4.0 Managing Relational Data

The relational database contains approximately 150 tables that hold information used by the application software. As described in Section 3.2, Building Relational Data, some of the tables are preloaded with records before the system is deployed. As the system is used, new information is added and some of the initial information may be modified or deleted.

The FEMIS application software, including the models, is largely responsible for managing the information in the relational database. This section discusses the default information in the database and then describes the general-purpose query tool that allows users to browse and modify data.

In the FEMIS system, all data access protection is performed by means of user interface windows. The procedures for giving FEMIS users the correct privileges to perform their tasks are provided in the System Administration topic of FEMIS Help.

Security was improved with the v1.4.6 relational database. The FEMIS software uses a database schema that has limited privileges so it is no longer possible to accidentally change the structure of a table or delete a table. Also available, is the capability to change database passwords. This additional security is transparent to users of FEMIS. Section 11.2, Database Security, in the *System Administration Guide for FEMIS Version 1.5.3* has more details on security features.

4.1 Site Default Information and Considerations

When the database for a new CSEPP site was created, a set of default information was defined that met the specialized requirements of the site. This information was solicited from the EOC users at the site and was loaded into the `EOC_Objective` table for each EOC.

The census data is gathered by asking people in residential areas how many people live at that residence. Since most people in a residence are more likely to be at home during the night than the day, these counts best define night time numbers. Also, since many families have routines that are structured around the 5-day workweek, the counts are good indicators of weekday populations while not accounting for the whereabouts of people on weekends or special events. Based on these considerations, the normal condition for population information is weekday, nighttime conditions.

4.2 Data Manager

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

The Data Manager is activated by clicking on `fdatamgr.exe`, which is located under the `FEMIS` directory on the `<FEMIS drive>`. If FEMIS is running, the Data Manager displays. If FEMIS has not been started, the FEMIS login window displays and you must enter a valid username and password for the EOC database that will be accessed. The Workbench displays first and then the Data Manager.

The appearance of the window depends on the privileges of the user. For the full function version shown below, `Edit` privilege for `System Administration` is required. A view only version of the window is displayed if the user has at least `View` privilege for `System Administration`. The view only window does not include the `Recordset Type:  Edit` button or the SQL Statement window. Other differences depend on which `Form Type:` is selected prior to opening one of the FEMIS tables.

Figure 4.1. Data Manager Window
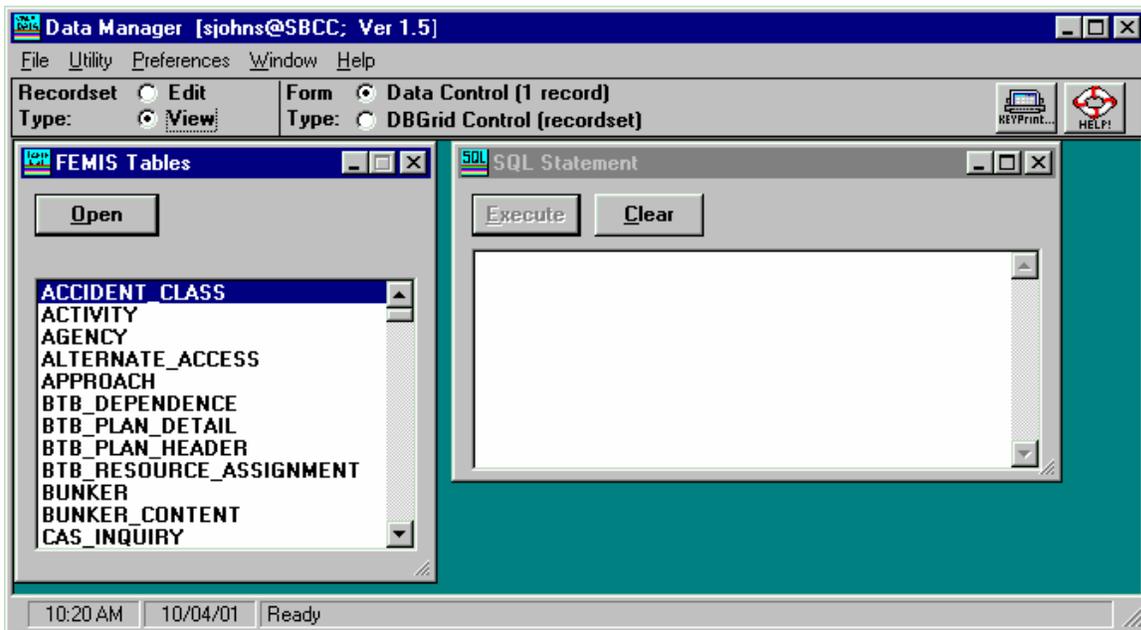
The FEMIS Tables window displays a list of all tables in the relational database that are appropriate for the current default EOC. Different tables are listed depending on whether you selected `Edit` or `View` mode.

The SQL Statement window on the right may be used to formulate a user query. The `Execute` button will send the query to the database. The `Clear` button will clear the SQL Statement text box.

> **Note:** The `Close` option from the control box or the `x` button on the window will minimize the SQL Statement window rather than closing it.

Two options exist for viewing the data in a table: Data Control or DBGrid Control. If you select the `Form Type:  Data Control (1 record)`, the data will be displayed one record at a time with a

`Data Control` bar to move from record to record. If you select the `Form Type: DBGrid Control (recordset)`, the data will be displayed in a spreadsheet format with scroll bars.

> **Note:** The only time records can be edited are when you have selected `Recordset Type: Edit` and `Form Type: Data Control` and opened the table using the FEMIS Tables window. Otherwise all data can only be viewed (read-only).

> **Note:** The Data Control window will not be able to add or modify data for the following tables: `SHARED_REPORT`, `GEO_OBJECT`, `VIEWMARK_DEF` and `FEMIS_USER`. These tables have CLOBs (Character Large Objects) fields and can only be edited using the SQL Statement window.

4.2.1 Data Control

The `Form Type: Data Control`, which presents a single record at a time for viewing or editing (if in `Edit` mode), contains some additional command buttons. The `Add`, `Update`, and `Delete` buttons (available only in `Edit` mode) allow editing of the current record in the Data Control window. The `Filter`, `Sort`, and `Move` buttons provide search and organization options for viewing the data regardless of mode. The `Refresh` button will requery the database and all previous sorting and filtering activities will be cleared. The `Close` button will close the window and prompt you to commit changes, if any were made.

> **Note:** The Data Control window will display the first 40 fields of a table. The rest of the fields can be viewed in the DBGrid Control window and edited using the SQL Statement Window.

Figure 4.2. Data Control on the Data Manager Window
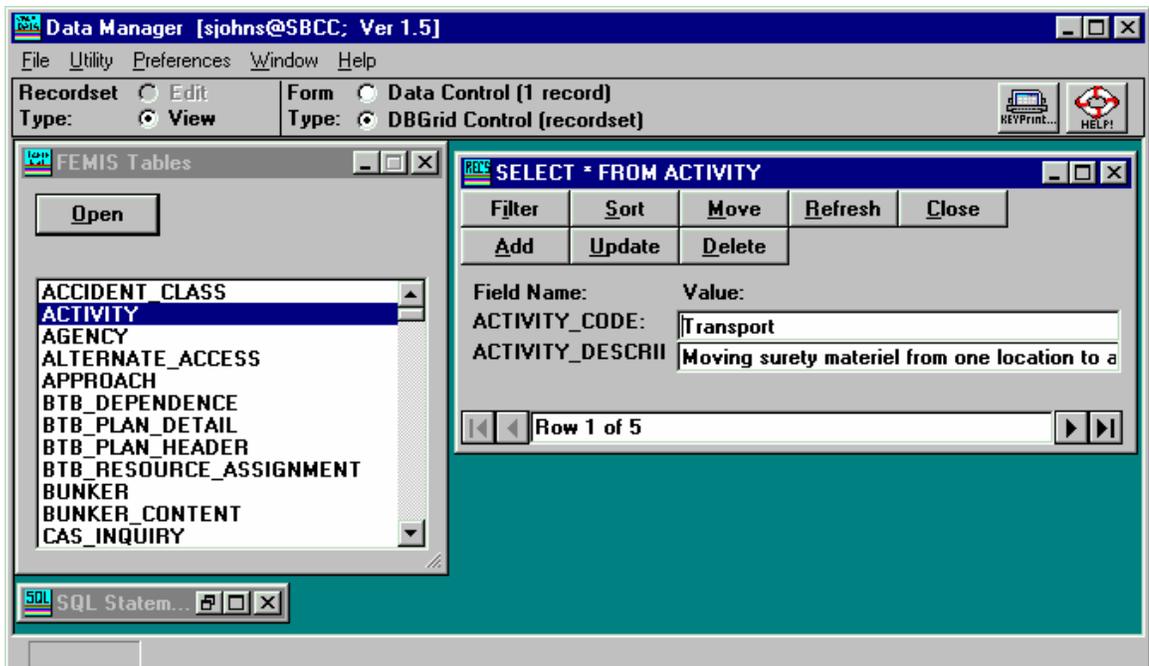
4.2.2 DBGrid Control

To view multiple records, select the DBGrid Control radio button and select a table from the FEMIS Tables list. You can double click on a table name, or highlight it and then click on the Open button. This will display a read-only window of the selected table and display it in a multi-record grid display. 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. The Refresh button will requery the database and all previous sorting and filtering activites will be cleared. The Sort and Filter buttons are search and organization options for viewing the records in the table. The Close button will close the window. The control bar at the bottom of the window can be used to quickly move through large numbers of records or to view current data control properties. These properties are not editable regardless of mode.

Figure 4.3. DBGrid Control on the Data Manager Window
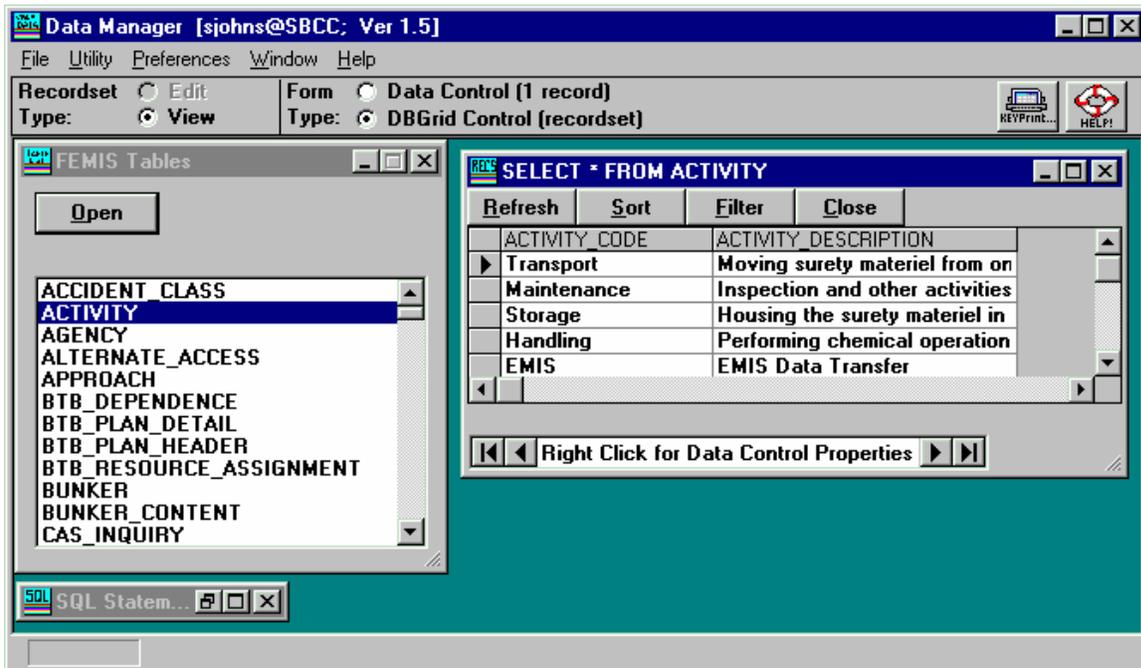
4.2.3 Other Data Manager Functions

To obtain a list of any errors you may have encountered during your session, click on Errors under the File menu. You can click on File → Properties to view properties of the DBEngine or Workspace and File → Print will display KeyPrint. The Print button also provides this capability.

The Utility menu provides various options for closing windows.

The `Show Performance Numbers` option under the `Preferences` menu allows you to turn on/off the display of statistics on the opening/loading of tables. This option only applies when the `Form Type: Data Control` radio button is selected. It is not available when the `Form Type:  DBGrid Control` option is selected.

4.3 Managing Relational Data

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

4.3.1 Database Integrity

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

When changes are made using the Data Manager tool or other tools, such as SQL*Plus, care must be taken to prevent inconsistencies in the database. Only System Administrators that understand the database and its inter-relationships should use these tools to make database modifications.

4.3.2 Testing Modifications

It is recommended that any significant changes to the database should first be tested by implementing them on an exercise dataset, see Section 6.0, Managing Exercise Data. 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.

4.3.3 Exercise Data

Each time a new exercise is generated, approximately one-half of the tables in the relational database gain a significant number of new records. If the obsolete exercise data is not removed, database performance may be impacted. Section 6.0, Managing Exercise Data, describes the maintenance of this type of data. Each dataset should be documented and unnecessary exercises deleted.

4.3.4 Archiving Tables

The Journal table (where events are logged), meteorological tables, and other database tables grow daily as the system is used. For example, if FEMIS is operated 7 days a week for 24 hours a day with continuous meteorological feed, the `MET_CONDITION` table records could increase by approximately 1,000 records per day. In a month, nearly 30,000 records would accumulate, and in a year, the count would be approximately 360,000. The rate of growth for the `Journal` table would be less than the

meteorological 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 meteorological status boards.

Data archiving was integrated with the Folder functionality in FEMIS v1.4.7. When a Folder is closed and marked for deletion, the information in the database is exported to a file, and then the table records for that Folder are deleted. As an integral part of Folder deletion, meteorological data and Journal data are also archived.

4.3.5 Backup and Recovery of the Database

The database files should be backed up at regular intervals. One backup per day, during off-use times, should be sufficient; your 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 latest backup. See the Section 12.0, Backup Strategy for FEMIS, in the ***System Administration Guide for FEMIS Version 1.5.3*** for additional details on backing up the database.

4.4 Data Sharing Between EOCs

Information in the EOC databases is shared between EOCs in order to provide users with a site-wide concept of the current status of conditions. In FEMIS, this sharing is done two different ways: depot owned tables or site-wide shared tables.

4.4.1 Depot Owned Tables

The simplest sharing is done with the depot tables that only the depot can modify. Examples are the `BUNKER` and `MET_CONDITION` tables. Offpost EOCs are provided with a read only copy of this data that reflects all changes made onpost. These shared tables are as follows:

```
BUNKER
BUNKER_CONTENT
CSEPP_ACCIDENT
D2_MET_SELECTION
MET_CLUSTER
MET_CONDITION
MET_TOWER
STORED_AGENT
WORK_PLAN
WORK_PLAN_ACT
WORK_PLAN_LIBRARY
```

4.4.2 Site-wide Shared Tables

Another form of data sharing assembles copies of other EOC data in a site-wide view. For example, Facility table data is shared in a view named `S_FACILITY` that contains information from all EOCs

including the local one. Table 4.1 shows the tables shared with the site-wide views and indicates the default options in the Conditional column.

For site-wide shared tables, the two options for controlling what table data remote EOCs will be able to view are unconditionally (all changes will be propagated) or conditionally. The conditional option uses a flag setting that allows changes in the local database to occur without propagation of the data until the user wants to share it (if sharing is desired).

<div align="center">

Table 4.1. Site-wide View Tables

Table Name	Conditional
AGENCY	N
ALTERNATE_ACCESS	N
CASE_ATTR	N
CASE_MANAGER	N
CONTROL_POINT	Y
D2_INPUT	Y
D2_ITEM_OF_INTEREST	Y
D2_I_CONCENTRATION	Y
D2_I_DOSAGE	Y
D2_I_MET	Y
D2_I_QUANTITY	Y
D2_I_RELEASE_NUM	Y
D2_O_POSINP	Y
DEPARTMENT	N
EOC_ZONE	N
EXERCISE_CONTROL	N
FACILITY	N
FOLDER	N
FREE_FORM_LOG	N
G_DEF_COMMUNITY	N
G_DEF_COMMUNITY_VAL	N
G_DEF_EMERGENCY	N
G_DEF_EMERGENCY_LEVELS	N
G_DEF_HAZARD_CLASS	N
G_DEF_NAV_BUTTON	N

</div>

Table Name	Conditional
G_DEF_NAV_FUNCTION	N
G_DEF_NAV_FUNCTION_IO	N
G_DEF_PAD_LABELS	N
G_EMERGENCY	N
G_SHARING	N
GEO_OBJECT	N
GEO_OBJECT_ZONE	N
GIS_LAYER	N
GIS_SYMBOL	N
GIS_THEME_DATA	N
HAZARD_CASE	Y
HAZARD_CASE_ITEM	Y
INTERVAL_QUANTITY	Y
JOURNAL	Y
MEMO_UNDERSTANDING	N
MODEL_ATTR	N
MODEL_DEF	N
NAVIGATOR	Y
NAVIGATOR_ITEM	Y
OBJECT_ATTR	Y
OBJECT_ATTR_DEF	N
OBJECT__CLASS	N
OBJECT__CLASS_CO_LOCATION	N
OBJECT_SUBCLASS	N
PARPAD_DETAIL	Y
PARPAD_HEADER	Y
PA_LOOKUP	N
PA_UNIT	N
PERSON_SHELTERED	N
PLUME	Y
POLYGONAL_LAYER	N
POSITION	N
POTENTIAL_ACCIDENT	Y

Table Name	Conditional
PRIVILEGE	Y
PROTECTIVE_ACTION	N
RELEASE	Y
REPLICATION_TEST	N
RESOURCE_CATEGORY	N
RESOURCE_DEFINITION	N
RESOURCE_OWNER	N
RESOURCE_LOCATION	N
SHARED_REPORT	Y
SITUATION_SUMMARY	N
THREAT_AREA	Y
UDS_COLUMN	Y
UDS_ROW	Y
USER_DEFINED_STATUS	Y
USER_MODEL_CASE	Y
WORK_PLAN	Y
WORK_PLAN_ACT	Y
WORK_PLAN_LIBRARY	Y
WK_POSITION	N
ZONE_CLUSTER_IN_GROUP	N
ZONE_IN_GROUP	N
ZONE_RISK_GROUP	N

4.5 Security Provisions

FEMIS provides table access security so it is possible to limit access to individual tables. This access is controlled by the tablist.tpl template file found in the /home/femis/database/dba directory. This table has six columns and a row for each table in the database.

The first column is the tablename and the rest of the columns control access to the table.

The second column specifies if the table is only located at the onpost database. A Y value means that a table like BUNKER is only found onpost; a B means the table is found both onpost and offpost.

The next three columns control the select, update, and insert/delete privileges, respectfully. The privileges are cumulative. To only allow read, set the `Select` column to `Y`, and the other two columns to `N`.

The sixth column controls which administrative schema has access to the table. A `B` here means both the `femis` and `oracle` schema have access. An `N` means neither have access, while an `O` lets only `oracle` have access. An `F` gives only the `femis` schema access.