1.pcode - polygon (area) attributes from Type 1 records. Relate name: PCODE.

4. <outcover_prefix>2.typea - additional polygon geographic area codes, including congressional districts, from Type A records. Type A files also have reserved place holders for possible future storage of school district boundaries, traffic analysis zones, and urbanized area codes. Relate name: ACODE.
5. <outcover_prefix>2.xcode - polygon label points from Type P records. Relate name: XCODE.
6. <outcover_prefix>2.typei - area boundary identifiers from Type I records (contains both Type 1 record numbers and Type P polygon identifiers). Links Type 1 line segment records to the corresponding Type P polygon records (left and right). Relate name: TYPEI.
7. <outcover_prefix>3.xcode - attributes of point and area landmark features and longitude/latitude coordinates of point landmarks from Type 7 records. Relate name: TYPE7.
8. <outcover_prefix>3.type8 - polygon identifiers for area landmarks from Type 8 records. Relate name: TYPE8.

These Info attribute files and the predefined relates allow users of Arcplot (the map display subsystem of Arc/Info) to select and display a specific theme (e.g., all hydrographic features) or a subset of features (e.g., primary and secondary divided highways) by relating the coverage to the CFCC attribute and selecting CFCC values that correspond to the desired feature types. Individual features (e.g., Interstate Highway 84) can be selected by feature name. Polygons of a specific type (e.g., census blocks boundaries) can be displayed by selecting all the line segments for which the left area identifier (e.g., census block identifier) differs from the right area identifier. Once the user has selected a group of similar features, these features can be extracted into an Arc/Info coverage and then exported to an ArcView theme for use within FEMIS.

4.0 Managing Relational Data

The FEMIS application has many user interface screens for accessing and managing relational data. The online help function provides a convenient user guide. A collection of the relational tables has no formal user screens and relies on a general-purpose tool to manage the records in them. This section discusses how this tool is used and provides guidelines to manage the relational database while FEMIS is in use.

In the FEMIS Phase I system, all data access protection is performed by means of user interface screens. The CONTROL_POINT table in the relational database defines the software branch points where protection can be used. The System Management section in the *FEMIS System Administration Guide* provides the procedures for giving FEMIS users the correct privileges to perform their tasks.

4.1 FEMIS Data Manager Tool

The FEMIS Data Manager Tool is activated from the last submenu under the Data drop-down menu and is titled Administration. Click on Administration to display the FEMIS data manager tool, which is the FEMIS Data Manager window. Within this window are two smaller windows, the FEMIS Tables window and the SQL Statement window. The FEMIS Tables window on the left contains a list of all the tables in the relational database.

Note: Some additional entries such as CMOR_TABLEXX appear here; these are views that are used for database replication and you should not access them.

The SQL Statement window on the right is used to formulate a user query, but normally it is not used. It can be turned into an icon by selecting the Close option or by double clicking on the control box in the top left corner of this window.

To view data in a table, select the Grid radio button below the main menu, highlight one of the tables from the list, and click on the Open button. This will bring up the Snapshot window which contains a multiple-record, grid display of the information in the FEMIS table. If the record is longer than the width of the window or there are more records available than can be shown, scroll bars are presented to view all the records and fields. For tables with many records, the Next button is used to select the next group.

FEMIS Database Manager [loveall@CT00: ver1.1a]

File EOC Table Utility Preferences Window

Method for viewing data: ☐ Form (Editable) ☒ Grid (Read Only)

FEMIS Tables

Open

Tables:

- CT00.ACCIDENT_CLASS
- CT00.ACTIVITY
- CT00.AGENCY**
- CT00.AGENT_MUNITION
- CT00.APPROACH
- CT00.BTB_DEPENDENCE
- CT00.BTB_PLAN_DETAIL
- CT00.BTB_PLAN_HEADER
- CT00.BTB_RESOURCE_ASS
- CT00.BUNKER
- CT00.CAS_INQUIRY
- CT00.CASE_CISCO
- CT00.CASE_LINK

SnapShot: CT00.AGENCY [38 rows]

Next Fast More Find Redo Filter Sort Close

	AGENCY_CODE	EXTENSE	AGENCY_NAME	AGENCY
1	US West	0	US West	ilities
2	UTAH Power	0	UTAH Power	ilities
3	SFD	0	Stockton Fire	ire Se
4	WFD	0	Wendover Fire	ire Se
5	GPD	0	Grantsville	aw
6	TCS	0	Tooele County	aw
7	SPD	0	Stockton	aw
8	TPD	0	Tooele Police	aw
9	UTHP	0	Utah Highway	aw
10	WPD	0	Wendover	aw

Ready

If you must create new data or edit data that is present, select the Form radio button instead of Grid. This will bring up a screen such as the one shown in the following example. From this window you can add, edit, or delete records. The find, filter, sort and prop buttons are search and organization options for the fields in the table. A zoom feature is present for displaying long fields, which is shown in the next screen. Place the cursor in the field and press F4 (function key 4) to display the zoom box window.

4.2 Managing Relational Data in Phase I

Future upgrades of the FEMIS system will incorporate functions to archive data that must be saved for the record and to discard other data that has no current value. A future release of FEMIS will also use the Oracle database backup and recovery functions to ensure the database can be restored to a consistent state if serious errors occur.

This section describes several considerations that will help manage the relational database and provides some guidelines to use. Topics included are database integrity, testing modifications, managing exercise data, archiving data, and backup and recovery.

4.2.1 Database Integrity

The information in the relational database has complex inter-relationships that must be maintained. The user interface screens have been designed and tested to achieve this integrity.

Caution

Changing the FEMIS relational database tables can destroy the functionality of the FEMIS application. Do not allow general users to modify the relational database. Database adjustments should only be performed by qualified Database Administrators. Observe extreme care when performing any maintenance in the relational database.

When changes are made using the FEMIS Data Manager or other tools, such as SQL*PLUS, care must be taken to prevent inconsistencies in the database. Only FEMIS users that understand the database should be given access to tools that allow modifications.

4.2.2 Testing Modifications

It is recommended that any significant changes to the database are first tested by implementing them on an exercise dataset. If problems are encountered, the exercise data can be easily deleted without any impact on the operational data. When the changes have been tested, then they may be applied to the operational data.

4.2.3 Managing Exercise Data

Each time a new exercise dataset is generated, approximately one-half of the tables in the relational database gain a significant number of new records. If the exercise director does not remove obsolete exercise data, database performance may be impacted. Section 7.0, Managing Exercise Data, describes the exercise director's screens that allow maintenance for this type of data. The exercise director should document each dataset and delete unnecessary data.

4.2.4 Archiving Tables

The Journal table (where events are logged) and the Met tables may require some maintenance. Two manual processes are available to archive the older data in these tables by first saving the data to a file and then deleting the records from the database table(s). The next phase of FEMIS will have more capabilities for archiving and include more tables than those noted above. When that phase is in production, these manual processes will become obsolete.

The frequency of archiving depends on how the system is used. If, for example, FEMIS was operated 7 days a week for 12 hours a day with continuous Met feed, the Met_Condition Table records will increase or grow by approximately 500 records per day. In a month, nearly 15,000 records would accumulate, and in a year the count would be approximately 175,000. The Journal table rate of growth would be less than the Met tables, but after a year's time, it may approach 100,000 records. These numbers of records would not fill the tables or the database but would be undesirable to view in the Status Boards.

Data should be archived when users indicate too many records are present or when the Database Administrator determines older records in the table are no longer useful. Because the archived data can be reloaded, archival does not mean the data is lost. Once the FEMIS system use pattern is set and fairly stable, archiving can be done periodically as part of standard system administration policies.

The archive processes are UNIX executables located in the /home/femis/data/dbutil directory in these files:

arch_met.arc	Archives Met data for the Post EOC
arch_jour_tead.arc	Archives Journal data for the Post EOC
arch_jour_ctoo.arc	Archives Journal data for Tooele County EOC
arch_jour_utst.arc	Archives Journal data for Utah State EOC.

The following example illustrates how to archive Journal data for the onpost EOC. The other processes are very similar.

```
>cd /home/femis/data/dbutil #Move to directory
>arch_jour_tead.arc          #Start the interactive process
```

The following interactive dialog is displayed:

```
This process will archive log entries from the Journal table.
Enter 1 to proceed
<1> [The user enters this]
```

This causes an export of the data in the table to the file journal.dmp. The Oracle Export tool produces several lines of output showing the date and version. The name of the table and the number of records are also displayed; the user should verify that the record count is an expected value. When the export is completed, a message stating that the Export terminated successfully without warnings. is displayed. If an error was present at this point, the user should abort the archive process and determine its cause.

The following interactive dialog is displayed:

```
Check status of export before proceeding
Enter date to archive from in this format MM/DD/YY
<12/12/94> [The user enters this]
```

The following dialog is displayed:

```
Records will be removed that are older than 12/12/94
If this date is incorrect abort now with Control_C,
Otherwise Enter 1 to proceed.
<1>[Assuming no problems, the user enters 1]
```

This causes the Oracle SQL*PLUS tool to execute and attempt to remove records from the table. The tool produces several lines of output showing the date and version. The number of records deleted is shown. The user should verify this number is close to the expected value. This process has been completed, and the following dialog is displayed:

Archive was successful. Remember to save exported data to tape.

The last line of the dialog is to remind the user to save the data so it may be retrieved at a later time. Because these archive processes write to the same files, the data must be saved before the next archive is attempted.

4.2.5 Backup and Recovery of the Database

The database files should be backed up at regular intervals. One back up per day, during off-use times, should be sufficient; the site System Administrator may decide that more frequent backups are desirable. In case of disk failures or other serious problems involving the database, the files can be restored from the last backup. See the *FEMIS System Administration Guide* for additional details on backing up the file system.

5.0 Managing Spatial Data

FEMIS spatial data stored as ArcView themes (layers) are called datasets. Each theme represents a specific type of geographic feature (e.g., roads, state and county boundaries, facility locations) within the area of interest surrounding the CSEPP site. Table 3.5 lists each of the FEMIS spatial themes and describes the storage structures and other characteristics of these themes. The data files for each spatial theme are stored on the UNIX server workstation in a directory structure that allows them to be easily located and accessed by the users and the software. Users maintain copies of these theme files in a parallel directory structure on their client PCs for use with the ArcView GIS software. Users are notified whenever a theme has been modified on the server so they can copy the updated theme to their PC. Some of the FEMIS software modules check the modification date of certain themes on the server and automatically update the local copies of the theme files if they are obsolete. The GIS_LAYER_DEFINITION table, in the relational database, contains information on the spatial data storage structure in the form of a set of rules defining the FEMIS naming convention for themes, file directories, files, and ArcView legends. In addition, tables in the relational database contain attribute values and other information about the features in the spatial themes. Other tables link the spatial data to this attribute information.

The FEMIS spatial data can be divided into three categories: system spatial datasets, user-modifiable spatial datasets, and model-related spatial datasets, which are discussed below.

1. System spatial datasets that change infrequently are themes managed and controlled by the system data administrator. Users cannot modify the spatial information contained in these datasets. Examples of system spatial datasets are roads; census blocks, tracts, and subdivisions; and emergency planning zone boundaries.
2. User-modifiable spatial datasets are themes that can be modified by users from within certain FEMIS modules. User modifications are restricted to adding new features to an existing theme. The system data administrator retains control over modification and deletion of existing features in these themes. Examples of user-modifiable spatial datasets are facilities and known points.
3. Model-related spatial datasets are created by the hazard model for each model case that is run. These themes are initially stored on the user's PC and can be copied to the server for access by other users.

5.1 System Spatial Datasets

The following paragraphs briefly describe the management and maintenance process for each FEMIS spatial theme or theme type.

5.1.1 Accident-Based Planning Categories

The FEMIS data administrator is responsible for maintaining this theme at each site. If changes in the category boundaries are recommended by the Accident Based Planning Review Group, the theme can be regenerated by running the ArcView/Avenue script "createABPC" using the desired parameters.

5.1.2 Administrative Boundaries

Administrative boundaries (e.g., national forest or national park boundaries) are maintained by the FEMIS data administrator. Changes in the data will probably originate from new or updated United States Geological Survey (USGS) Digital Line Graph (DLG) data, which was the original source of the IBS Administrative Boundaries data. Depending on the nature and magnitude of the changes, the data administrator could choose either to regenerate the entire theme from the new USGS data files (the recommended method), or to use Arc/Info's ArcEdit utility to edit the Arc/Info coverage and then export the modified coverage to ArcView.

5.1.3 Census Blocks, Tracts, and Subdivisions

Census enumeration district boundaries are maintained by the FEMIS data administrator. Changes in the data would originate from updated TIGER/Line data from the U.S. Bureau of the Census. Depending on the nature and magnitude of the changes, the data administrator could choose either to regenerate the entire theme from the new TIGER/Line files for the effected counties (the recommended method), or to use Arc/Info's ArcEdit utility to edit the Arc/Info coverage and then export the modified coverage to ArcView.

5.1.4 Emergency Planning Zones

This theme is maintained by the FEMIS data administrator at each site. Changes in the data due to changes in zone boundaries or the addition of new zones are made by editing the ASCII text file for zones and then regenerating the ArcView theme from the ASCII file.

5.1.5 Igloos (point and area)

Igloo themes are maintained by the FEMIS data administrator at each site. Changes in the data from onpost (new igloo constructed, existing igloo destroyed, or a correction in the location data for an existing igloo) are made by editing the ASCII text file containing the igloo information and then regenerating the ArcView theme from the ASCII file.

5.1.6 Image Maps

Image maps are maintained by the FEMIS data administrator. Revised image maps are incorporated into the spatial database in the same manner as the original image maps were installed (registration in Arc/Info, conversion to a TIFF graphics file format, integration with other images, and export to ArcView). An image map of an area previously not represented would be added to the image library. A revised image map of an area previously represented would replace the obsolete image map of the same area.

5.1.7 Met Towers

The Met tower point location theme is maintained by the FEMIS data administrator. If a new Met tower is constructed, an existing tower is taken out of service or a correction is needed in the location data for an existing Met tower. The changes are made by editing the ASCII text file containing the Met tower information and then regenerating the ArcView theme.

5.1.8 Road Themes (All, Major)

Road network themes (All and Major) are maintained by the FEMIS data administrator. Changes in the data originate from updated TIGER/Line data from the U.S. Bureau of the Census. Depending on the nature and magnitude of the changes, the data administrator could choose either to regenerate the entire themes from the new TIGER/Line files for the affected counties (the recommended method), or to use Arc/Info's ArcEdit utility to edit the Arc/Info coverages and then export the modified coverages to ArcView.

5.1.9 State and County Boundaries

The state and county boundaries theme is maintained by the FEMIS data administrator. Changes in the data originate from updated TIGER/Line data from the U.S. Bureau of the Census. Depending on the nature and magnitude of the changes, the data administrator could choose either to regenerate the entire theme from the new TIGER/Line files (the recommended method), or to use Arc/Info's ArcEdit utility to edit the Arc/Info coverage and then export the modified coverage to ArcView.

5.1.10 Streams and Water Bodies

The streams and water bodies theme is maintained by the FEMIS data administrator. Changes in the data originate from updated TIGER/Line data from the U.S. Bureau of the Census. Depending on the nature and magnitude of the changes, the data administrator could choose either to regenerate the entire theme from the new TIGER/Line files for the affected counties (the recommended method), or to use Arc/Info's ArcEdit utility to edit the Arc/Info coverage and then export the modified coverages to ArcView.

5.2 User-Modifiable Spatial Datasets

This section discusses accident-based planning wedge themes, facility themes, and known points themes.

5.2.1 Accident-Based Planning Wedges

Separate accident-based planning wedge themes exist for each EOC. Users can add wedges to their EOC's planning wedge theme from within FEMIS. After a user has finished adding one or more wedges and submits the new information, an SQL script is automatically run that updates the appropriate database tables and creates an ASCII text file that is used to generate a new planning wedge theme for the EOC. The FEMIS data administrator can modify any EOC's planning wedge theme by the following process: generate an ASCII text file of the existing planning wedges; edit that file to add, modify, or delete wedges; and generate a new theme from the edited ASCII file.

5.2.2 Facilities

Separate facility themes exist for each EOC. Users can add facilities to their EOC's facility theme from within FEMIS. After a user has finished adding one or more facilities and submits the new information, an SQL script is automatically run that updates the appropriate database tables and creates an ASCII text file that is used to generate a new facility theme for the EOC. The FEMIS data administrator can modify any EOC's facility theme by the following process: generate an ASCII text file of the existing facilities; edit that file to add, modify, or delete facilities; and generate a new theme from the edited ASCII file.

5.2.3 Known Points

Separate known points themes exist for each EOC. Users can add new known points to their EOC's known points theme from within FEMIS. After a user has finished adding one or more known points and submits the new information, an SQL script is automatically run that updates the appropriate database tables and creates an ASCII text file that is used to generate a new known points theme for the EOC. The FEMIS data administrator can modify any EOC's known points theme by the following process: generate an ASCII text file of the existing known points; edit that file to add, modify, or delete known points; and generate a new theme from the edited ASCII file.

5.3 Model-Related Spatial Datasets

Model-related spatial datasets include the following themes: D2 track, track, and wedge. D2 track (Dose), track (Concentration), and wedge themes are generated by the D2 model software and are stored by EOC and D2 case ID. D2 themes generated at an EOC are stored locally on the user's PC and can also be copied to the server for use by others. Once a D2 theme has been placed on the server, the FEMIS data administrator assumes control for deletion of the theme. Once a D2 theme has been created, it should not be modified.

6.0 Managing Meteorological (Met) Data

Meteorological (Met) information is normally supplied continuously by the subsystem that collects Met parameters from the towers. The subset of parameters that are required for dispersion modelling are stored in the relational database in real time. As shown in Figure 1.1, the communication (Comm) server collects the sensor data and sends it to the UNIX server where Met_In software writes the data into the Met_Condition database table.

For the Met_In function to operate correctly on the UNIX server, a configuration file must be available. This file contains information about the Met towers and sensors for the site. An example of this file is shown in Table 6.1. When the FEMIS system is installed, this file will be modified to reflect the current configuration. If the initial Met configuration is changed, the METTOWER.DAT file must be modified accordingly by the System Administrator.

In the Phase I system, data records will accumulate in the Met_Condition table while the Met collection subsystem is in operation. Because there is no archive function to remove old data, this function has to be done periodically by the Database Administrator or a user that is familiar with Met data. If site policy requires that the old information has to be saved, then the data should be copied to a permanent media for the archiving.

Table 6.1. METTOWER.DAT File Example

Type	Description	Data Units
1	Wind Speed	m/sec, km/hr, ft/sec, miles/hr, knots
2	Wind Direction	deg
3	Wind Gust Speed	m/sec, km/hr, ft/sec, miles/hr, knots
4	Wind Gust Direction	deg
5	Wind Sigma	deg
6	Air Temperature	C, F
7	Relative Humidity	%
8	Atmospheric Pressure	mm_hg, in_hg, atm, bar, mil bar, psi
9	Height of Mixing Layer	m, km, ft
10	Cloud Height	m, km, ft
11	Cloud Cover	%
12	Rain Gauge	mm, cm, inches
13	Tipping Bucket	#
14-98	Unused/Unknown	
99	Battery Voltage	(volts)

TOWER_ID towerid lat(deg min sec dir) lon(deg min sec dir)
 CLUSTER clusterid height-in-meters
 SENSOR sensorid type units

TOWER_ID 00000001 37 44 03.85 N 084 11 45.70 W
 CLUSTER 00000001 15
 SENSOR 01 99 volts
 SENSOR 61 01 m/sec
 SENSOR 63 02 deg
 SENSOR 64 04 deg
 SENSOR 66 06 C

TOWER_ID 00000002 37 41 35.94 N 084 11 09.52 W
 CLUSTER 00000001 15
 SENSOR 01 99 volts
 SENSOR 51 01 m/sec
 SENSOR 53 02 deg
 SENSOR 54 04 deg
 SENSOR 56 06 C

7.0 Managing Exercise Data

Training and readiness are evaluated through exercises. The FEMIS system supports training or exercise of any aspect of the system's use while still maintaining the integrity of the real world data and situation. In Exercise mode, FEMIS uses copies of the real data so the exercise can be as similar to real world use as possible. Both Planning and Operational modes exist under exercise. Additionally, the system manager/exercise director can set up the exercise situation to meet exercise objectives.

Over 90 of the tables in the relational database are used for exercises. These tables can each contain data for many exercises. The Exercise control function manages the exercise record. This section describes how the exercise controller is able to manage this type of data.

7.1 Selecting Activities in Exercise Mode

To start exercise mode, from the Select Mode and Phase window, click on one of the Exercise mode buttons located on the right side of this window under Training and Exercise.

Select Mode and Phase					
Modes	Normal		Training and Exercise		
	Planning	Operations	Planning	Operations	Setup
Phases	Preparedness	Preparedness	Preparedness	Preparedness	Preparedness
	Response	Response	Response	Response	Response
	Recovery	Recovery	Recovery	Recovery	Recovery
	Mitigation	Mitigation	Mitigation	Mitigation	Mitigation

The FEMIS Exercise mode Navigator matrix will display.

When in Exercise mode, a bike icon is displayed on FEMIS windows and screens.

Exercise mode can include the following activities:

- Exercise Setup: Create Exercise
- Select Exercise
- Modify Exercises
- Databases
- Setup Privileges
- Planning Training with Exercise Mode.

7.2 Creating an Exercise in Exercise Mode

FEMIS enables the system manager/exercise director to create the appropriate environment for the desired exercise. Because exercise objectives may require particular circumstances, specific exercise data must be selected.

Click the Create Exer button on the Navigator (Exercise Setup) window. The Exercise Setup: Create Exercise window is displayed.

Exercise Setup: Create Exercise

Exercise Times

Start Time: [] Start Date: []

End Time: [] End Date: []

☐ Multiple EOCs

☐ This EOC Generate MET Injects

Source of Data to copy to this Exercise: []

Brief Description of New Exercise: []

Detailed Description of New Exercise: []

OK Cancel

Enter the information in the fields to create a unique exercise.

To save the new exercise, click the OK button. Click the Cancel button to exit without creating a new exercise.

FEMIS will ensure data integrity between exercise, real, and planning data. During an exercise some data may be entirely simulated while other data may be real. FEMIS enables you to specify when the data is real in as non-obtrusive a way as possible.

During the exercise itself, FEMIS supports exercise control by allowing the controller to inject information into the exercise data, use E-mail, and review the exercise using FEMIS status boards.

Following an exercise, the system manager/exercise director may want to capture logs of exercise activities for further review.

7.3 Modifying an Exercise in Exercise Mode

FEMIS enables the system manager/exercise director to modify an existing exercise to fit changing site requirements.

Stage Phase	Setup	Hazard Assessment	Protective Action	Alert and Notification	Initial Actions	Ongoing Actions
	<input type="button" value="Create Exer"/> <input type="button" value="Select Exer"/> <input type="button" value="Modify Exer"/> <input type="button" value="Delete Exer"/>	<input type="button" value="MIT Inject"/>				<input type="button" value="Delete Exer"/>
Preparedness						
Response						
Re-entry, Recovery, Restoration						
Mitigation						

Clock Time: 14:43 17/Jan/1995 Select an existing Exercise (to Perform in or Modify)

To modify an exercise, click on the Modify Exer button located on the Navigator (Exercise Setup) window. The Select Exercise to Modify window is displayed.

Select Exercise to Modify

Select Exercise
50 - Exercise for UMDA EOC

OK Cancel

Enter the name of the exercise you want to modify and click the OK button.

The Exercise Setup: Modify Exercise window is displayed with the details of the selected exercise prefilled in the various fields.

Exercise Setup: Modify Exercise

Exercise Times

Start Time: 14:54:51 Start Date: 05/Dec/1994

End Time: 12:12:12 End Date: 12/Dec/1994

Source of Data to Copy to This Exercise

Brief Description of New Exercise

Exercise for UMDA EOC

Detailed Description of New Exercise

the description

At this point, you can modify the exercise to fit your needs. Click the OK button to save your changes. Click the Cancel button to exit and leave the exercise unmodified.

7.4 Deleting an Exercise in Exercise Mode

FEMIS enables you to delete an exercise.

Exercises take up a lot of disk space and database space. To keep your database from filling up with exercises, delete them as necessary.

To delete an exercise, click the Database button on the Navigator (Exercise Setup) window. From the drop-down list, select the Case Management option.

From the Case Management drop-down list, select the Plans option.

The Select Exercise to Delete window is displayed.

Select the name of the exercise you want to delete from the Select Exercise drop-down list. Click the OK button to delete the selected exercise, or click the Cancel button to exit without deleting an exercise.

8.0 Managing D2 Model Data

Managing D2 model case data is done by means of the options under the D2PC pull-down File menu. These options enable you to: Open a D2 case, Save a D2 case, Delete a D2 case, and Import a D2 case.

D2PC Hazard Prediction Input Interface - Case #1 Version 1.0

File Run Options Local ID Releases Met Site Communication Help

Open D2 Case

- Open Current Onpost Case
- Save D2 Case
- Save D2 Case As...
- Delete D2 Case
- Make Case Current Operational
- Revert to Site Defaults

Import

Print Area

Print Screen

Exit

Instantaneous (explosive)

CASE DESCRIPTION

GB105 4.42MPH@005INSstb:D

LOCATION

Lat/Lon: 45.0573 -119.4421 Map Loc

UTM Zone: Y X

From: K1823

METEOROLOGICAL CONDITIONS

Season: Winter

Stability Class: D = Neutral

Wind Dir. (from): 5.00 degrees

Wind Speed: 4.42 MPH

Temperature: 32.00 °F

Hgt. Mix. Layer: 0.20 mi [X] Default

Atm. Pressure: 730.00 mm Hg [X] Default

8.1 Opening a D2 Case

The Open Case options work like a typical Windows File Open command, by displaying a window listing your current D2 cases available for opening. Select a case from the list by double-clicking on the case description and then clicking the OK button.

8.2 Saving a D2 Case

The Save D2 Case option enables you to save any changes to the current D2 case. This option saves your changes to the case you currently have open. To save D2 case changes to a new case, use the Save D2 Case As option.

The Save D2 Case As option enables you to save D2 case changes to a new case number. This creates a new D2 case filled with the changed data you have created.

1. When you select this option, a screen similar to the following example will display.

Save Case As

Current Case Number: 1

New Case Number: 9

Case Description: GB105 4.42MPH@005INSstb:D

OK Cancel

2. A suggested new case number will be displayed in the "New Case Number" field. If the suggested case number is not acceptable, enter your own number.
3. Type a case description in the Case Description field. You can enter details such as type of release, wind speed, and temperature.
4. Click the OK button to save the D2 case to the new case number, or click on the Cancel button to quit without saving the file.

8.3 Deleting a D2 Case

1. Select Delete D2 Case from the File pull-down menu. A screen similar to the following will display.

2. Select the D2 case you want to delete from the list and click the OK button. The case will be deleted.

8.4 Importing a D2 Case

1. Select the Import option from the File pull-down menu. An Import D2 screen similar to the following example will display. Two options are available. The first option is to load a single case and the other to load multiple cases. To create a Case List, the user must use an editor and produce a file that contains the full path name for each D2 case included in the List. This List file must have a *.lst file name extension, such as myd2list.lst.

- Click the Pick Case to Import button to import a single case or the Pick Case List to Import button to import multiple cases. A file listing box similar to the following example will display.

D2 Case files will have a .dat file name extension. D2 case file listings will have a .lst file name extension if the Pick Case List option is chosen.

- Find the file you want to import by clicking on the drive and file path names until the files you want are listed. Select the file from the list and click the OK button to import the file or file list.

Appendix A

Database Data Models

Appendix A

Database Data Models

Diagrams for the three logical data models (Main, Spatial, and D2) illustrate what information is present and how the data objects are interrelated. The Main data model represents a large collection of general purpose tables, the Spatial data model contains tables used by the GIS, and the D2 model contains tables used by the dispersion model.

The diagram illustrates the data model for a drug information system, centered around the **D2_INPUT** entity. It shows the following entities and their attributes:

- D2_I_RELEASE_NUM**: @d2_case_id, @d2_rel_num, @exercice_num, d2_i_mun, d2_i_mun_src, d2_i_rel, d2_i_rel_src, d2_i_nmu, d2_i_nmu_src, d2_i_nqi, d2_i_nqi_src, d2_i_lev, d2_i_lev_src, d2_i_sur, d2_i_sur_src, d2_i_ere, d2_i_ere_src, d2_i_len, d2_i_len_src, d2_i_opc, d2_i_opc_src, d2_i_hst, d2_i_hst_src, d2_i_dai, d2_i_dai_src, d2_i_tst, d2_i_tst_src, d2_i_val, d2_i_val_src, d2_i_rde, d2_i_rde, d2_i_hrl, d2_i_crd, d2_i_qqq, d2_i_hls, d2_i_sxs, d2_i_sxs, d2_i_szs, d2_i_tlm.
- D2_I_MET**: @d2_case_id, @d2_i_met_num, @exercice_num, d2_i_met_sib, d2_i_met_hml, d2_i_met_wnd, d2_i_met_w_d, d2_i_met_lmc, d2_i_met_sib_src, d2_i_met_hml_src, d2_i_met_wnd_src, d2_i_met_w_d_src, d2_i_met_lmc_src.
- D2_I_DOSAGE**: @d2_case_id, @d2_dosage_num, @exercice_num, d2_i_dosage_d, d2_i_dosage_d_d, d2_i_dosage_d_src, d2_i_dosage_d_d_src.
- D2_I_CONCENTRATION**: @d2_case_id, @d2_conc_num, @exercice_num, d2_i_conc_ci, d2_i_conc_ci_d, d2_i_conc_ci_src, d2_i_conc_ci_d_src.
- D2_I_TIME_STEP**: @d2_case_id, @d2_time_step, @exercice_num.
- D2_I_QUANTITY**: @d2_case_id, @d2_rel_num, @exercice_num, d2_i_quan_num, d2_i_quan_q, d2_i_quan_q_src, d2_i_quan_ql, d2_i_quan_ql_src.
- D2_I_ITEM_OF_INTEREST**: @d2_case_id, @d2_time_step, @d2_item_of_interest, @exercice_num, d2_i_distance.
- D2_I_USER**: @d2_case_id, @exercice_num, d2_time_step_increment.
- D2_O_RUN_DT**: @d2_case_id, @exercice_num, d2_o_run_dt.
- D2_O_DOSAGE_MAXD**: @d2_case_id, @d2_dosage_num, @exercice_num, d2_o_dos_maxdist, d2_num_dosage_hwidth.
- D2_O_DOSAGE_HWIDTH**: @d2_case_id, @d2_dosage_num, @d2_dosage_seq_num, @exercice_num, d2_o_dos_dist, d2_o_dos_hwidth.
- D2_O_CONCENTRATION_MAXD**: @d2_case_id, @d2_conc_num, @exercice_num, d2_o_conc_maxdist, d2_num_conc_hwidth.
- D2_O_CONCENTRATION_HWIDTH**: @d2_case_id, @d2_conc_num, @d2_conc_seq_num, @exercice_num, d2_o_conc_dist, d2_o_conc_hwidth.
- D2_O_POSINP**: @d2_case_id, @exercice_num, d2_o_quantity, d2_o_time_to_release, d2_o_sxs, d2_o_sxs, d2_o_sxs, d2_o_pardos_reason.
- D2_O_DISCRETE_RECEPTOR**: @d2_case_id, @user_code, @d2_discrete_receptor_num, @exercice_num, d2_discrete_receptor_location, d2_o_angle_from_center, d2_o_out_of_plume_flag, d2_o_dist_from_center, d2_o_offset_dist_from_center.
- D2_O_SLICE**: @d2_case_id, @d2_function, @user_code, @exercice_num, d2_o_slice_total_dose, d2_o_slice_time_top, d2_o_slice_time_tail.
- D2_O_SLICE_DOSE_TIME**: @d2_case_id, @d2_function, @user_code, @d2_dose, @exercice_num, d2_o_slice_dose_pct, d2_o_slice_time.

Relationships are indicated by diamond symbols with labels:

- d21**: D2_I_RELEASE_NUM (N) to D2_I_MET (1).
- d22**: D2_I_DOSAGE (N) to D2_I_DOSAGE (1).
- d23**: D2_I_CONCENTRATION (N) to D2_I_CONCENTRATION (1).
- d24**: D2_I_QUANTITY (N) to D2_I_QUANTITY (1).
- d25**: D2_I_USER (1) to D2_O_RUN_DT (1).
- d26**: D2_I_ITEM_OF_INTEREST (1) to D2_O_DOSAGE_MAXD (N).
- d27**: D2_I_ITEM_OF_INTEREST (1) to D2_O_SLICE (N).
- d28**: D2_I_ITEM_OF_INTEREST (1) to D2_O_DOSAGE_MAXD (N).
- d29**: D2_O_DOSAGE_MAXD (1) to D2_O_DOSAGE_HWIDTH (N).
- d210**: D2_I_ITEM_OF_INTEREST (1) to D2_O_CONCENTRATION_MAXD (N).
- d211**: D2_O_CONCENTRATION_MAXD (1) to D2_O_CONCENTRATION_HWIDTH (N).
- d212**: D2_O_SLICE (1) to D2_O_SLICE_DOSE_TIME (N).
- d213**: D2_I_ITEM_OF_INTEREST (1) to D2_O_POSINP (1).
- d214**: D2_O_POSINP (1) to D2_O_DISCRETE_RECEPTOR (N).
- d215**: D2_I_TIME_STEP (N) to D2_I_TIME_STEP (1).
- d216**: D2_I_ITEM_OF_INTEREST (1) to D2_I_ITEM_OF_INTEREST (1).
- d217**: D2_I_RELEASE_NUM (N) to D2_I_ITEM_OF_INTEREST (1).

Appendix B

Site Survey Forms

Appendix B

Site Survey Forms

Because FEMIS encompasses more functionality than IBS and EMIS, some site-specific information that is essential for FEMIS is not present electronically. This type of information is obtained during the Site Survey. The Site Survey consists of three sections: 1) a set of assumptions, 2) a WordPerfect document that identifies the data required by FEMIS, and 3) Excel spreadsheets used by the responders to enter the data that links this data to the WordPerfect document. In some cases, the responders will be asked to supply the data in its entirety. In others, they will be asked to edit data that is supplied. In both situations the data will be captured in the Excel spreadsheets.

An example of a Site Survey is included to show the types of information contained. These surveys are tailored for each site. This example is for the TEAD site in Utah.

The first part of the survey lists a set of assumptions similar to those below.

The following are basic assumptions regarding the site configuration and data sources. Please review these and note any variances.

- a. The Area of Interest for map coverage is 75 miles from the center of the Chemical Limited Area (CLA).
- b. Each Immediate Response Zone (IRZ) EOC will have a UNIX server and each Protective Action Zone (PAZ) EOC will be serverless and use an existing IRZ server.
- c. Population data will be derived from the current U.S. Bureau of the Census data and represent weekday, night time counts.
- d. Roads and trails, streams and water bodies, administrative boundaries, census boundaries, and political boundaries will be generated from government furnished external data sources and not from IBS or EMIS data.

The second part of the survey requests specific information about EOCs, Accident Based Planning Categories, operator positions, Emergency Support Functions, and resource categories. This information is not available from either IBS or EMIS, and it is essential to begin data collection as soon as possible for a new site database. The following example is for the Tooele Army Depot EOC at TEAD in Utah. It is supplied in electronic format so the site can fill in entries directly using a word processor.

FEMIS Site Specific Survey Form

Site: TEAD

EOC: Tooele Army Depot

1) Information required for your specific EOC:

EOC Name:	EOC name that will appear in selection lists
EOC Code:	Four character code used to uniquely identify this EOC
EOC Type:	Onpost or Offpost
EOC Description:	Extended description of the EOC
EOC Responsible Area:	Text to identify the Emergency Planning Zones (EPZs) in your jurisdiction.
EOC Server Name:	The name you have assigned to the UNIX server that will contain your EOC's FEMIS database.
EOC Notify Port:	The number of the physical port connected to the FEMIS Notification Server. Use the default port 9020 if possible. Check with your system administrator to see if that port is available.
EOC UNIX Port:	The number of the physical port connected to the Evacuation Model. Use the default port 9010 if possible. Check with your system administrator to see if that port is available.
Decision Time:	The time, in minutes, for an EOC to determine that an event has occurred and determine which actions to take. NOTE: Primarily for the Onpost EOC.
Notify Time:	The time, in minutes, necessary for the EOC to notify the community in the event of a CSEPP accident.
Time Zone Code:	Identifies which time zone the EOC is in: PST for Pacific Standard Time MST for Mountain Standard Time CST for Central Standard Time EST for Eastern Standard Time
Dosage Level	Identifies the D2 dosage level used to establish impact times for protective action recommendations: No effects No deaths 1% lethality

*** Review and update this information ***

1.1)	EOC Name:	Tooele Army Depot (default)
1.2)	EOC Code:	TEAD (default)
1.3)	EOC type:	Onpost (default)
1.4)	EOC description:	Tooele Army Depot North EOC (default)

1.5) EOC Responsible Area: _____

1.6) EOC Server Name: _____

1.7) EOC Notify Port: 9020 (default)

1.8) EOC UNIX Port: 9010 (default)

1.9) Decision Time: 8 minutes (default)

1.10) Notify Time: 3 minutes (default)

1.11) Time Zone Code: MST (default)

1.12) Dosage Level: No Effects (default)

2) Information required to set Accident Based Planning Categories:

This section should be completed by the EOC responsible for setting policy for the accident based planning categories. We are assuming this policy will be set by a state agency.

Geographic Center: The geographic center of the accident based planning area in longitude and latitude coordinates.

Distance to Category 1: Measured in meters to the edge of "circle" for category 1.

Distance to Category 2: Measured in meters to the edge of "circle" for category 2.

Distance to Category 3: Measured in meters to the edge of "circle" for category 3.

Distance to Category 4: Measured in meters to the edge of "circle" for category 4.

Distance to Category 5: Measured in meters to the edge of "circle" for category 5.

***** Please supply this information *****

2.1) Geographic Center: _____ Longitude _____ Latitude

2.2) Distance to Category 1: _____ Meters

2.3) Distance to Category 2: _____ Meters

2.4) Distance to Category 3: _____ Meters

2.5) Distance to Category 4: _____ Meters

2.6) Distance to Category 5: _____ Meters

3) Information required for EOC Operator Positions:

Default position information is provided in an attached spreadsheet. Delete any positions from the spreadsheet that your EOC does not support. Add any new EOC positions, if not supplied on the list. If available, please fill in the remaining columns.

Position Code: Uniquely identifies a position.

Position Name: A longer name for the position used by the FEMIS user interface.

Position Description: A brief job description of each position for your specific EOC.

Phone Number: If available, the telephone number of the position's "chair" in the EOC.

First and Last Names: The first and last names of the personnel who are assigned to this position. **NOTE:** Multiple entries of names may be made on each row.

*** Review and enter information in the spreadsheet ***

To edit the spreadsheet, access the file POSITION.XLS that was included with this package.

4) Information for EOC Specific Emergency Support Functions:

Default Emergency Support Functions (ESFs) are provided in an attached spreadsheet. Delete any ESFs that your EOC does not support and add new ESFs, if not supplied in the list.

ESF Code: Uniquely identifies an ESF.

ESF Description: A longer name for the ESF.

*** Review and modify information in the spreadsheet ***

To edit the spreadsheet, access the file EMERGENCY.XLS that was included with this package.

5) Information for EOC Resource Categories:

Default Resource Categories are provided in an attached spreadsheet. These are common to other sites, and it is a goal of FEMIS to promote commonality between EOCs and sites. Delete any categories that your EOC will not support and add new categories, if not supplied in the list.

Resource Category: Uniquely identifies a class of resources.

Resource Description: A longer name for the resource Category.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file RES_CAT.XLS that was included with this package.

The third part of the site survey requests a review of data that has been extracted from existing sources and provided to each site for revisions. This information will be provided in the following Excel spreadsheets in electronic form. When the site has completed reviewing and revising the files, they are returned to PNL.

6) MET_TOWER.XLS - Defines Met tower configurations

The data requested below defines the names and locations of the meteorological (Met) towers used within FEMIS.

Tower Name:	Uniquely identifies the tower.
Tower Code:	Code that further describes the tower.
Tower Description:	A brief description of the general location and condition of the tower.
Tower Status:	Active or Inactive (default: Active).
Tower Longitude:	Geographical location of tower.
Tower Latitude:	Geographical location of tower.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file MET_TOWR.XLS that was included with this package.

7) DEPARTMENT.XLS - Specifies agencies and departments

The minimum required data for the Department spreadsheet is as follows:

Agency_Code: Name of the Agency that oversees the Department.
Dept_Code: A short name used to uniquely identify the department.
Dept_Name: A longer name to help describe the department.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file DEPARTMT.XLS that was included with this package.

8) FACILITY.XLS - Defines facilities at your EOC

The minimum required data for the Facility spreadsheet is as follows:

Facility_Name: Name used to uniquely identify the facility.
Facility_Type: The type of facility it is based upon the global Facility_Type table preset during FEMIS installation.
EOC_Name: Name of the EOC where the facility is.
PA Unit: Indicate with a "Y" or "N" if the facility needs to be configured as a protective action unit.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file FACILITY.XLS that was included with this package.

9) PERSON.DAT - Lists persons important to your EOC and indicates if they are FEMIS users

The minimum required data for the Person spreadsheet is as follows:

Name_Last: Last name of the person to be entered in the database.
Name_First: First name of the same person.
Femis User: Indicate with a "Y" or "N" if the person needs to be configured as a user of the Femis software.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file PERSON.XLS that was included with this package.

- 10) RESOURCE_DEF - Defines resources at your EOC

The minimum required data for the resource definition spreadsheet is as follows:

Resource_Name: Descriptive name of the resource.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file RES_DEF.XLS that was included with this package.

- 11) TCP.XLS - Defines Traffic Control Points (TCPs)

The data requested below defines the names and locations of the TCPs as identified for the evacuation model.

TCP_Name: Descriptive name for the control point.

TCP_Long: Geographical location of the TCP.

TCP_Lat: Geographical location of the TCP.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file TCP.XLS that was included with this package.

- 12) ZONE.XLS - Defines the zones in use at your EOC

Please enter or edit the zone data within your CSEPP site.

Zone Name: Uniquely identifies a zone at the site.

Zone Type: IRZ, PAZ, MSZ

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file ZONE.XLS that was included with this package.

- 13) ZONE_RISK.XLS - Defines zone risk groups for your EOC

Please enter or edit the zone risk group data within your CSEPP site.

Zone Risk Group Name:	Uniquely identifies a zone risk group.
Zone Risk Group Description:	Brief textual description of the zone risk group within the site.
Zone Name1	Name of zone in this group. Add as many columns as needed.

***** Review and modify information in the spreadsheet *****

To edit the spreadsheet, access the file ZON_RISK.XLS that was included with this package.

Appendix C

Relational Database Dictionary

Appendix C

Relational Database Dictionary

The Relational Database Dictionary will be supplied as a separate volume.

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