

5.0 Managing Spatial Data

FEMIS spatial datasets are stored as ArcView themes (layers) and referenced by the FEMIS GIS ArcView Project (APR) file. Each theme represents a specific type of physical or geopolitical feature (e.g., roads, state and county boundaries, chemical storage locations) within the area of interest surrounding a CSEPP site. Table 3.5 lists and describes the standard FEMIS spatial themes that are required or are typically included in each CSEPP site database. Additional site-specific themes may also be included to meet the needs or interests of a specific site. The data files for each spatial theme are stored on the UNIX server in a directory structure that allows them to be easily installed on each PC. Users maintain copies of these theme files in a parallel directory structure on their client PCs for use with the ArcView GIS software. When additions or changes are made to spatial data files on the server, an update program that runs during PC login is used to update the PC's copy of those files.

The `GIS_LAYER` and `GIS_LAYER_DEFINITION` tables in the relational database contain metadata that define the storage structures and display characteristics of the spatial themes. Other tables contain location information and attribute values associated with individual geographic features within a spatial theme. The `GEO_OBJECT` table contains unique feature identifiers that link the attribute information in the relational database to the corresponding features in the spatial data.

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

1. Static spatial data themes cannot be modified by FEMIS users. Required changes or upgrades to these themes occur infrequently and are managed and controlled by the System Administrator. Examples of static spatial themes are roads, census blocks, and emergency planning zone boundaries.
2. User-modifiable spatial data themes can be modified by authorized users from within certain FEMIS modules. These modifications may include addition and deletion of map features (objects) and modification of the location and other attributes of existing map features. The changes are first applied to the FEMIS relational database. The FEMIS software then updates the corresponding spatial themes in ArcView based on the values in the relational database. Facilities and Traffic Control Points are examples of user-modifiable spatial themes.
3. Model-related spatial data themes are created dynamically for each model case that is run. These themes are temporarily generated and stored on the user's PC as needed.

5.1 Static Spatial Datasets

The following paragraphs briefly describe the management and maintenance processes for the static FEMIS spatial themes that cannot be modified by FEMIS users.

5.1.1 Census Blocks

Your System Administrator maintains the census enumeration district boundaries. Changes in the data would normally originate from updated TIGER/Line data files from the US Bureau of the Census. The entire Census Block theme would be regenerated from the new TIGER/Line files for the included counties or other geographic areas. Changes in the values of the `POPULATION` attribute for each census unit may also need to be made as new census statistical data becomes available.

5.1.2 County Boundaries

Your System Administrator maintains the County Boundaries theme. Changes in the data would normally originate from updated TIGER/Line data files from the US Bureau of the Census. Depending on the nature and magnitude of the changes, your System Administrator could choose either to regenerate the entire theme from the new TIGER/Line files (the recommended method) or to use a spatial data editing tool to edit the existing County Boundaries theme.

5.1.3 Accident-Based Planning Categories

Your System Administrator maintains the Accident-Based Planning Categories theme. If changes in the planning category boundaries are recommended for your site, the theme can be regenerated by running the ArcView/Avenue script `createABPC`, using the desired parameter values for center location and radius.

5.1.4 Emergency Planning Zones

Your System Administrator maintains the Emergency Planning Zones theme. Changes in the data, necessitated by changes in zone boundaries or the addition of new zones, can be made by using the Zone Editor tools in the FEMIS GIS APR. The Zone Editor tools can be used to modify or add zone boundaries and/or change zone attributes and to generate zone modification files. These files are then read by a UNIX shell script, which generates and runs a sequence of SQL database scripts to make the corresponding updates to the `ZONE` table and other related tables in the FEMIS relational database. See Section 8.3, CSEPP Zone Editor, in the *System Administration Guide for FEMIS Version 1.5* for instruction on how to use the Zone Editor tools and scripts.

5.1.5 Depot Zones

The Depot Zones theme, which consists of the Chemical Limited Area (CLA) boundary plus any other onpost zones that the site desires to include, is maintained by your System Administrator. Changes to the Depot Zones theme can be made by replacing the theme in its entirety with new data, by using a spatial data editing tool to graphically edit the existing Depot Zones theme, or by performing the following steps: 1) Edit the original ARC/INFO `generate` text file that contains the

polygonal vertex locations for the CLA boundary and any other included depot sub-zones; 2) use the edited file to recreate the ARC/INFO Depot Zones coverage; and 3) convert the coverage to an ArcView shape file set.

5.1.6 Administrative Boundaries

Your System Administrator maintains Administrative Boundaries (e.g., national forest boundaries, military reservation boundaries). Changes in the data would likely originate from new or updated United States Geological Survey (USGS) Digital Line Graph (DLG) data. Depending on the nature and magnitude of the changes, your System Administrator could choose either to regenerate the entire theme from the new USGS data files (the recommended method), or to use a spatial data editing tool to edit the Administrative Boundaries theme.

5.1.7 Road Themes (Detailed, Major)

Road network themes (Detailed and Major) are maintained by your System Administrator. Changes in the data would likely originate from updated TIGER/Line data from the US Bureau of the Census. Depending on the nature and magnitude of the changes, your System Administrator could choose either to regenerate each affected theme from the new TIGER/Line files (the recommended method), or to use a spatial data editing tool to edit the appropriate Road themes.

5.1.8 Railroads

Your System Administrator maintains the Railroads theme. Changes in the data would likely originate from updated TIGER/Line data from the US Bureau of the Census. Depending on the nature and magnitude of the changes, your System Administrator could choose either to regenerate the entire theme from the new TIGER/Line files (the recommended method) or to use a spatial data editing tool to edit the existing Railroads theme.

5.1.9 Streams and Water Bodies

Your System Administrator maintains the Streams and Water Bodies theme. Changes in the data would likely originate from updated TIGER/Line data from the US Bureau of the Census. Depending on the nature and magnitude of the changes, your System Administrator could choose either to regenerate the entire theme from the new TIGER/Line files (the recommended method), or to use a spatial data editing tool to edit the existing Streams and Water Bodies theme.

5.1.10 Elevation Contours

Your System Administrator maintains the Elevation Contours theme. Changes in the data would likely originate from new or updated USGS elevation data. Depending on the nature and magnitude of the changes, your System Administrator could choose either to regenerate the entire theme from the new USGS data files (the recommended method) or to use a spatial data editing tool to edit the existing Elevation Contours theme.

5.1.11 Image Maps

Your System Administrator maintains image maps. Revised image maps are incorporated into the spatial database in the same manner as the original image maps were installed (registration to the target map projection in ARC/INFO or other geo-referencing software, conversion to a TIFF formatted file, integration with other images as necessary, and export to ArcView). A revised image map of an area previously represented would replace the obsolete image map file of the same area. An image map of an area not previously represented could be added to the image files.

5.2 User-Modifiable Spatial Datasets

This section discusses Facilities, Traffic Control Points, Sirens, User Defined Points, User Defined Polygons, Met Towers, and Igloos themes. Users that have the appropriate privileges can modify these themes from within FEMIS.

5.2.1 Facilities

Users can add, delete, or modify facility locations and attributes in their EOC from within FEMIS. After a user has finished making the changes and submits the new information to the database, an `SQL-PASSTHRU` query is automatically run from the FEMIS application. This query updates the appropriate database tables and creates an ASCII event file that is used to regenerate the Facilities theme. Your System Administrator can update the Facilities theme by following the same process.

5.2.2 Traffic Control Points

Users can add, delete, or modify traffic control point locations and attributes in their EOC from within FEMIS. After a user has finished making the changes and submits the new information to the database, an `SQL-PASSTHRU` query is automatically run from the FEMIS application. This query updates the appropriate database tables and creates an ASCII event file that is used to regenerate the Traffic Control Points theme. Your System Administrator can update the Traffic Control Points theme by following the same process.

5.2.3 Sirens

Users can add, delete, or modify warning siren locations and attributes in their EOC from within FEMIS. After a user has finished making the changes and submits the new information to the database, an `SQL-PASSTHRU` query is automatically run from the FEMIS application. This query updates the appropriate database tables and creates an ASCII event file that is used to regenerate the Sirens theme. Your System Administrator can update the Sirens theme by following the same process.

5.2.4 User Defined Points

Users can add, delete, or modify user defined point locations and attributes in their EOC from within FEMIS. After a user has finished making the changes and submits the new information to the database, an `SQL-PASSTHRU` query is automatically run from the FEMIS application. This query updates the appropriate database tables and creates an ASCII event file that is used to regenerate the User Defined Points theme. Your System Administrator can update the User Defined Points theme by following the same process.

5.2.5 User Defined Polygons

Users can add, delete, or modify user defined polygon locations and attributes in their EOC from within FEMIS. After a user has finished making the changes and submits the new information to the database, an `SQL-PASSTHRU` query is automatically run from the FEMIS application. This query updates the appropriate database tables and creates an ASCII event file that is used to regenerate the User Defined Polygons theme. Your System Administrator can update the User Defined Polygons theme by following the same process.

5.2.6 Met Towers

Users can add, delete, or modify Met tower locations and attributes in their EOC from within FEMIS. After a user has finished making the changes and submits the new information to the database, an `SQL-PASSTHRU` query is automatically run from the FEMIS application. This query updates the appropriate database tables and creates an ASCII event file that is used to regenerate the Met Towers theme. Your System Administrator can update the Met Towers theme by following the same process.

5.2.7 Igloos

Onpost users can add, delete, or modify igloo locations and attributes in their EOC from within FEMIS. After a user has finished making the changes and submits the new information to the database, an `SQL-PASSTHRU` query is automatically run from the FEMIS application. This query updates the appropriate database tables and creates an ASCII event file that is used to regenerate the Igloos theme. Your System Administrator can update the Igloos theme by following the same process.

5.3 Model-Related Spatial Datasets

Model related spatial datasets include the following themes: D2PC plumes, Threat Area(s), Evacuation nodes, Evacuation links, and Evacuation centroids. For each of these themes, the actual ArcView GIS files are created dynamically by the FEMIS application and stored temporarily on the PC. No model spatial data files for the GIS are stored on the server.

5.3.1 D2PC Theme Data

Although D2PC theme files are stored on the PC, they are actually regenerated each time a D2PC plume plotting function is invoked by the FEMIS application. D2PC themes are temporarily created and displayed on the map as needed and are not part of the permanent FEMIS spatial database.

5.3.2 Threat Area Theme Data

Threat Area theme files are regenerated on the PC each time a plume-based threat area or user defined threat area plotting function is invoked by the FEMIS application. Threat Area themes are temporarily created and displayed on the map as needed and are not part of the permanent FEMIS spatial database.

5.3.3 Evacuation Theme Data

Evacuation theme data is stored in the database and used to generate GIS files within ArcView on a PC-by-PC basis. For example, if someone changes some geographic information for an evacuation case on one PC, the evacuation grid for that case will need to be regenerated on any other PC to utilize the latest information. The GIS layer for an existing evacuation case may be generated on any PC by using the `Create Network` option contained within the evacuation interface.