Federal Emergency Management Information System (FEMIS)

System Administration Guide FEMIS: Phase 1

Version 1.1u

Federal Emergency Management Information System

June 1995

**Prepared for the CSEPP Office
United States Army Chemical
and Biological Defense Command
under a Related Services Agreement
with the U.S. Department of Energy
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**Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
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FEDERAL EMERGENCY MANAGEMENT INFORMATION SYSTEM (FEMIS)

SYSTEM ADMINISTRATION GUIDE FEMIS: PHASE I

Version 1.1u

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FEMIS integrates the following commercial software products. These products are trademarks or trade names of their respective owners.

Arc/Info ® and ArcView ® Environmental Systems Research Institute, Inc.

BW-Connect™ Beame and Whiteside Software.

GroupWise™ Novell Inc.

Microsoft ® Exel for Windows™, Microsoft ® Project for Windows™, Microsoft ® PowerPoint™, and Microsoft ® Visual Basic™ Microsoft Corporation

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

RSAREF RSA Laboratories, Inc.

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

Martin Hall et al. January 20, 1993. *Windows Sockets, An Open Interface for Network Programming under Microsoft® Windows™, Version 1.1*. Available on CompuServe and by anonymous FTP on rhino.microsoft.com and microdyne.com.

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Preface

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

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

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 Online Help System* explains how to start and use the FEMIS client software, 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 product 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 Biological Defense Command. The *FEMIS System Administration Guide* defines FEMIS hardware and software requirements and gives instructions for installing the FEMIS software package.

Scope

System administrators, database administrators, and general users can use this guide to install, configure, and maintain the FEMIS client software package. This document provides a description of the FEMIS environment; distribution media; data, communications, and electronic mail servers; user workstations; and system management.

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 to system administrators and managers. Users of this guide are expected to be familiar with the *FEMIS Database Management Guide* and with the FEMIS itself.

Prerequisites

This guide assumes the system administrators have some knowledge of the UNIX operating system. Additional training may be required to understand the multi-server distributed data architecture of FEMIS. A complete set of UNIX and COTS software documents should be available to the database administrator.

Organization

This document is organized into seven sections, which include details on the description, installation, configuration, utilities, and troubleshooting of FEMIS.

- Section 1.0 - discusses the FEMIS software packages, environment, Quick Start Checklist, installation, and distribution media.
- Section 2.0 - describes the UNIX-based services, which includes the relational database management system, backup procedures, the Notification Service, the Command Service, and the Meteorology Receiver.
- Section 3.0 - discusses the capability of FEMIS to connect to a variety of external data sources, including meteorological data, using the communications server.
- Section 4.0 - discusses the meteorological simulator application.
- Section 5.0 - discusses the electronic mail service and its components and installation and tips for using the Novell GroupWise Client.
- Section 6.0 - describes how the PC-based user interface and services provide a variety of functions necessary for managing an emergency, including the Commercial-Off-The-Shelf software, FEMIS system configuration, and PC client workstation troubleshooting.
- Section 7.0 - describes the system manager tool available from the FEMIS user interface.

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Acronyms and Definitions

B&W	Beame and Whiteside
COTS	Commercial Off-The-Shelf
CPU	Central Processing Unit
CSEPP	Chemical Stockpile Emergency Preparedness Program
CTOO	Name of a FEMIS database (Tooele County)
DBMS	Database Management System
DLL	Dynamic Linked Library
DNS	Domain Name Services
E-mail	Electronic Mail
EMIS	Emergency Management Information System
EOC	Emergency Operations Center
FEMIS	Federal Emergency Management Information System
GIS	Geographic Information System
GUI	Graphical User I/nterface
IBS	Integrated Baseline System
LAN	Local Area Network
MB	Megabyte
Met	Meteorological
NFS	Network File System
NIS	Sun's Network Information System
ODBC	Open Data Base Connectivity
PC	Personal Computer
PNL	Pacific Northwest Laboratory
SQL	Structured Query Language
SQL script	Sequence of SQL statements that perform database operations
TCP/IP	Transmission Control Protocol/Internet Protocol
TEAD	Name of a FEMIS database (Army Depot) and Tooele Army Depot
UNIX	Server Operating System
UTST	Name of a FEMIS database (Utah State)
VB	Microsoft Visual Basic
WAN	Wide Area Network
Windows NT	Microsoft Network Operating System for Workstations
WinSock	Windows Sockets
YP	Sun's Yellow Pages

1.0 Overview

The Federal Emergency Management Information System (FEMIS) Phase I is an emergency management planning and analysis tool that was developed by the Pacific Northwest Laboratory (PNL)^(a) under the direction of the U.S. Army Chemical Biological Defense Command. The *FEMIS System Administration Guide* defines FEMIS hardware and software requirements and gives instructions for installing the FEMIS software package. This document contains information on the following: software installation for the FEMIS data servers, communication server, mail server, and the emergency management workstations; distribution media loading and FEMIS installation validation and troubleshooting; and system management of FEMIS users, login, privileges, and usage. The system administration utilities (tools) available in the FEMIS client software are described for user accounts and site profile.

The Phase I system 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 later releases.

Each EOC has between 5 and 25 personal computers (PCs) that emergency planners and operations personnel use to do their jobs. These PCs are connected via a local area network (LAN) to servers that provide 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 on the clients (PCs). This client software comprises a graphical user interface (GUI) based on Microsoft 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 host provides E-mail services, Oracle database management system (DBMS) services, Arc/Info GIS capabilities, and basic file management services. A PC communication (Comm) server is available to interface with external subsystems. The weather collection system (Met) is the only external subsystem.

Proper installation of the FEMIS software is crucial to the operations of the emergency management system. Many software elements must be installed on a variety of servers and client workstations. Each must be installed and configured according to specifications for proper interoperability.

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

For the purpose of discussion in this document, the following names will be used to indicate the respective system configurations.

The servers named server1 through server7 represent any typical onpost or offpost EOC server which may be a Sun 670 Server, Sun SPARCServer 1000e, or a Sun SPARCStation 20 model 612.

1.1 Environment

For FEMIS to operate correctly, your first step will be to install all of the COTS software, including Oracle7 and Arc/Info, on your UNIX system. FEMIS will not operate correctly if older versions of the COTS software than those specified in Section 6.1 of this guide are installed.

Also, for FEMIS to operate correctly, disable or remove Sun's Network Information System (NIS) or Yellow Pages (YP) prior to running FEMIS. Many aspects of FEMIS are rendered unusable if NIS or YP are present.

FEMIS uses Beame and Whiteside's (B&W's) Transmission Control Protocol/Internet Protocol (TCP/IP) for all PC network communications. B&W TCP has been tested by PNL and is fully compatible with FEMIS requirements. Although other vendors may claim to offer a fully standard TCP/IP, including fully compliant WinSock^(a) and Network File System (NFS), PNL has not verified and tested any other TCP configurations for PCs, and thus, cannot endorse such installations. Presently, some vendors' TCP/IP-PC/NFS packages are not fully standard and compliant. Some typical problems are noncompliant NFS, limits to the number of open network connections, and a partially compliant WinSock Dynamic Linked Library (DLL).

1.2 FEMIS Quick Start Checklist

A Quick Start Checklist identifies the steps that should be taken to ensure a smooth installation of FEMIS and provides an outline of the tasks that must be completed before FEMIS will run.

Preparation

- Novell GroupWise E-mail has been installed on the Sun
- Oracle has been installed on the Sun
- SQL*Net has been installed on the Sun
- Oracle users are defined for the Sun
- NT for Windows has been installed on the PC
- BW-Connect (Beame & Whiteside) has been installed on the PCs and Servers
- Commercial-Off-The-Shelf (COTS) software has been installed on the PCs.

(a) Martin Hall et al. January 20, 1993. *Windows Sockets, An Open Interface for Network Programming under Microsoft® Windows™, Version 1.1*. Available on CompuServe and by anonymous FTP on rhino.microsoft.com and microdyne.com.

Checklist

- ☐ 1 Load FEMIS Support Software on the UNIX server(s).
- ☐ 2 Start the FEMIS Support Software on each UNIX server
 - ☐ Notification Service ☐ Met Simulator
 - ☐ Command Service ☐ EMIS/FEMIS Data Exchange Interface.
- ☐ 3 Validate COTS software installation.
- ☐ 4 Load FEMIS Client Software and GIS maps on PC(s).
- ☐ 5 Configure your FEMIS software. This includes updating the FEMIS.INI file to provide your PC name and to describe your COTS software configuration. It also includes 'attaching' an access database to Microsoft Project.
- ☐ 6 Configure the PC to ensure the startup drives and system services are properly set to support FEMIS.
- ☐ 7 Load the appropriate EOC FEMIS database on each UNIX server
- ☐ 8 Run the Open Data Base Connectivity (ODBC) application to define the FEMIS database connections for your site.
- ☐ 9 Complete FEMIS installation by adding Met Communication and Met Simulator PCs to the FEMIS network.

1.3 Installation

FEMIS is an integrated software product that resides on a client/server computer architecture. The main body of FEMIS software, referred to as the FEMIS Application Software, resides on the PC client(s) and is directly accessible to emergency management personnel. The remainder of the FEMIS software, referred to as the FEMIS Support Software, resides on the UNIX server. The Support Software provides the communication, data distribution, and notification functionality necessary to operate FEMIS in a networked, client/server environment. Because the FEMIS support functionality is accessed via the FEMIS application, the general FEMIS user should never have to deal with the FEMIS UNIX server.

To operate FEMIS, the Application Software must have access to the FEMIS emergency management database. The FEMIS database resides on the UNIX server and contains both relational and geographic information. Data that pertains to an individual EOC jurisdiction is stored on the EOC's local server. Information that needs to be accessible to all EOCs is automatically distributed by the FEMIS database to the other EOCs at the site.

To run the FEMIS software, you **MUST** have a FEMIS database. A FEMIS database will be provided by PNL when FEMIS is installed at your site, and it **MUST** be tailored for each individual FEMIS site. The FEMIS test database will be generated from the Integrated Baseline System (IBS), the Emergency Management Information System (EMIS), TIGER maps, and Census data and from TEAD emergency managers' input (see the *FEMIS Data Management Guide*).

1.3.1 Loading of Distribution Media

The FEMIS release consists of three major parts:

1. FEMIS Application Software
2. FEMIS Support Software
3. FEMIS database.

These parts consist of approximately 30MB to 50MB (megabytes) of files distributed on either a CD ROM or 8mm cartridge tape. The files are encapsulated in UNIX tar format.

To complete the system installation, you must be logged in as root on the UNIX server.

A FEMIS user account needs to be created prior to installing the software. To create the FEMIS user account, you must be logged on as root and must have created the /home/femis directory. Then enter the following commands to setup a user account and the femis group (also see Section 5.0, Electronic Mail Service):

```
# groupadd -g 30508 femis
# useradd -c "FEMIS account" -d /home/femis -g 30508 -s /bin/csh -u 30508
femis
# cd /home/femis
# chown femis .
# chgrp femis .
```

Once this command has been executed, you are ready to install the software.

1.3.1.1 CD-ROM Media

The CD-ROM media provides high capacity, compactness, and flexibility for distribution. On a system where one or more workstations are connected to a UNIX system, the CD ROM may be read by either the PC workstation or the UNIX system. The UNIX tar files are copied to the UNIX file system and then extracted from the tar format. The UNIX executables appear in /home/femis/exe when the femis.tar file is extracted.

If your media distribution is on CD ROM, execute the following commands:

```
# cd /home/femis
# cp /cdrom/database.tar .
# cp /cdrom/femis.tar .
```

At this point you should have two files in the /home/femis directory: femis.tar and database.tar.

Once the tar files are in the /home/femis directory, execute the following command from the /home/femis directory.

```
# tar xvf femis.tar
# tar xvf database.tar
```

1.3.1.2 Cartridge Tape Media

The 8mm tape cartridge is a UNIX readable tape format that must be loaded from a UNIX system. The UNIX tar files are copied to the UNIX file system and then extracted from the tar format.

If your media distribution is on 8mm tape, execute the following commands:

```
# cd /home/femis
# tar xvf /dev/rmt/"tape name"      (the location of the tape drive name).
```

At this point you should have two files in the /home/femis directory: femis.tar and database.tar.

Once the tar files are in the /home/femis directory, execute the following command from the /home/femis directory.

```
# tar xvf femis.tar
# tar xvf database.tar
```

1.3.2 UNIX Installation

1.3.2.1 UNIX Environment Setup

To complete the installation, run the script update_system_files.sh by executing the following commands:

```
# cd /home/femis/exe/sys
# update_system_files.sh
```

The update_system_files.sh script makes the necessary initialization and termination scripts for femis_event and femis_shell and makes the /etc/services and /etc/inetd.conf entries to allow fxcommnd to run and open the ports for femis_command, femis_notify, and femis_metdata.

The server should be rebooted at this time for the changes to be initialized.

To complete the database installation, see Section 2.2.1, FEMIS Database Installation.

1.3.2.2 Setup FEMIS Dotfiles

The user dotfiles can be found in the exe/sys/dotfiles directory. Enter the following commands to copy the dotfiles into the correct location.

```
# cd /home/femis
# cp exe/sys/dotfiles/.??* .
```

1.3.2.3 Creating the Database

To create the database, the table data must be imported, and then the configuration can be built.

Importing Table Data

1. Login to the server that supports the TEAD EOC database and execute this command:

```
# cd /home/femis/database
```

2. Start the Oracle Import tool to import the TEAD data:

```
# imp tead/tead
```

This command will cause an interactive session and give the name of import file when required. Accept all other default selections.

3. Repeat Steps 1 and 2 for Tooele County (CTOO) and Utah State (UTST) EOC databases.

Creating Database Configuration

1. Steps 1 through 6 are for the a multiple_server configuration. Login to the server that supports the TEAD EOC database.
2. Move to the multiple_server subdirectory to begin the creation of the normal multiple_server configuration. If you are generating a one_server configuration go to Step 7.
3. Start the Oracle SQL*Plus tool with this command:

```
# sqlplus tead/tead
```

4. Run the `master.sql` script with three parameters for Oracle listener names as indicated:

```
SQL>start master <tead_listener> <ctoo_listener> <utst_listener>
```

where `xxxx_listener` is the SQL*NET listener name for each EOC.
THE ORDER IS IMPORTANT!!

5. Several pauses in the script provide exit points in case errors are encountered. If errors are present, press Control-C and determine the cause of the errors. Otherwise, press the Enter key to proceed. When the script is complete, the SQL prompt will be displayed.
6. Your multiple_server configuration is now ready to use. Type exit to leave SQL*PLUS and proceed with the installation.

7. Steps 7 through 11 are only for the one_server configuration. Rlogin to the server that will be used.
8. Move to the one_server subdirectory to begin the creation of the one_server configuration.
9. Start the Oracle SQL*Plus tool with this command:

```
# sqlplus tead/tead
```

10. Run the master_one.sql script as indicated:

```
SQL>start master_one
```

11. Several pauses in the script provide exit points in case errors are encountered. If errors are present, press Control-C and determine the cause of the errors. Otherwise, press the Enter key to proceed. When the script is complete the SQL prompt will be displayed. You must now make modifications to the EOC table to match your configuration. For details, see Section 2.2, Relational Database Management System.

1.3.3 FEMIS PC Client Software Installation

1.3.3.1 Connect FEMIS Network Drive

Obtain the path \\<hostname>\<partition>/home/femis from your System Administrator.

Open the Windows File Manager.

Click on the Disks item on the menu bar. -> Pull-down menu appears.

Select Connect Network Drive. -> Connect Network Drive window appears.

Drive field: Select drive letter M.

Path field: Type \\<hostname>\<partition>/home/femis.

Connect As field: Type femis.

Click ok -> Enter Network Password window appears.

Password field: Type femis.

Click ok -> Enter Network Password window disappears.

A new File Manager pane will appear when the connection is successful.

1.3.3.2 Connect E-mail Network Drive

Obtain the path \\<hostname>\<partition>/home/femis from your System Administrator.

Open the Windows File Manager.

Click on the Disks item on the menu bar. -> Pull-down menu appears.

Select Connect Network Drive. -> Connect Network Drive window appears.

Drive field: Select drive letter M.

Path field: Type \\<hostname>\<partition>/.../grpwise/po/1:sfemis.

Connect As field: Type femis.

Click ok -> Enter Network Password window appears.

Password field: Type femis.

Click ok -> Enter Network Password window disappears.
A new File Manager pane will appear when the connection is successful.

1.3.3.3 Install FEMIS Client Software

Open the Windows File Manager.
Select the M drive.
Select the pc directory.
Double click on M:\pc\setup.exe.
Accept the default directory of C:\femis.
Wait for the files to be installed.
Acknowledge the completion of the installation.

1.3.3.4 Install FEMIS GIS Theme Files

Open the Windows File Manager.
Select the c drive.
Select the M drive.
With both directory windows open, select the M:\gis directory.
Drag the M:\gis directory to the C:\femis directory, to make C:\femis\gis.
Wait for subdirectories and files to be copied.

1.3.3.5 Edit FEMIS.INI

Open C:\WINDOWS\FEMIS.INI with Notepad.
Ensure the FemisUserTopDirNFS and GISTopDirNFS path names refer to the M drive.

Edit C:\WINDOWS\FNOTIF1.INI to change DefaultNotifServerHost to your server IP address (See your site administrator for this information). This identifies which EOC will be used as the default connection for each individual PC. This change should only have to be done once for each PC.

1.3.3.6 Inspect TNSNAMES.ORA File

This file should be configured by your System Administrator and distributed to each PC.

Open with Windows Write, C:\ORAWIN\NETWORK\ADMIN\TNSNAMES.ORA.
It should contain a paragraph for each Sun host/EOC database combination.
Each paragraph is headed by the name of the Oracle listener (e.g. fi6=).
The HOST ... should have an IP address or an IP name.
The SID ... should have the name of the Oracle database instance.
Note the Oracle listener name(s).

1.3.3.7 Setup ODBC.INI File

Obtain from your System Administrator the EOC database name and the Oracle listener name.
Open the Windows File Manager.
Find the program C:\WINNT35\SYSTEM\ODBCADM.EXE. (WINNT35 could be some other name).
Double click the program to run it.

For each EOC to be added (TEAD, CTOO, UTST),
Select Add... to create a new network link to the FEMIS database.
Choose ORACLE7 for the ODBC driver.
Click OK to accept the selection.
Enter an EOC database name for the Data Source Name (e.g. TEAD).
Type a short description to describe the type of configuration.
Enter the Oracle listener name for the SQL*NET Connect String (TEAD = fi6,
CTOO = fi6, UTST = fi8).
Click OK to commit the configuration.
To inspect or modify existing links,
Select Setup... button.
Assure the data is correct for the link.
Click OK to accept the values.

1.3.3.8 Setup FEMISDB.INI File

Open the Windows File Manager.
Find the program C:\FEMIS\MKDBINI.EXE.
Run the program.
Enter the default <EOC DB name> (e.g. TEAD) for this PC.
Enter the same name for all three fields.
Select OK.

1.3.3.9 Setup PFEMIS.MDB File

Find the program C:\FEMIS\ATTACH.EXE.
Run the program.
Tab to the following fields to change its values:
Local DB: defaults to C:\FEMIS\PFEMIS.MDB, change as needed.
SQL*Net Connect: enter the Oracle listener name. (e.g. fi6)
Data Source Name: enter the EOC database name (e.g. TEAD)
User ID: enter the EOC database name (e.g. TEAD)
Password: enter the EOC database name (e.g. TEAD)
Attaching: this is a status field showing the current database table.
Click the Attach button. This process will take several minutes.
Wait until a window declaring FEMIS Oracle Tables Are Attached appears.
Click the OK button.
Click the close box for the Attach FEMIS Tables window.

1.3.3.10 Setting the Clock

Use the Windows control panel
Select International option
Set your date format order to MDY (Month Day Year).
Note: Make sure that you are using either a 24-hour clock or have set the
labels for 12-hour clock to AM and PM (not case sensitive).

1.3.3.11 Network Time Protocol (NTP) Service

The time of day synchronization of the FEMIS PC workstations with the FEMIS UNIX host is accomplished with a program called Tardis. This program is installed on each FEMIS workstation and should be configured as a Windows NT service.

The following steps are performed in a Windows NT DOS window:

1. Locate the Windows NT system directory by using a DOS window and type `set` which will return information about the boot environment including drive and the system directory currently used.
2. Ensure that the following are present in the `..\<windows>\system32` directory:

<code>TARDSERV.EXE</code>	The Tardis service program
<code>TARDIS.CPL</code>	The Control Panel applet
<code>TARDIS.WRI</code>	The Tardis manual in Write format
<code>TARDIS.HLP</code>	On-line help.

3. Register Tardis as a Windows NT service using the path found above. The format of the command is

```
tardserv <add | remove> [path to tardserv.exe]
```

Example 1: `tardserv add c:\winnt35\system32\tardserv.exe`

Example 2: `tardserv remove`

4. Dismiss the DOS window by typing `exit` at the DOS prompt. The time service should now be registered and ready to configure.

The following steps are performed in the Windows Program Manager:

1. From the Main program group, open the Control Panel item. The Tardis control panel should be visible.
2. Open the Services control panel and scroll down to the Tardis service. Select it and click the Startup button.
3. When the setup panel appears, click the Automatic startup type radio button.
4. Close the panel and click the Start button in the Services panel.
5. Close the Service panel and open the Tardis service.
6. Enter the name of your time service host in the Time Server field.
7. Note that the update interval is set to 1 minute and the maximum correction is set to 1 hour (3600 seconds).
8. Close the Tardis panel and open the Date/Time control panel.

9. Ensure the correct time zone is selected for your area.
10. Set the minutes portion of the clock display to 00 and wait for it to update to the time sent by the time service host. This should take about 1 minute.
11. Close the Date/Time control panel and open the Tardis control panel.
12. Change the update interval to 60 minutes or more.
Note: Each update generates an entry in the Windows NT applications log file.
13. Close the Tardis panel and the Control Panel to return to the Program Manager.
The PC clock should now be synchronized with the time service host.

1.3.4 PC - Communications Server

Make a `C:\FEMIS` directory on the destination PC.

Copy the `met` directory from the `M` network drive onto a floppy disk.

At the DOS prompt, type the following:

```
xcopy /v/s A:\met C:\femis\met
```

Copy the `met` directory from the `M` network drive to the `C:\FEMIS` directory of the destination PC, using the Windows File Manager.

Run the application `fxcommpc.exe`.

This program communicates with the UNIX program `fxcommd` running as a daemon on the FEMIS server (see Section 2.4 for further details). It also communicates with the `metsim` program described in Section 4.0, Meteorological (Met) Simulator.

1.3.5 PC - Met Data Simulator

Make a `C:\FEMIS` directory on the destination PC.

Connect a RS232 cable from the Met Simulator PC's COM2 to the Communications Server PC's COM2. A null modem cable or a gender changer may be necessary.

At the DOS prompt, type the following:

```
c:\femis\met\metsim.exe -c2 -w60
```

Copy the `met` directory from the `M` network drive onto a floppy disk.

Copy the `met` directory from the floppy disk to the `C:\FEMIS` directory of the destination PC.

Run the application `metsim.exe`.

This program communicates with the fxcommnc program described in Section 3.0, Meteorological (Met) Communications Server.

1.3.6 E-Mail Services

The installation of the FEMIS E-mail services is a complex process involving a UNIX-based post office and message delivery system, a DOS-based administration program, and a Windows-based client interface. Refer to Section 5.0, Electronic Mail Service, for the installation procedures.

1.3.7 EMIS/FEMIS Data Exchange Interface

The definitive description of this interface can be found in the *Release Notes, Version 1.1u*.

1.4 Validation of FEMIS Installation

To run correctly, FEMIS software relies on many integrated components: the FEMIS database, commercial and government supplied software products, the FEMIS application, and system support services. Therefore, it can be difficult to determine if the FEMIS system is fully operational. This section is intended to assist the system manager in validating that the FEMIS system has been properly installed and is operating correctly. The three major components to consider when validating a FEMIS installation are the server, the external communications, and the PC clients.

The first component, the server, consists of the FEMIS host software. For FEMIS to run, a set of UNIX executables must be installed and operate properly. These executables include the Command Server and the Notification server. The FEMIS database is considered part of the host software installation.

The second component is the External Communications. Validation includes checking the EMIS/FEMIS Data Exchange Interface (DEI), Meteorological Monitoring Simulator, and the integration of the Electronic Mail system.

The third component is the PC clients. Validating the PC clients includes ensuring that all of the COTS software packages are properly installed and accessible by the FEMIS client software; the FEMIS client application is properly installed; the FEMIS client application has access to the FEMIS database, notification server, and command server residing on the Sun host, and the integration of the E-mail services provided by the external communications side.

The FEMIS Validation Checklist includes items that need to be checked to ensure that the FEMIS system is operating properly. These items are tested from the PC to ensure access and integration into the FEMIS application. This document provides procedures to validate that the Server and External Communications are properly installed. An

extended list is also provided which contains a suggestion or reference on the best way to validate the item. Also included are some of the most likely problem(s) if the feature is not working properly.

FEMIS Validation Checklist

- ☐ FEMIS PC Configuration
- ☐ FEMIS Login
- ☐ FEMIS Database Connection
- ☐ FEMIS Notification Server
- ☐ FEMIS D2
- ☐ FEMIS GIS
- ☐ FEMIS Electronic Planning (Planning Mode)
- ☐ FEMIS Help
- ☐ FEMIS System Administration
- ☐ FEMIS Database Manager
- ☐ Facility/Resource Manager
- ☐ FEMIS Printer
- ☐ Met Simulator for Exercise Mode
- ☐ FEMIS E-Mail
- ☐ Site Defined Status Boards
- ☐ Current FEMIS Navigation Matrix
- ☐ COTS Word Processing Software
- ☐ COTS Spreadsheet Software
- ☐ COTS Mail Software
- ☐ COTS GIS Software
- ☐ COTS Project Management Software
- ☐ EMIS/FEMIS Data Exchange Interface

FEMIS Validation and Troubleshooting Notes

- ☐ **Checking the Configuration**
The definitive reference for this validation step can be found in the *Release Notes, Version 1.1u*.
Check that the PC clock is using either a 24-hour clock or a 12-hour clock set to AM and PM. From the Windows control panel (should be in the Main program group), International option, verify your date format order is MDY (Month, Day, Year). Make sure you are using either a 24-hour clock or have set the labels for a 12-hour clock to AM and PM (not case sensitive).
- Troubleshooting:**
 - * If you get an error when hitting a Now button in Event Declare, Workplan, or Status Boards, then your clock is probably not configured correctly.
- ☐ **Check Network Time Protocol (NTP) Service**
From the Main program group, open the Control Panel item. Open Tardis control panel. Check that the correct time service host is entered in the Time Server field. Ensure that the update interval is set to 60 minutes or more. This number can range from 1 minute to hundreds of minutes. Be aware that each update will

generate an entry in the Windows NT applications log. Close the Date/Time control panel and open the Services control panel. Scroll down the list to find the Tardis service. Verify its status is started and startup is automatic. Close the Tardis panel and open the Date/Time control panel. Ensure the correct time zone is selected for your area. To test Tardis, set the minutes in the time display to 00. After waiting a period of time greater than the update interval set above, verify the time displayed is the correct time.

- **Check Link to M: Drive**

Open the File Manger in the Main program group and verify that drive M: is displayed under the menu bar.

Troubleshooting:

- * If you get the error "D2 case not able to be logged," then the network configuration is bad.

- **Check Link to L: Drive**

Open the File Manger in the Main program group and verify that drive L: is displayed under the menu bar.

- **FEMIS Login**

Validate the ability to access the FEMIS application by double clicking on the FEMIS Version 1.1u icon in the FEMIS Version 1.1u program group. Enter the usercode/password assigned to you by your System Administrator. The FEMIS Navigation screen should appear. Access the Current Information item under the Help menu. Click on the Site and EOC tab to see how you are interfacing with the FEMIS system.

Troubleshooting:

If the FEMIS Login screen does not work there may be many causes. The best fix is to review the installation section and validate that all of the steps have been completed. The following is a list of the most likely causes:

- * Verify that the FEMIS program item in the Program Manager has the correct working directory. Go to the Windows Program Manager. Find and select the FEMIS program item. Select Properties under the menu bar File item. Ensure that the Command Line path is C:\FEMIS\FEMIS.EXE and the Working Directory path is C:\FEMIS.
- * The usercode/password is not valid.
- * Your ODBC data source does not have the proper connection information. See PC installation section and rerun the ODBC connection utility.
- * You are not pointing to the correct default EOC. Rerun MKDBINI.EXE to identify the default EOC for your workstation.
- * You have not moved the TNSNAMES file to the C:\ORAWIN\NETWORK\ADMIN directory.
- * The FEMIS database Listener is not active. See Section 2.2.1, FEMIS Database Installation.
- * The EOC table in the database has not been updated to include the name of your server.

- **FEMIS Database Connection**

After logging in select the Operations Mode button. Again access the Current Information item under the Help menu. You should see the types of information associated with your operational information. Select the Ops Tracking button under the Setup Phase. The Operations Tracking screen should appear with information and colored boxes. Selecting different EOCs from the EOC list menus should change the values and colors of the screen. This will validate FEMIS is connected to your EOCs database and is receiving replicated information from other EOCs.

Troubleshooting:

If this screen is grey and empty or error messages appear the following items are suspect:

- * The databases at the effected EOC are not active. Review FEMIS database installation section.
- * The Oracle Replication functionality is not working properly. Review Section 2.2.1, FEMIS Database Installation.

- **FEMIS Notification Server**

Leave the Operations Tracking screen active during the testing of other FEMIS functionality. As the functions are complete you should get a blinking icon which looks like a Package. This is the Notification server passing messages to your PC that FEMIS data notifications are being sent. You can determine that the Notification capability in FEMIS is active by seeing the Socket Message Window icon (a yellow circle with an exclamation point) on your desk top. If this icon is present all is well with the notification system.

Troubleshooting:

If you get an error message that states "The Notification Server has been Corrupted" and the Socket Message Window icon (a yellow circle with an exclamation mark) is not active on your desk top --- DON'T Panic. This can happen two or three different ways.

- * The Notification server is out of sync with your PC. This usually occurs after you exit FEMIS and immediately re-enter FEMIS. The PC did not have time to disconnect the Notification application from the socket on the server before running the FEMIS application again. Exit FEMIS. Double-click the background portion of your NT desk top to bring up the Task List screen, and ensure that the Socket Message Window task has ended. If the task has ended you should be able to rerun FEMIS without any problems.
- * If you have exited FEMIS and the notification icon is still present, double click the icon, and then close the window. This will end the notification task.
- * The Socket Message Window truly is corrupted and has become confused at to which socket it is supposed to connect to on the PC and Sun server. This will usually happen after you get a General Protection fault or some other significant PC error. The easiest way to fix this is to log out and re-enter windows. This will fix the problem 95% of the time. As a reminder, it is always a good practice to re-enter windows after a General Protection Fault or some other significant Windows error.
- * The notification server is down. Check the Notification system and restart it if necessary. **Note:** This should happen very rarely. Try rebooting your PC first.

- **_____ FEMIS D2**

The easiest way to check D2 is to hit the Run Hazard button from the FEMIS Navigation screen. Be a bit patient while the initial connection is made to the D2 application and the FEMIS database. D2 should come up with a default case and be ready to run. Select the Run Model item from the Run menu item. You should quickly get a user interface screen containing the results of the D2 run.

Toggle the edit button and trigger logging. Make a change to the D2 case and rerun it. This will test that D2 runs can be logged onto the server for transfer to other EOCs.

Troubleshooting:

If D2 does not run it generally means the Command Server on the Sun Server was not properly installed.

If an error message occurs that states "The D2 run cannot be logged," it means the `femis.ini` file is either

1. not porting to the proper place on the server to log D2 runs
2. the PC did not connect properly to the server during startup(no m: drive)
3. the user does not have the proper privileges on the UNIX server to log the D2 case.

- **_____ FEMIS GIS**

The easiest way to check that the FEMIS GIS is installed properly is to pick the MAP button from the FEMIS Menu Bar. The ArcView application should be initiated and you should see a set of base maps appear within an ArcView window. Afterwards you should initiate D2 and select the Run and Plot Model Results item from the D2 Run menu. Touch the Map Locate button from within D2 to check the interface between FEMIS and GIS objects. Test procedure 130 (provided by PNL) contains steps for reviewing the link between FEMIS and the GIS.

Troubleshooting:

- * The MAP button on the FEMIS Menu Bar is grayed out. This implies that either ArcView has not been installed or the path provided in the `FEMIS.INI` file to access the ArcView executable is incorrect.
- * ArcView runs but it keeps asking where files are and putting up a directory screen. This implies that the data provided in the FEMIS install was not properly copied to the FEMIS GIS directory. Make sure all of the GIS files and directories sent are copied down to each PC.
- * Could not start GIS.

- **_____ FEMIS Electronic Planning (Planning Mode)**

To run FEMIS Electronic Planning in the Planning Mode you must have Microsoft Project on your PC and a FEMIS Access Database properly 'attached.' The easiest way to validate this is to go into Planning Mode from the FEMIS Navigation screen and select a dataset. Examine the Plan Tracking screen to be sure a Plan has been selected. Hit the Edit Plan button from the FEMIS Navigation screen. This should bring up Microsoft Project and read in the FEMIS

Plan into a project screen. If you can do this without any errors or messages the FEMIS Planning software should work properly.

To ensure that the drop-down list is properly attached, go to the Microsoft Project screen. Select an Emergency Support Function attribute cell and click the 'pick' icon. The drop-down list should come up. Hit the fill button, and note the ESFs appear in the drop-down list. Double click an item, and note it appears back in the plan. Check that the GIS is properly linked to the plan by selecting either the location or location type cell in the project. Invoke and drop-down list, and fill. A 'get location' interface similar to the one in D2 should appear. Select a location from the interface. Click OK from the GIS interface to see the location entered into the drop-down list. Trigger the 'add attribute' button to get the location entered into the plan. Test the resource interface by clicking the resource icon (two faces). The resource assignment form should appear. The Project calendar should be set to a 24-hour clock and a 7-day calendar. Verify by clicking on File and then Summary Info. The Calendar field should display "All Working" which is equivalent to a 24-hour clock and a 7-day calendar.

Troubleshooting:

- * Cannot find Microsoft Project. You did not install the software or your FEMIS.INI file has not been updated to provide the proper path to the software.
- * OLE Error when reading the database. You are only able to run the plan generation software from you default EOC. Check the Current Info item in the Help Menu to ensure you are logged into your default EOC. If you are logged into your default EOC you must have an Access Database 'attached' to the Oracle database for your EOC. This was supposed to be done during the PC installation. Review the Installation section to determine if your PC has been attached to your local database. If you are not sure or you want to change default EOCs : 1) Copy the file PFEMIS.NEW in the FEMIS directory to PFEMIS.MDB in the same directory. Overwrite the old PFEMIS.MDB file. 2) Run ATTACH.EXE from your FEMIS directory. This will take approximately 10 minutes to complete. This is only done once when you define the default EOC to be connected to the PC.

Drop-down list doesn't work. This is generally caused by a Microsoft Project error. You will need to: 1) logout of FEMIS and try again, or 2) log off the NT and re-login. If you can see the pick icon you should have access to the capability.

- * Calendar not based on 24-hour clock, 7-day a week schedule. You have a bad global.mpt file in Winproj. Delete the old one and copy the global.mpt from the FEMIS install into the Winproj directory.

- **FEMIS Help**

Use the help icon (a lifesaver) on the D2 toolbar to check that the Help subsystem is active.

- **FEMIS System Administration**
Select the System Admin item from the FEMIS Menu Bar to validate the access to System Administration functionality.

Troubleshooting:

- * Error occurs in starting up System Administration. The FEMIS Install was not performed properly. Make sure `FSYSMGR.EXE` is in the FEMIS directory.
- * The System Administration item is grayed out. You do not have the privilege to access System Administration functionality.

- **FEMIS Database Manager**
Select the Administration item FEMIS Menu Bar to validate the access to the FEMIS Data Administration functionality.

Troubleshooting:

- * Verify that a mode has been selected.
- * Error occurs in starting up Database Administration. The FEMIS Install was not performed properly. Make sure `FDATAMGR.EXE` is in the FEMIS directory.
- * The data Administration item is grayed out. You do not have the privilege to access data Administration functionality.

- **FEMIS Facility/Resource Manager**
Select the Administration item FEMIS Menu Bar to validate the access to the FEMIS Facility/Resource Administration functionality.

Troubleshooting:

- * Verify that a mode has been selected.
- * Error occurs in starting up Facility/Resource Administration. The FEMIS Install was not performed properly. Make sure `F_RMMGR.EXE` is in the FEMIS directory.
- * The data Administration item is grayed out. You do not have the privilege to access data Administration functionality.

- **FEMIS Printer**
Select the Printer button from the FEMIS Toolbar. This should provide a printout of the FEMIS screen to the default printer.

Troubleshooting:

- * The site System Administrator is responsible for configuring the printer to the PC and Sun server. Contact them for assistance.

- **Met Simulator for Exercise Mode**
Select the Met Conditions item from the Status Board icon. A window containing the most current met data should appear on the screen.

Troubleshooting:

- * The contents of the window are empty or the values are old and not changing. This would imply that the Met Monitoring system has not been installed and/or the met simulator is not operating. See Section 4.0, Meteorological (Met) Simulator to install and configure the Met Monitoring system.

- **____ FEMIS E-Mail**

Select the MAIL button from the FEMIS Toolbar. This should bring up the GroupWise electronic mail software.

Troubleshooting:

- * The button is grayed out. The software has not been installed and/or the FEMIS.INI file does not give the correct path to the vendor supplied software.

- **____ Site Defined Status Boards**

Select the Site Defined item from the Status Board icon on the FEMIS Toolbar. A selection window should come up which allows the user to identify the Site Defined Status Board they wish to access. To generate the layout for a Site Defined Status Board select the Status Board Designer item from the FEMIS Utilities Menu Bar.

Troubleshooting:

- * There are no names in the Status Board Name field. The site System Administrator has not generated any site defined status boards.
- * If you cannot select a Site Defined Status Board, this is usually because you do not have privileges set for that Status Board. See your System Administrator for the privileges.

- **____ Current FEMIS Navigation Matrix**

To ensure that you have the most current Navigation Matrix select the Modify Matrix item from the FEMIS Utility Menu Bar. Select the Reset to FEMIS Defaults button at the bottom left of the form and hit OK. This should reset the Navigation Screen to it default setting and send a message to the users that the Navigation Screen has changed. This is only done once for each database.

- **____ COTS Word Processing Software**

Select the Word Processing item from the Utility Menu Item. This should bring up the WordPerfect word processing software.

Troubleshooting:

- * The button is grayed out. The software has not been installed and/or the FEMIS.INI file does not give the correct path to the vendor supplied software.

- **____ COTS Spreadsheet Software**

Select the Spreadsheet item from the Utility Menu Item. This should bring up the Excel spreadsheet software.

Troubleshooting:

- * The button is grayed out. The software has not been installed and/or the FEMIS.INI file does not give the correct path to the vendor supplied software.

- **____ COTS Mail Software**

Select the Mail item from the Utility Menu Item. This should bring up the GroupWise electronic mail software.

Troubleshooting:

- * The button is grayed out. The software has not been installed and/or the FEMIS.INI file does not give the correct path to the vendor supplied software.

- **___ COTS GIS Software**

Select the GIS item from the Utility Menu Item. This should bring up the ArcView 2 GIS software.

Troubleshooting:

- * The button is grayed out. The software has not been installed and/or the FEMIS.INI file does not give the correct path to the vendor supplied software.

- **___ COTS Project Management Software**

Select the Project Management item from the Utility Menu Item. This should bring up the Microsoft Project software.

Troubleshooting:

- * The button is grayed out. The software has not been installed and/or the FEMIS.INI file does not give the correct path to the vendor supplied software.

- **___ EMIS/FEMIS Data Exchange Interface**

Note: The definitive description of this interface can be found in the *Release Notes, Version 1.1u*.

Click the Status Board icon in Operations mode. Select the Met menu item. If the current Met data appears in the table, the EMIS/FEMIS connections should exist.

Troubleshooting:

- * If there is no data or outdated Met information, the EMIS/FEMIS interface may not be properly installed. See the *Release Notes, Version 1.1u*, for documentation on installing and validating the EMIS/FEMIS interface.

1.5 Directory Structures

Directory structures for FEMIS are illustrated in this section.

FEMIS UNIX Data Server Components

UNIX Server Directory Structure

Unix Server COTS

- o Sun Solaris v2.4 with database accelerator
- o Oracle RDBMS v7.1 with distributed option
- o SQL*Plus v2.0
- o Oracle SQL*Net v2.0
- o Protocol Driver for TCP/IP
- o ArcInfo v7.0.2
- o Novel GroupWise v4.1 Client/Admin Pack (admin portion)
- o Novel GroupWise v4.1 Message Server Pack for Unix
- o Novel GroupWise v4.1 SMTP Gateway for Unix

Emergency Management Workstation

COTS

- o Microsoft Windows NT Workstation, v 3.5
- o ArcView v2.0b GIS
- o Novell GroupWise v4.1 Client/Admin Pack for Windows
- o BW-connect: NFS client for Windows NT x86 v3.5
- o Microsoft Project v4.0
- o Oracle SQL*Net v2.0
- o Oracle TCP/IP adapter v2.0
- o WordPerfect for Windows v6.0 or better
- o Microsoft Office v4.3 including:
 - o Microsoft Excel v5.0 or better
 - o Microsoft PowerPoint v4.0 or better

2.0 UNIX Host

The UNIX host server is the primary data and information storage and distribution component. Its primary software elements consists of the Oracle database management system (DBMS); the Notification Service; the Command Service; the meteorology (Met) data receiver; and the sockets communications service.

The programs discussed require the UNIX environment on a Sun computer running Solaris 2.4 or IBM R/6000 running AIX 3.2; and utilizing standard Berkeley Sockets.

PNL recommends you read Section 2.1 in its entirety prior to beginning the Oracle installation.

2.1 Installing the Oracle Server

Before beginning the Oracle installation, you must have the *Oracle7 for Sun SPARC Solaris 2.x Installation & Configuration Guide Release 7.1.6*, also called the ICG. These installation instructions are intended to be used in conjunction with the ICG.

The FEMIS Oracle administrator must install the following products. The release numbers for the products on your media may be slightly higher than these.

- Oracle Names 1.0.1.0.0
- Oracle Network Manager 2.1.4.1.0
- Oracle Server Manager 2.0.3.0.0
- ORACLE7 Distributed Database option 7.1.4.1
- ORACLE7 Server (RDBMS) 7.1.4.1.0
- PL/SQL V2 2.1.4.0.0
- SQL*Net V2 2.1.4.1.0
- SQL*Plus 3.1.3.5.1
- TCP/IP Protocol Adapter (V2) 2.1.4.1.0.

Any discussion in the ICG about other products can be skipped.

Be sure to follow the pre-installation instruction in the ICG. It is vital to configure the operating system shared memory parameters. Consult Table 3-1 in the ICG.

Oracle and PNL recommend using an OFA installation. Chapter 1 of the ICG includes a useful section on the OFA configuration and UNIX Administration Standards. Using the OFA installation will significantly reduce problems with maintenance in the future.

2.1.1 Installation

Prior to installation, create a file that will condition the shell environment for installation. The following is an example.

```
setenv DISPLAY mydeskX:0

setenv ORACLE_TERM xsun
setenv ORACLE_SID tead1
setenv ORACLE_BASE /u00/apps/oracle
setenv ORACLE_HOME $ORACLE_BASE/product/7.1.6

set path=( /bin /usr/sbin /usr/bin )
set path=( /usr/ccs/bin $path )
set path=( /apps/SUNWsprow/bin $path )
set path=( $ORACLE_HOME/bin $path )
```

Once you have "sourced" the above file and started the installation, the installer will display several dialog boxes. For most questions the answers are easy. The following paragraphs give additional guidance.

For the NLS dialog, select American/English.

For the character set dialog, select US7ASCII.

For the Relink dialog, select yes.

For the Server Manager dialog, Both Server Manager options, character mode and MOTIF, should be selected.

When specifying files for the database tablespaces, spread the files across as many drives as possible. Be sure to put the files for the rollback segments tablespace, system tablespace, and redo log files on separate drives. All redo log files can be on the same drive. Redo log files can be set to a large value such as 20M to reduce checkpointing.

Spread the control files across three drives. The control files are small and have very little activity but are key to database recovery. Do not let the failure of a single disk take out all of the control files.

Oracle stores your answers to the installation dialog boxes in a file named `usrdf1.log`. The following is an example of this file. This example can be used to help you decide on answers to other dialog boxes you may encounter.

```
unix.Oracle_Doc=/apps/oracle/doc
unix.skip_readme=TRUE
unix.readme_ver=7.1.6.1
unix.Owner=oracle
unix.Inst_Action=COMPLETE SOFTWARE/DATABASE FRESH INSTALL
unix.Doc_Load=For all products being installed.
unix.Oracle_Sid=tead1
unix.lang=American/English
unix.Port_Spec_Doc=TRUE
unix.CD_Doc_Install=For all products being installed.
rdbms.dba_group=dba
rdbms.db_char_set=US7ASCII
```

```

rdbms.orapwd_pw_get=FALSE
rdbms.start_lsnr=FALSE
rdbms.dflt_ctrlf_ok=FALSE
rdbms.control1_file=/u01/apps/oracle/tead1/control01.ctl
rdbms.control2_file=/u02/apps/oracle/tead1/control02.ctl
rdbms.control3_file=/u03/apps/oracle/tead1/control03.ctl
rdbms.all_db_defaults_okay=FALSE
rdbms.system_file=/u01/apps/oracle/tead1/system01.dbf
rdbms.system_size=30M
rdbms.log1_file=/u02/apps/oracle/tead1/redo01.log
rdbms.log1_size=20M
rdbms.log2_file=/u02/apps/oracle/tead1/redo02.log
rdbms.log2_size=20M
rdbms.log3_file=/u02/apps/oracle/tead1/redo03.log
rdbms.log3_size=20M
rdbms.rbs_file=/u03/apps/oracle/tead1/rbs01.dbf
rdbms.rbs_size=10M
rdbms.temp_file=/u04/apps/oracle/tead1/temp01.dbf
rdbms.temp_size=10M
rdbms.users_file=/u05/apps/oracle/tead1/users01.dbf
rdbms.users_size=4M
rdbms.tools_file=/u05/apps/oracle/tead1/tools01.dbf
rdbms.tools_size=10M
plus.do_inst_help=TRUE
plus.do_inst_demo=TRUE
svrmgr.gui_choice=Motif Bitmapped Interface|Character Mode Interface
unix.get_x_lib=/usr/dt/lib
unix.get_motif_lib=/usr/openwin/lib
unix.append_root_inst=TRUE
unix.sv_rtsn=/u00/apps/oracle/product/7.1.6/orainst/root.sho
unix.spawn_xterm=TRUE

```

During installation it is useful to have an extra xterm or command tool running so that you can create any directories the installer needs but does not automatically create. This can save time since you will not have to restart the installation.

2.1.2 Configuring the Oracle Server for FEMIS

After installation the `inst.ora` file must be modified. The replication parameters must be added. The replication parameter can be found at the bottom of the following sample `inst.ora` file. Other parameters can also be increased. The database server must be restarted for the changes to `inst.ora` to become effective.

```

#
# include database configuration parameters

file = /abbe/apps/oracle/admin/tead1/pfile/configtead1.ora

rollback_segments = (r01,r02,r03,r04)

#
# This file is provided by Oracle Corporation to help you customize
# your RDBMS installation for your site. Important system parameters
# are discussed, and example settings given.
#
# Some parameter settings are generic to any size installation.
# For parameters that require different values in different size
# installations, three scenarios have been provided: SMALL, MEDIUM
# and LARGE. Any parameter that needs to be tuned according to

```



```
# installation size will have three settings, each one commented
# according to installation size.
#
# Use the following table to approximate the SGA size needed for the
# three scenarios provided in this file:
#
# -----Installation/Database Size-----
#          SMALL          MEDIUM          LARGE
# Block      2K      4500K          6800K          17000K
# Size       4K      5500K          8800K          21000K
#
# To set up a database that multiple instances will be using, place all
# instance-specific parameters in one file, and then have all of these files
# point to a master file using the IFILE command. This way, when you change a
# public parameter, it will automatically change on all instances. This is
# necessary, since all instances must run with the same value for many
# parameters. For example, if you choose to use private rollback segments,
# these must be specified in different files, but since all gc_*
# parameters must be the same on all instances, they should be in one file.
#
# INSTRUCTIONS: Edit this file and the other INIT files it calls for your
# site, either by using the values provided here or by providing your own.
# Then place an IFILE= line into each instance-specific INIT file that points
# at this file.

# tuning parameters
db_files = 20

##          Small      Medium      Large
##          -----
db_file_multiblock_read_count = 16      # M #      8      16      32
db_block_buffers = 550      # M #      200      550      3200
shared_pool_size = 6000000      # M #      3500000      6000000      9000000
log_checkpoint_interval = 10000
processes = 200      # L #      50      100      200
dml_locks = 200      # M #      100      200      500
log_buffer = 163840      # L #      8192      32768      163840
sequence_cache_entries = 30      # M #      10      30      100
sequence_cache_hash_buckets = 23      # M #      10      23      89

#          # audit_trail = true      # if you want auditing
#          # timed_statistics = true      # if you want timed statistics
#          max_dump_file_size = 10240      # limit trace file size to 5 Meg each

#          # log_archive_start = true      # if you want automatic archiving

mts_dispatchers="ipc,1"
mts_max_dispatchers=10
mts_servers=1
mts_max_servers=10
mts_service=tead1
mts_listener_address="(ADDRESS=(PROTOCOL=ipc)(KEY=tead1))"
```

```
# For replication.  
# Additional info in: "Oracle7 Server Documentation Addendum Release 7.1"  
snapshot_refresh_processes = 1  
snapshot_refresh_interval = 20  
snapshot_refresh_keep_connections = true
```

The failure of Oracle to detect dead sessions also requires you to set the processes parameter in `inst.ora` to a high number. You should set the processes parameter to five to ten times the number of individuals using FEMIS.

2.1.3 Oracle Server Troubleshooting

PNL has experienced failures of the listener process. Restarting the listener with a daily cron task is advised to reduce or eliminate listener failures.

Be sure the listener service is listed in the `/etc/services` file.

SQL*NET, version 2.0, uses several configuration files on the servers and the clients. You should create these files with the Network Manager that comes with the server. Coordination with the other EOCs at the site will be required for this operation.

When using the Network Manager, it is sufficient to identify just one NT client and distribute the files for that NT client to all NT clients.

The per session Oracle server process does not always detect the failure of its client. You can improve this situation by adding the following line to the client's `sqlnet.ora`:

```
sqlnet.expire_time = 1
```

2.2 Relational Database Management System

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 FEMIS Phase I, over 180 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. Additional 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. More details about the DBMS are provided in the *FEMIS Data Management Guide*.

2.2.1 FEMIS Database Installation

Each CSEPP site requires the installation of a custom database. This section describes the Utah TEAD site, which includes three EOCs in the initial installation: the Army Depot (TEAD), Tooele County (CTOO), and Utah State (UTST).

Note: FEMIS Version 1.1u is implemented without a real TEAD EOC. Instead, the EMIS system, located at the Army Depot, sends messages to the Tooele County EOC. A EMIS/FEMIS process then inserts data from these messages into the TEAD database managed by the UNIX server, which is located at Tooele County. This is referred to as the Phantom Post EOC.

Before proceeding, your System Administrator should verify that Oracle has been installed correctly and that the database has been started (see Section 2.1, Installing the Oracle Server). Also, the SQL*Net software must be installed correctly and operational.

The Database Administrator will prepare the Oracle database by creating tablespaces and user accounts. This work should be done by the Database Administrator unless the System Administrator has knowledge and experience in this area.

Note: If you have concerns about the Oracle installation, tablespaces, and user accounts **do not proceed** with the FEMIS database installation.

The System Administrator must log on to a UNIX workstation and change the directory to /home/femis, where the database.tar file was loaded (see Section 1.3.1.1, CD-ROM Media, or Section 1.3.1.2, Cartridge Tape Media).

The command `# tar xvf database.tar` created a database directory with three subdirectories: `one_server`, `multiple_server`, and `dba`. The `dba` subdirectory includes example scripts to create tablespaces and users. The files in these subdirectories contain database dumps and scripts to create data objects.

To install the FEMIS database, the first step is to import the data files that create the definition of the tables and load data into the ones that have preset records. These files were created by the Oracle Export utility and are imported using the Oracle Import utility.

The following command is an example to import the TEAD data when you are logged into the server that is assigned to TEAD:

```
# imp tead/tead
```

This command will cause an interactive session to commence where the System Administrator will be asked for the name of the import file such as `tead02_22.dmp`, where `02_22` is the date the file was exported. Accept all default settings during the import session. After completion of the first import, perform the other two imports to load CTOO and UTST. **Verify that you have logged into the proper server.** If the user is not familiar with the Import tool, refer to the Oracle manuals.

After the imports are finished, the proper Oracle scripts will create a single server or multiple-server configuration. Change the directory to either the `one_server` subdirectory or `multiple_server` subdirectory as appropriate.

The standard configuration is the `multiple_server` configuration. The script `master` creates this version. To run the script, your System Administrator must use the Oracle access tool called SQLPLUS. Enter the following command to create a multiple server configuration:

```
SQL>start master <tead_sql_listener> <ctoo_sql_listener> <utst_sql_listener>
```

Note: `xxxx_sql_listener` is the name of the Oracle SQL*NET Listener for the server that services the EOC. These parameters must be entered in the proper order.

A special one server configuration can be built for testing and training. The `one_server` script `master_one` is in the `one_server` directory. Log into the server and enter the following command to create a this server configuration:

```
SQL>start master_one
```

Due to configuration changes, some modification of the preset data in the EOC table is required. For the three accounts (TEAD, CTOO, and UTST), this modification must be done for each EOC table. These modifications must be done using the SQLPLUS tool. For the development dataset used in the one server configuration, the following is required:

1. Update the `eoc_server_name` field to your server name for all records using a command like:

```
SQL>update EOC set eoc_server_name = 'yourserver';
```

2. The database contains default port numbers for the FEMIS Notification Services. If these ports are unused on your system, please use the default configuration. If they are unavailable, you will need to update the `eoc_notify_port` and the `eoc_unix_port` to the port numbers in your configuration using a command like:

```
SQL>update EOC set eoc_notify_port = 'yourport', eoc_unix_port = 'yourport'  
where eoc_num = <proper_number>;
```

The database should now be configured so that the FEMIS application can be executed.

2.2.2 Backup Procedures

Software backups and archiving are highly recommended as part of normal system administration operations and management. Example scripts are delivered to perform these tasks. The EOC and site System Administrator should become familiar with the examples and make any modifications necessary to comply with their information system policies.

2.2.2.1 UNIX Hosts

Because much of the information used by FEMIS is stored in the Oracle database that your EOC is connected to, this database must be archived. The database must be saved periodically so your EOC can recover from hardware disk errors, inadvertent user errors, or catastrophic events (i.e., fires, floods).

The recommended backup policy is to shutdown Oracle, and then copy all the files that are used to a file that can later be written to tape. The tape should be removed and stored in a safe place.

The example Oracle backup script is a UNIX cron (timed) process that periodically shuts down the Oracle instance and saves the database files. While Oracle is shutdown, a user level export is also performed. As part of the file system backup process, the Oracle files (including the export) and other dynamic files will be copied. Oracle can be restarted. The backup files should be written to tape and archived by your System Administrator.

The recommended procedure, for files other than Oracle, is to tar the files using the following command:

```
tar cvf filename tapedrivename
```

Another procedure you can use is CPIO (see UNIX manual page for instructions).

2.2.2.2 PC Workstations

Personal computer software and data files should be backed up using a tape archiving method. Either an internal or external DAT tape drive system, with appropriate archiving software, can be used.

2.3 UNIX Host Notification Service

The Notification Service has two modules: the Application Manager (discussed in this section) and the Authorization module (discussed in Section 7.0, System Management).

The COTS applications are developed by software companies that seldom, if ever, collaborate on the issue of data portability. Thus, when multiple COTS applications are brought together as in FEMIS, there is the question of how they should work together. The job of the Application Manager is to ensure that all the FEMIS applications can work with one another without user intervention. The inter-task Notification Service is a process for dissimilar applications to communicate with one another during operation. Applications can post and receive event notifications within the FEMIS system with the support of the Notification Service residing on the UNIX host server and on client workstations.

Each workstation hosting the FEMIS client software uses the Notification Service to coordinate activities and data at three levels. The purpose of the Notification Service is to communicate status among active processes on a given workstation; between workstations on the same server; and among workstations on other servers. The Notification Service does not communicate data, but notifies active processes of the availability and location of relevant data in a timely fashion. It is the responsibility of the interested processes to retrieve the data. Likewise, processes which produce, manipulate, or transform data can notify affected processes of the new state of the data.

The Notification Service also resides on the UNIX host server. Its purpose is to receive and forward notification events to other servers. Workstations connected to this server may emit notification events destined for workstations connected to other servers. These events can be forwarded between servers where the local Notification Service can determine the final destination. The UNIX host server utilizes a relational database for the organization and storage of the enterprise data. The DBMS and any other server process can also use the Notification Service to coordinate activities.

Query, manipulation, and update of data are performed by applications residing in FEMIS workstations. These applications have the responsibility to notify other applications that require the same data of any data changes. This event is communicated via the Notification Service, which serves as the single point of contact that manages the distribution of the event to relevant receivers. When necessary, the Notification Service will propagate the event to distant workstations connected to other servers.

2.3.1 UNIX Notification Service

This section describes the Notification Service residing on the UNIX platform, which serves as the host server. The PC version of the Notification Service is included in the installation of the FEMIS client software. Both versions have identical functions. The UNIX function that implements the Notification Service is called `femis_event`. The function of `femis_event` is to provide PC users of the FEMIS event notification system a communication path for the sharing of event information with each other. Events posted at one PC are sent to other PCs on the network by communicating with one or two notification servers.

Local events posted at one PC client workstation are received at the notification server running on LAN, and then sent out to all clients that have expressed an interest in that event.

Global events posted at one PC client workstation are received at the notification server running on LAN, and then sent out to clients on that LAN and also to other notification servers on wide area network (WAN).

Femis_event is normally run as a background daemon process. Scripts that are used to startup the FEMIS system also invoke the notification server.

As do all sockets servers, femis_event utilizes a predefined service port on which to listen for client connection requests. By default, the service port is obtained from a definition in /etc/services, the standard UNIX data file of Internet services and aliases. The standard service name of the notification server is femis-notify. The standard port for the notification server, in FEMIS Version 1.1u, is 9020.

2.3.1.1 Executable Binary Files

Two executable binary files are in the UNIX notification subsystem:

```
/home/femis/exe/femis_event : notification server executable  
/home/femis/exe/fev : a test client for UNIX environment
```

2.3.1.2 Service Ports Data File

For the notification server to utilize its default service ports, they must be defined in the standard UNIX service ports data file, /etc/services. The following lines define the three new service ports (command, notification, and Met data servers) needed to operate FEMIS:

```
#  
# FEMIS Project Standard Service Ports  
#  
femis-command 9010/tcp fxcommand # notification server  
femis-notify 9020/tcp fxnotify # notification server  
femis-metdata 9037/tcp fxcommnd # met data server
```

These three service ports must be unique on the host being configured. If for any reason, one or more of the three service port numbers are already in use, contact PNL immediately and configure the host using different service port numbers.

2.3.1.3 Daemon Server Startup

Scripts should be used to start or restart the notification server daemon. The following script will successfully start and restart the command and notification servers:

```
sh /etc/inst.d/femis {start or stop}
```

2.3.1.4 Automatic Server Startup

To use the automatic features of UNIX to startup the servers at boot up time, a FEMIS startup script must be created. By running the update_system_files.sh script in the /home/femis/exe directory, you will automatically startup the server. Another way to start the server is to log in as root and copy the file called /home/femis/exe/sys/inst.d.entries to /etc/inst.d/femis and make hard links from this file to /etc/rc2.d/S99femis and /etc/rc0.d/K99femis. .

This startup script will set up a one server configuration for the system. To change this to a two server configuration, uncomment the line containing the OTHERHOST entry, in /etc/inst.d/femis and comment out the line below it, which is the same except for the OTHERHOST entry. Replace OTHERHOST with the name of the other host at the other EOC. This host should have the same configuration with the name of this host as OTHERHOST.

2.3.2 Notification Server Configuration Options

2.3.2.1 Command Line Options

The command line options of program `femis_event` that are defined in this section are

```
femis_event      : executes in foreground
femis_event -c    : executes a clone in background
femis_event -v    : report the current version
femis_event -V    : report the current + rcs versions
femis_event -q    : quiet mode
femis_event -Q    : really quiet mode
femis_event -d    : executes with many diagnostics
femis_event -q -d : executes with only a few diagnostics
femis_event -L FFFF : write a verbose log file named FFFF
femis_event -l FFFF : write a brief log file named FFFF
femis_event -e FFFF : write an error only log file
femis_event -s SSSS : specifies service name for getservbyname
femis_event -S     : uses service name femis-notify if found
femis_event -p PPPP : gets port number from environment variable PPPf
femis_event -t secs : RESERVED - NOT IMPLEMENTED (see note)
femis_event nnnn    : use port nnnn instead of standard
femis_event host    : connect to named server
femis_event host host : connect to named servers (see note)
femis_event -r hostfile : gets hosts list from file (see note)
femis_event # host host : port number # and a list of hosts
```

Normally, only `femis_event -c host` will be needed to start executing a notification server. However, the additional options can be mixed to provide logging, diagnostics, and nonstandard service port usage.

2.3.2.2 Clone Process in Background Option

When this option has been included anywhere on the command line, the `femis_event` program clones itself and then the parent exits, leaving the child process to carry on as a background daemon process.

```
if (fork () != 0)
exit (0);
....
```

Example: `femis_event -c`

2.3.2.3 Display Version Options

Including `-v` or `-V` anywhere on the command line with `femis_event`, causes the current version or the current version with rcs version to be displayed. Example:


```
> femis_event -v
FEMIS EVENT - Version 1.0.11 - Wed Dec 14 15:19:49 PST 1994
> femis_event -V
FEMIS EVENT - Version 1.0.11 - Wed Dec 14 15:19:49 PST 1994
Copyright (C) 1994 Battelle Memorial Institute. All Rights Reserved.
RCS: $Id: femis_event.cc,v 1.2^I 1994/12/14 23:17:08 d31033 Exp d31033$
```

The `femis_event` version is the current code version, not the FEMIS nor the rcs version. The date and time indicate when the executable was compiled and linked.

2.3.2.4 Diagnostic and Quiet Modes

Using `-d` causes diagnostics to be printed out when running in foreground mode, i.e., not using option `-c`. Including `-q` or `-Q` with `-d` limits the amount of diagnostic information printed out. Options `-q` and `-Q` mean quiet and real quiet respectively. Using `-d` alone produces verbose diagnostics. Using `-d -q` limits the diagnostics. Using `-d -Q` limits all but severe diagnostics. Examples:

```
> femis_event -q : quiet mode
> femis_event -Q : really quiet mode
> femis_event -d : executes with many diagnostics
> femis_event -q -d : executes with only a few diagnostics
```

2.3.2.5 Service Port Name Option

Including this option lets you specify the service port name on the command line rather than using the default name, `femis-notify`. Example:

```
> femis_event -c -s evtserve-test-3-eoc
```

For this command to work correctly, the service name `evtserve-test-3-eoc` must have been entered in the `/etc/services` data file.

Using option `-s` causes the standard service port name to be invoked.

2.3.2.6 Service Port Environment Option

Using this option lets you specify service ports in environment variables as in the following example:

```
> setenv MY_FEV_PORT 9027
> femis_event -p MY_FEV_PORT -c
```

2.3.2.7 Enable Log Files

These options let you enable log file output from `femis_event`. The `-e` option creates an errors-only log file. Option `-l` produces a brief diagnostic log file. Option `-L` generates a verbose log. Place the desired file name in the argument following `-e`, `-l`, or `-L`. Examples:

```
> femis_event -e errors-only.log.12-24-94 -c
> femis_event -L femis_event.log.12-25-94 -c -p XMAS_PORT
> femis_event -l /home/femis/log/femis_event.log`date +%y%m%d.%H%M`
```

2.3.2.8 Nonstandard Port from Command Line

The notification server can be started with a nonstandard service port without the need for changes in `/etc/services` (which requires root access) or changing the environment variables simply by including the desired port number on the command line (specify only once). Example:

```
> femis_event -c 9920  
> fev -9920
```

2.3.2.9 Connecting to Other EOC's Notification Server

To have the notification servers at multiple EOCs connected together, include the names of the other EOC server hosts on the command line. Example:

```
server1:> femis_event -c server2  
server2:> femis_event -c server1
```

2.3.2.10 Getting Remote Hosts from File

Rather than including the names of the remote EOC hosts on the command line, edit the names into a file and use the `-r` option.

2.3.2.11 Multiple Remote EOC Servers Limitation

At the time of FEMIS Version 1.1u release, no special server-to-server algorithms for routing had been implemented in the notification server. Smart routing algorithms may be implemented in a future version. Also, the `-t` option, a part of multi-host, is not implemented.

If you specify only one remote host, you get the optimal routing, which is host-to-host with no alternate conditions or routes.

If you specify two or more remote hosts, the local server connects with all the remote hosts you named. Global event messages are then relayed to all specified remote hosts, even though that may not be necessary. As a result, global messages may be sent to a remote host more than once.

2.3.2.12 Server To Server Connection

The FEMIS UNIX Notification Server (`femis_event`) supports a network of multiple notification servers. Any number of server programs can interconnect with each other, and the purpose of this interconnection is to provide a media for communicating global event messages, provided that topology of the network is not a concern.

In a later release, an enhancement will be made that will optimize FEMIS notification server performance to the topology of the WAN.

To establish connection to other servers, a list of notification servers can be included on the command line. The syntax to designate a notification server connection is as follows:

host name (uses default service port)

In the following lines, all servers use the same default service port number. Example:

```
>femis_event -c countyeoc stateeoc  
>femis_event -c irzcountyeoc pazcountyeoc stateeoc
```

Multiple notification servers can be executed on the same host by using a different service port number for each instance. The syntax to designate multiple notification server connections is as follows:

<port number>@<host name>

In the following lines, two notification servers are started and each is cross connected to the other. Example:

```
>thiseoc:/home/femis/exe/> femis_event -c 9021 9022@thiseoc  
>thiseoc:/home/femis/exe/> femis_event -c 9022 9021@thiseoc
```

In the above example, service ports 9021 and 9022 are used rather than the default service port 9020. Server 9021 is connected to server 9022, and Server 9022 is connected to server 9021. These connections are on the same host.

In the current FEMIS release, both concepts above have limitations. First, event routing is not optimized for more than two notification servers. Thus, a single event declaration will be sent multiple times on inter-network links.

A network of notification servers can be started by implementing exact topology in a series of startup commands. Example:

```
posteoc> femis_event -c 9020 9020@countyeoc 9020@stateeoc  
countyeoc> femis_event -c 9020 9020@posteoc 9020@stateeoc  
stateeoc> femis_event -c 9020 9020@posteoc 9020@countyeoc
```

The above example starts notification servers on three hosts: posteoc, countyeoc, and stateeoc. Each is capable of sending global event messages to the other two. No regard is given to topology, i.e., each server sends events to the other two servers, even if having one of the others do a relay would accommodate more efficient use of network bandwidth.

An alternate way to start the servers is to start one, then add one to the network, and later add the third. Example:

```
posteoc> femis_event -c 9020
```

The above established a single notification server. Next enter:

```
countyeoc> femis_event -c 9020 9020@posteoc
```

We now have a two-node event server network: `countyeoc` connects to `posteoc`, which learns of the new server-to-server connection. We now have a two- node event server network. Next enter:

```
stateeoc> femis_event -c 9020 9020@posteoc 9020@countyeoc
```

We now have a three-node event server network. `Stateeoc` connects to both `posteoc` and `countyeoc` and each learn of the new server node.

Graceful removal of nodes from the notification server topology and optimization of topology for saving network bandwidth have not yet been implemented. These will be done in future FEMIS releases.

2.3.2.13 Which Service Port to Use

Which service port the notification server uses is determined as follows: from the following list, the first service port that produces a valid service port number is used as the service port method for this daemon server.

- If the port number is included on the command line, then that port is used even if the methods below also produce a valid service port number. Example:
`femis_event 9975`
- If a service name is included on the command line (via `-s` or `-S`), then that service name is used in a `getservbyname()` call. If that service name returns a valid service port from the `/etc/services` data file, then that port is used.
Example:
`femis_event -s FEMIS_ShellServer`
- If an environment name is included on the command line, then that environment name is translated into a service port number. Example:
`setenv MYPORT 7120 ; femis_event -p MYPORT`
- The default service name, `femis-notify`, is tried in a call to `getservbyname()`. If that returns a valid service port, then that port number is used.
- The default environment name `FEMIS_EVENT_PORT` is translated. If that name is defined and translates to a valid port number, then that service port is used.
- If all the above fail, `femis_event` terminates with an error.

Normally, you can just use the standard service port number from the `/etc/services` file. However, for testing and diagnostics, additional methods have been included for running additional notification server modules that use a nonstandard port number, so there is no interference with normal operations.

2.3.3 Notification Server Utilities

2.3.3.1 UNIX Test Client - fev

The notification server subsystem includes a test client for the UNIX system environment. The UNIX client can be used to test features of the command server, both new and old, and to perform certain diagnostics.

Note: This client is not an integral FEMIS system component.

The file name of the test client is fev. The UNIX test client is installed at the same subdirectory as the notification server (see Section 2.3 1.1, Executable Binary Files).

2.3.3.2 UNIX Test Client Command Line Options

Valid command line options for fev have the same format and usage as the notification server. Example:

```
> fev host nnnn # nonstandard port and host from command
> fev - nnnn # nonstandard port local host (testing only)
> fev -p PPPP # nonstandard port from environment variable
> fev -s SSSS # nonstandard port from /etc/services file
> fev -S # use standard service name femis-notify
> fev -i IDNUM # specify notification client id number
> fev -x # don't exit on eof from standard-input
```

See descriptions of these options in Section 2.3.2, Notification Server Configuration Options.

2.3.3.3 Client ID Number

You can simulate what happens when a notification system client crashes and then comes back online. In that case, the PC/client needs to receive the same client ID number that was assigned to that PC during the previous session. The notification server handles that scenario correctly, but during testing on a single development host, you need to tell the test client which client is connecting by specifying the client ID from the previous session (see o command reply).

Syntax: fev -i IDNUM

2.3.3.4 Test Client Protocol

To run the notification server test client, do the following:

```
> set path = (/home/femis/exe $path)
> fev # connect to local host, standard port
> fev <remote host> # connect to a remote host
> fev - <port> # connect to nonstandard port on this host
> fev <remote host> <port># connect to nonstandard port on remote host
```

The notification server test client provides several shorthand commands to the actual notification server protocol, as follows:

```
o : sends open-link message (NS_MT_OPENLINK)
: reply message contains the client's link id
c : sends close-link message (NS_MT_CLOSELINK)
i EEEE : sends register-interest message (NS_MT_REGISTER_INTEREST)
r EEEE : sends remove-interest message (NS_MT_REMOVE_INTEREST)
e EEEE : sends declare-event message (NS_MT_EVENTMSG) (nonglobal)
g EEEE : sends declare-global message (NS_MT_EVENTMSG & NS_EF_GLOBAL)
t1 : bombard server with multiple NS_MT_EVENT testing
t2 : bombard server with multiple NS_MT_EVENT testing
```

2.3.3.5 Test Client Example

Example:

```
server1:> femis_event -c 9920 server2
FEMIS_EVENT port is 9020
server2:> femis_event -c 9920 server1
FEMIS_EVENT port is 9020
server3:> fev server1 9920
FEMIS_EVENT port is 9020
o
<<<<<< received OPENLINK-reply: client-id = 2
i TestEvent
i GlobalEvent

server4:> fev server1 9920
FEMIS_EVENT port is 9020
o
<<<<<< received OPENLINK-reply: ...
client-id = 3
e TestEvent

<<<<<< received notification: event=TestEvent

c
^D
server4:> fev server2 9920
o
<<<<<< received OPEN-LINK-reply: ...
client-id = 2
e TestEvent
g GlobalEvent

<<<<<< received notification: event=GlobalEvent

c
^D
c
^D
```

In the example, the operator runs the notification server on two hosts, server1 and server2; they connect to and communicate with each other because the other's host name is on the command line.

Next, the client is run on server3, connecting to server1, a link is opened, and interest is declared in two events, TestEvent and GlobalEvent. Also, the client is run on server4, connecting to server1, a link is opened, and event TestEvent is declared. Because server3's client has declared interest, a notification message is delivered and reported there.

The client on server4 is next terminated (via close link and control-D). The server4 client is rerun, this time connecting to server2, and the link is opened. The event TestEvent is then declared at server2. Nothing happens at server3, as it is global (not local) to the server on server2.

Finally, the client on server4 declares a global event (GlobalEvent), and the client on server3 is notified. The path is server4 to server2, server2 to server1, and finally server1 to server3.

Both test clients are then terminated via close link and Control-D.

2.3.3.6 Test Client Diagnostics

The test client fev has features whereby it can spy on what notification servers are doing and what the status of each connection is. The two commands are

`$i` : sends back information and statistics
`$s` : sends back socket connections information

2.3.3.7 Test Client Information Diagnostic `$i`

Entering `$i` at the fev test client's terminal causes statistics information to be returned to the client. Example:

```
> fev server1
FEMIS_EVENT port is 9020
$i
FEMIS_EVENT - Version 1.0.11 - Wed Dec 14 15:54:18 PST 1994
started time . . . . . Sat Dec 17 03:00:09 1994
current time . . . . . Mon Dec 19 13:51:59 1994
pid . . . . . 23473
ppid . . . . . 1
uid . . . . . 30508
gid . . . . . 30508
dir . . . . . /home/femis/exe
home . . . . . /home/femis/sunos/home/femisuser
host . . . . . server1
port . . . . . 9020
background . . . . . Yes
accepts . . . . . 192
connects . . . . . 1
reconnects . . . . . 0
messages rcvd . . . . . 11826
characters rcvd . . . . . 513556
messages sent . . . . . 1274
characters sent . . . . . 85600
malloc arena/used . . . . 61448 35416
evtbuf cur/tot/peak . . . 2 9 9
evtbrd cur/tot/peak . . . 2 9 2
intlist cur/tot/peak . . 288 2607 306
```

From the display above, you know the following information about the notification server daemon: has been up for 2 days, was started at 3:00 a.m. on Dec 17, is the Dec 14 version; the process ID is 23473; the sever is in background (because ppid == 1); its uid is 30508 (femis account); user's home is /home/femis/sunos/home/femisuser; the host's name is server1; the service port number is 9020 (the standard port); the notification server is running as a clone in background; and the server currently has 35416 bytes of dynamic memory allocated.

Furthermore, the server has accepted 192 connections, has established one connection itself (to the other server), has done no reconnects (because of connection termination), has received 11826 messages containing a total of 513556 characters, and has transmitted 1274 messages containing a total of 85600 characters. Using either received or transmitted, the average message length is approximately 42 characters.

For event library statistics evtbuf, evtbrd, and intlist, also reported are current, total, and peak.

Character and message counts utilized in the diagnostic messages overhead are not included in the totals displayed.

2.3.3.8 Test Client Socket Connections Diagnostic \$\$

Entering \$\$ at the fev test client's keyboard causes socket connection information to be sent to the test client's display. Example:

```
> fev server1
FEMIS_EVENT port is 9020
$$
```

The heading of the display which follows contains:

```
ii : index number in femis_event's internal database
lisn : 1 if socket is the server's primary listening socket
acpt : 1 if connection was accept()-ed on this socket
conn : 1 if connect() was established on this socket
stio : 1 if this is one of the standard i/o files
svrc : 1 if accept or connect is to another server
chan : the channel number
host : name of the host to which this socket is connected
IP : the IP address to which this socket is connected
hwid : 32 bit hardware id number - derived from IP address
anid : the notification system client id number
when : when (date and time) when connection was established
rcv : number of messages and number of characters received
xmt : number of messages and number of characters transmitted
```


Example display of first 11 parameters:

```
ii lisen acpt conn stio svrc chan : host : IP : hwid : anid :  
3 1 0 0 0 0 3 : server1.pnl.gov : 130.20.76.45 : 82144C2D : 0 :  
4 0 1 0 0 0 4 : server5.pnl.gov : 130.20.28.29 : 82141C1D : 19 :  
5 0 1 0 0 1 5 : server2.pnl.gov : 130.20.242.31 : 8214F21F : 0 :  
6 0 1 0 0 0 6 : 130.20.28.131 : 130.20.28.131 : 82141C83 : 71 :  
7 0 1 0 0 0 7 : server6.pnl.gov : 130.20.60.103 : 82143C67 : 47 :  
8 0 1 0 0 0 8 : server4.pnl.gov : 130.20.92.71 : 82145C47 : 69 :  
9 0 1 0 0 0 9 : server3.pnl.gov : 130.20.92.87 : 82145C57 : 0 :  
10 0 1 0 0 0 11 : server7.pnl.gov : 130.20.92.39 : 82145C27 : 53 :
```

Example display of final 5 parameters:

```
when : rcv : xmt  
Sat Dec 17 03:00:12 1994 : r 0 0 : x 0 0  
Mon Dec 19 09:50:29 1994 : r 255 11115 : x 7 473  
Sat Dec 17 03:00:24 1994 : r 0 0 : x 4 319  
Mon Dec 19 10:47:17 1994 : r 91 3896 : x 8 547  
Mon Dec 19 10:27:49 1994 : r 259 11303 : x 8 547  
Mon Dec 19 10:45:24 1994 : r 56 2335 : x 2 117  
Mon Dec 19 11:14:17 1994 : r 13 13 : x 0 0  
Mon Dec 19 10:29:36 1994 : r 56 2335 : x 2 117
```

From the above display, we can say that 5 clients currently have active connections, that client ID numbers range from 19 to 71, and that one client has no entry in the local name table (IP address 130.20.28.131).

Socket 3 is the listening socket. Socket 5 connects to the notification server on server2. Socket 9 is the client doing diagnostics.

Character and message counts utilized in the diagnostic messages are not included in the totals displayed.

2.3.3.9 Test Client Auxiliary Connect Information Diagnostic \$aux

Entering \$aux at the fev test client keyboard causes the auxiliary connect information to be sent to the test client's display. Example:

```
> fev server1  
FEMIS_EVENT port is 9020  
$eve
```

The heading of the display which follows contains:

```
ii : index number in femis_event's internal database  
conn : connect mode = L C A  
svrc : server circuit = 0 1  
auxtype : aux connection type S C U  
host : name of host to which this socket is connected  
hwid : 32 bit hardware id number - derived from IP address  
port : port number of server/client at remote end  
pid : process id number of server/client process at remote end  
cid : client id number of server/client process at remote end
```

Example listing:

```
5 L 0 : U : virus.pnl.gov : 8214F20A : 9020 : 14415 : 0
6 C 1 : S : locusts.pnl.gov : 8214F20B : 9020 : 12093 : 0
7 A 0 : U : : 0 : 0 : 0 : 46
8 C 1 : S : temblor.pnl.gov : 8214F20C : 9020 : 19831 : 0
9 A 0 : U : : 0 : 0 : 0 : 38
10 A 0 : U : : 0 : 0 : 0 : 48
11 A 0 : U : : 0 : 0 : 0 : 43
12 A 0 : C : hattrick : 82145C57 : 9020 : 2593 : 0
```

2.3.3.10 Test Client Remote Servers Diagnostic \$rem

Entering \$rem at the fev test client keyboard causes the remote connect information to be sent to the test client's display. Example:

```
> fev server1
FEMIS_EVENT port is 9020
$rem
```

The heading of the display which follows contains:

```
RemoteServer : Port number @ host name of the remote notification server
IPAddress : IP address of the remote host
Address : 32 bit hardware id number - derived from IP address
```

Example listing:

```
RemoteServer : IPAddress : Address
9022@virus.pnl.gov : 130.20.242.10 : 8214F20A
9021@temblor.pnl.gov : 130.20.242.12 : 8214F20C
```

2.3.3.11 Test Client Event Board Diagnostic \$eve

Entering \$eve at the fev test client keyboard causes the server's event board information to be sent to the test client's display. Example:

```
fev - test client for femis_event server
FEMIS_EVENT port is 9020
$eve
```

The heading of the display which follows contains:

```
EventName : name of the event
ExerID : exercise id
Par1 : first parameter
Par2 : second parameter
Par3 : third parameter
GMT : date/time event declared
RecID : record id
```

Example listing (abbreviated):

EventName	: ExerID	: Par1	: Par2	: Par3	: GMT	: RecID			
CSEPPEvent	: 0	: 10000299	:	:	:	ALL OVER	: 18:25	: 37	
MD2	: 1295	: Operations	:	:	:	UPD:10001	: 18:38	: 41	
PLN:PlanChanged	: 0	: 10000107	:	:	:		: 18:17	: 33	
PLN:TaskChanged	: 0	: 10000006	: 21	:	:		: 16:17	: 23	
RSB:EventLogAdd	: 0	: J	:	AckEvent	:		: 18:25	: 39	
RSB:EventLogAdd	: 1295	: J	:	D2:10001	:		: 18:37	: 40	
UDept	: 0	:	:	:	:		: 15:19	: 19	
UFacility	: 0	:	:	:	:		: 15:16	: 18	
ULocalID	: 0	: TEADTEAD	: alstuff	:	:		: 15:48	: 43	
UPerson	: 0	:	:	:	:		: 16:48	: 24	

2.3.3.12 Test Client Synchronize Action \$sync

Entering \$sync and a qualifier at the fev test client keyboard causes the server to send the same message back to fev. Fev can utilize reception of known dollar-sync messages to synchronize certain events and actions.

The test client uses the command "\$sync exit" to synchronize forced exit while running in script mode. This must be used in conjunction with the -x option.

Example script:

```
#!/bin/csh -f
#
fev -x virus 9020<<eod
o
g My-Event 1 "par one" par_two par3
g My-Event 123 "" - 999.000
g Your-Event 99 - - -
c
\$sync exit
eod
```

The above script runs fev, opens a link, declares the three events, closes the link, and synchronizes a forced exit. Fev does

2.3.4 Notification Server Troubleshooting

The notification server is very stable; however, this program runs in a network environment and, thus, is prone to any and all failures which can occur in network computing and distributed data management systems.

2.3.4.1 Check Notification Server Active

To check if the notification server is active, log in to the UNIX server and issue the following command:

```
> ps axw | grep femis_event
```

If the notification server is active, you will get a reply such as:

```
17739 pe S 0:00 femis_event -c server1 -e femis_event.e.log.941219.1140
1073 pe S 0:00 grep femis_event
```

If the notification server is not active, only the second line above will be displayed. The pid of the `femis_event` notification server is the first number shown, e.g., 17739.

2.3.4.2 Check Notification Server Communication

To check the notification server communication, run the UNIX test client either from the server host or from another UNIX system. You should be able to run `fev` and issue notification server instructions. Example:

```
> cd /home/femis/exe
fev
```

If the notification server is not active, you will get a reply such as the following and then be returned to the command line processor:

```
fev - test client for femis_event server
FEMIS_EVENT port is 9020
connect failed: Connection refused
>
```

If the notification server is active, you should get a reply such as the following:

```
fev - test client for femis_event server
FEMIS_EVENT port is 9020
```

After receiving the above reply, you can issue an instruction to the UNIX test client. Example:

o

This is the test client's command to open a link. Next you should see

```
<<<<<< received OPENLINK-reply: client-id = nnnn
```

where `nnnn` is an open link ID number (could be any positive integer). If you get such a reply, the notification server is active and communicating. If the notification server is active and communicating, then the problem is probably either in the network or on the PC side.

2.3.4.3 Aborting Notification Server

If you need to abort the notification server during testing or troubleshooting, you must manually log in as the user account from which `femis_event` was started. In FEMIS Version 1.1u, that user account is `femis`, or you can log in as `superuser`.

You next need to learn the process ID number (pid) of the `femis_event` server needing to be killed. There are two ways to learn the pid of a FEMIS server process.

The first is to use the `ps` and `grep` commands. Example:

```
> ps ef | grep femis_event
```

If the notification server is active, you will get a reply such as:

```
23473 pe S 0:00 femis_event -c server2 -e femis_event.e.log.941219.1140
1073  pe S 0:00 grep femis_event
```

If the notification server is not active, only the second line above will be displayed. The pid of the `femis_event` notification server is the first number shown, e.g., 23473.

The second way to learn the pid of `femis_event` is to run the test client and use the `$i spy` command. Example:

```
> fev - # connect to local host
fev - test client for femis_event server
FEMIS_EVENT port is 9020
$i
pid . . . . . 23473
```

From the `$i` reply, the `femis_event` pid is 23473.

Now that you have the pid number, you can abort the notification server. The preferred way is

```
> kill -2 23473
```

Recheck if the server is still active. If the above `kill -2` (the graceful exit), did not work, then use

```
> kill -9 23473
```

Using `kill -9` will kill the notification server, but the state of open connections will be lost and possibly may not be recoverable until some long TCP/IP timeout period elapses.

A script file, such as the following, may be used

```
foreach killnum ( -2 -9 )
ps ef >! ..PS..
set serverpid = ( `fgrep femis_event ..PS.. | awk '{print $2}' ` )
foreach pid ( $serverpid )
echo kill $killnum $pid
kill $killnum $pid
end
end
```

2.3.4.4 Fixing Notification Port

When running a FEMIS Client Application such as a Visual Basic application, the application first uses the FNOTIF1.INI file in the Windows directory to get the notification server's name and port number. If either the name or port number is incorrect, you will get an error 10054. You could fix the file to avoid this error occurring in the future; but it is not necessary because the Visual Basic application then lets you login to an EOC and gets a new notification server name and port number from the FEMIS database. If either the new name or port number is incorrect, you will get an error 10054. You **MUST** then correct the EOC table by changing the values for either the EOC_SERVER_NAME or the EOC-NOTIFY_PORT fields.

2.3.4.5 PC WinSock Errors

The following list includes the errors encountered during development and testing of the notification server software. A complete list of WinSock and UNIX errors can be found in *Windows Sockets, Version 1.1* documentation.

PC WinSock Error 10022

This error is an internal Windows Sockets error which is caused when a Windows application crashes/terminates without properly closing down. In doing so, the Windows application has wasted and lost critical dynamic memory. Error 10022, which means invalid argument, is reported by mistake. The real problem is Windows running out of a critical resource. Shut down other Windows applications and reboot the PC.

PC WinSock Error 10024

This error is an internal Windows Sockets error which is caused when a Windows application crashes/terminates without properly closing down. In doing so, the Windows application has wasted and lost critical dynamic memory. Error 10024, which means too many files open, is reported by mistake. The real problem is Windows running out of a critical resource. Shut down other Windows applications and reboot the PC.

PC WinSock Error 10038

This error is an internal Windows Sockets error which is caused by a software error, most likely manifested from Windows running out of a critical resource. In reaching this error, an application has tried to reuse an I/O channel which was previously connected to a network socket but has since been closed. Restart the affected applications. If this does not fix the problem, reboot the PC.

PC WinSock Error 10050

This error means the network is down; there is no network communication with the server host to which this PC is trying to connect with. Report the error to the System Administration Authority and wait for diagnosis. After all hardware and communication bugs have been fixed, restart the affected applications. If this does not fix the problem, reboot the PC.

PC WinSock Error 10053

This error means that connection to the server was aborted and may be because the server was terminated, either intentionally or by a failure. This error can also mean

that connection was never established because the server is not currently active. Check if the notification server, `femis_event` is currently active on the UNIX server. If not, restart it using scripts described in Section 2.3.1.3, Daemon Server Startup. The UNIX test client can be used to check for server health, see Section 2.3.3, Notification Server Utilities.

PC WinSock Error 10054

This error means that the notification server is not active. Check if the notification server, `femis_event` is currently active on the UNIX server. If not, restart it using scripts described in Section 2.3.1.3, Daemon Server Startup. The notification subsystem UNIX test client can be used to check on server health, see Section 2.3.3, Notification Server Utilities.

This error can also mean that the client software on the PC does not have the correct service port number or server. The default port for the notification server is 9020. Client software must use this same service port. If the port number is determined to be incorrect, fix it and restart the client software applications. Reboot the PC if necessary.

2.4 FEMIS Command Service

The function of the Command Service is to provide PC clients, some using Visual Basic, a method to execute UNIX programs and UNIX shell scripts remotely. This function is similar to `rsh`, a Berkeley Standard Distribution (BSD)-derived command to invoke a remote shell.

2.4.1 Command Service Installation

The Command Service is implemented by the UNIX program `femis_shell`. Requests from multiple clients can be handled simultaneously by `femis_shell`. However, only one command per client is allowed at any one time. Thus, a client waits until one command has finished before invoking another. Client requests run as child processes on the server.

`femis_shell` is normally run as a background daemon process. Scripts that are used to startup the FEMIS system also invoke the command server.

As do all sockets servers, `femis_shell` utilizes a predefined service port on which to listen for client connection requests. By default, service port is obtained from a definition in `/etc/services`, the standard UNIX data file of Internet services and aliases. The standard service name of the command server is `femis-command`. The standard port for the command server, in FEMIS Version 1.1u, is 9010.

In the current version, there is no login or security provided in the command server. You just run a client and start executing commands. In a future release of the command server, there will be security added and additional commands dealing with user account name, authorization, and password.

2.4.1.1 Executable Binary Files

Two executable binary files are in the command server subsystem:

```
/home/femis/exe/femis_shell : command server executable  
/home/femis/exe/fss : a test client for Unix environment
```

2.4.1.2 Service Ports Data File

For the command server to utilize its default service ports, they must be defined in the standard UNIX service ports data file, `/etc/services`. The following lines define the three new service ports needed to operate FEMIS; command, notification, and Met (meteorological) data servers:

```
#  
# FEMIS Project Standard Service Ports  
#  
femis-command 9010/tcp fxcommand # command server  
femis-notify 9020/tcp fxnotify # notification server  
femis-metdata 9037/tcp fxcommnd # met data server
```

The three service ports defined must be unique on the host being configured. If for any reason, one or more of the three service port numbers above are already in use, contact PNL immediately and configure using different service port numbers.

2.4.1.3 Daemon Server Startup

Scripts should be used to start or restart the command server daemon. The following script will successfully start and restart the command and notification servers:

1. Log into the FEMIS account
2. Run the following script

```
#!/bin/csh -f  
# start FEMIS specific server processes  
  
# usage: rc.femis_servers <server1> <server2>  
# e.g. : rc.femis_servers server1 server2  
  
# ...get name of the other eoc host  
if ( `hostname` == $1 ) set remote_eoc_host = $2  
if ( `hostname` == $2 ) set remote_eoc_host = $1  
  
# ...set default to femis executables  
cd /home/femis/exe/  
  
# ...get pid-s if servers already executing  
ps auxww > rc.tmp  
set p_femis_event = ( `fgrep femis_event rc.tmp | awk '{print $2}' ` )  
set p_femis_shell = ( `fgrep femis_shell rc.tmp | awk '{print $2}' ` )  
rm rc.tmp  
  
# ...kill the current servers  
foreach p ( $p_femis_event $p_femis_shell )  
echo kill -2 $p; kill -2 $p  
end
```



```
# ... start both servers
femis_event -c $remote_eoc_host
femis_shell -c
```

2.4.1.4 Automatic Server Startup

To use the automatic features of UNIX to startup the servers at boot up time, a FEMIS startup script must be created. You can either log in as root and copy the file called `/home/femis/exe/sys/inst.d.entries` to `/etc/inst.d/femis` and make hard links from this file to `/etc/rc2.d/S99femis` and `/etc/rc0.d/K99femis`; or run the `update_system_files.sh` script in the `/home/femis/exe` directory, which will automatically do this for you.

Note: The Command Service should NEVER be started from the root account.

2.4.2 Command Service Configuration Options

2.4.2.1 Command Line Options

The command line options of program `femis_shell` that are discussed in the following paragraphs are

<code>femis_shell</code>	: execute as foreground process
<code>femis_shell -c</code>	: executes clone process in background
<code>femis_shell -v</code>	: reports the current version
<code>femis_shell -V</code>	: reports the current + rcs versions
<code>femis_shell -q</code>	: quiet mode
<code>femis_shell -Q</code>	: really quiet mode
<code>femis_shell -d</code>	: executes with many diagnostics
<code>femis_shell -q -d</code>	: executes with only a few diagnostics
<code>femis_shell -o XXXX</code>	: sets path for child process output
<code>femis_shell -L FFFF</code>	: write a verbose log file
<code>femis_shell -l FFFF</code>	: write a brief log file
<code>femis_shell -e FFFF</code>	: write an error only log file
<code>femis_event -s SSSS</code>	: specifies service name for <code>getservbyname</code>
<code>femis_event -S</code>	: uses service name <code>femis-command</code> if found
<code>femis_shell -p PPPP</code>	: gets port number from environment variable <code>PPPP</code>
<code>femis_shell nnnn</code>	: use port <code>nnnn</code> instead of standard

Normally, only the second form is needed to begin execution of the command server. However, multiple options above can be mixed to provide logging, diagnostics, and nonstandard service port usage.

2.4.2.2 Clone Process in Background Option

When this option has been included anywhere on the command line, the `femis_shell` program clones itself, and then the parent exits, leaving the child process to carry on as a background daemon process. Example:

```
if (fork () != 0)
exit (0);
....
```

Example: `femis_shell -c`

2.4.2.3 Display Version Options

Including `-v` or `-V` anywhere on the command line with `femis_shell` causes the current version or current version with rcs version to be displayed. Example:

```
> femis_shell -v
FEMIS_SHELL - Version 1.0.12 - Wed Dec 14 09:51:18 PST 1994
> femis_shell -V
FEMIS_SHELL - Version 1.0.12 - Wed Dec 14 09:51:18 PST 1994
$Id: femis_shell.c,v 1.13 1994/10/14 15:51:02 d31033 Exp d31033 $
```

The `femis_shell` version is the current code version, not the FEMIS nor the rcs version. The date and time indicate when the executable was compiled and linked.

2.4.2.4 Diagnostic and Quiet Modes

Using `-d` causes diagnostics to be printed out when running in foreground mode, i.e., not using option `-c`. Including `-q` or `-Q` with `-d` limits the amount of diagnostic information printed out. Options `-q` and `-Q` mean quiet and real quiet respectively. Using `-d` alone produces verbose diagnostics. Using `-d -q` limits the diagnostics. Using `-d -Q` limits all but severe diagnostics.

2.4.2.5 Child Output Option

Including this option on the command line with `femis_shell` causes it to set the default path for child process standard output and standard error. The default path for child output and error is `/tmp`. File names are `fss#.out` and `fss#.err`, where `#` is the process ID number of the child process. Example:

```
> femis_shell -c -o /home/user/JR_Ewing
> fss
FEMIS_SHELL port is 9010
recv :: 20 :: FSS-CONNECT-SUCCESS
x ls
send :: 11 :: execute ls
recv :: 20 :: FSS-EXECUTE-STARTED
recv :: 26 :: FSS-EXECUTE-DONE-4815-0-0
^D
> ls -l /home/user/JR_Ewing/*4815*
-rw-rw-rw- 0 Dec 15 12:48 /home/user/JR_Ewing/fss4815.err
-rw-rw-rw- 528 Dec 15 12:48 /home/user/JR_Ewing/fss4815.out
```

2.4.2.6 Service Port Name Option

Including this option lets you specify the service port name on the command line rather than using the standard default name, `femis-command`. Example:

```
> femis_shell -c -s cmdserv-rsa-testing
```

For the above to work correctly, the service name `cmdserv-rsa-testing` must have been entered in the `/etc/services` data file.

Using option `-s` causes the standard service port name to be invoked

2.4.2.7 Service Port Environment Option

Using this option lets you specify service ports in environment variables as in the following example:

```
> setenv MY_FSS_PORT 9011
> femis_shell -p MY_FSS_PORT -c
```

2.4.2.8 Enable Log Files

These options let you enable log file output from `femis_shell`. The `-e` option creates an errors-only log file. Option `-l` produces a brief diagnostic log file. Option `-L` generates a verbose log. Place the desired file name in the argument following `-e`, `-l`, or `-L`. Examples:

```
> femis_shell -e errors-only.log.12-15-94 -c
> femis_shell -L femis_shell.log.12-16-94 -c -p MY_FSS_PORT
> femis_shell -l /home/femis/log/femis_shell.log`date +%y%m%d.%H%M`
```

2.4.2.9 Nonstandard Port from Command Line

The command server can be started with a nonstandard service port without the need for changes in `/etc/services` (which requires root access) or changing the environment variables simply by including the desired port number on the command line (specify only once). Example:

```
> femis_shell -c 9910
> fss -9910
```

2.4.2.10 Which Service Port to Use

Which service port the command server uses is determined as follows: from the following list, the first service port that produces a valid service port number is used as the service port method for this daemon server.

- If the port number is included on the command line, then that port is used even if the methods below also produce a valid service port number. Example:
`femis_shell 9990`
- If a service name is included on the command line (via `-s` or `-S`), then that service name is used in a `getservbyname()` call. If that service name returns a valid service port from the `/etc/services` data file, then that port is used.
Example:
`femis_shell -s FEMIS_ShellServer`
- If an environment name is included on the command line, then that environment name is translated into a service port number. Example:
`setenv MYPORT 7110 ; femis_shell -p MYPORT`
- The default service name, `femis-command`, is tried in a call to `getservbyname()`. If that returns a valid service port, then that port number is used.

- The default environment name `FEMIS_SHELL_PORT` is translated. If that name is defined and translates to a valid port number, then that service port is used.
- If all the above fail, `femis_shell` terminates with an error.

Normally, you can just use the standard service port number from the `/etc/services` file. However, for testing and diagnostics, additional methods have been included for running additional command server modules, that use a nonstandard port number, so there is no interference with the normal operations.

2.4.3 Command Service Message Protocol

Communication to and from the command server is via a standard Berkeley socket, set up for two-way, nonblocking operation. All messages sent or received are ASCII encoded. Below are the server commands and replies.

The command server and its clients send messages back and forth with each other in order to synchronize what they are doing, to handle errors, and to report successful completion. The exact style and format of messages sent in this manner is the protocol of the command server.

The following commands are valid in the FEMIS Version 1.1u command server:

```
execute executable arg1 ... : execute a program on the server
kill                        : kill/abort current child process
status                     : return status of child process
default directoryname      : set default directory of child process
outerr directoryname       : set directory for stdout & stderr files
```

After a client has connected to the command server, the following reply is sent to that client:

```
FSS-CONNECT-SUCCESS : when femis_shell is ready
```

2.4.3.1 Execute Protocol

The format of the execute command is the word `execute` followed by the command and its arguments. Example:

```
execute sh myscript.sh /home/d31033/data.file
```

When `femis_shell` receives an execute command, it sends back:

```
FSS-EXECUTE-ACTIVE       : previous execute is still active
FSS-EXECUTE-BAD-FILENAME : if filename is invalid
FSS-EXECUTE-FILE-NOT-OPENED : if file cannot be opened
FSS-EXECUTE-STARTED      : when executable is started
```

If the execute command was successfully started, then when the executing child process finishes, `femis_shell` sends the following reply:

FSS-EXECUTE-DONE-#-#-# : after executable terminates

Where #-#-# are the child process ID number, and two termination bytes. The termination bytes are

byte 1 = 0 : normal / successful completion
-1 : error -- see the other termination byte
1-20 : signal numbers designating reason for exiting
byte 2 = 0 : normal / successful completion
-1 : error -- see the other termination byte
1-20 : signal numbers designating reason for exiting

The command must be the name of a file which exists in the current path of the process which created `femis_shell`. To get that path, `femis_shell` expands the value of the `PATH` environment variable. Thus, when `/bin` is in the `PATH` environment, the protocol `execute sh` behaves the same as `execute /bin/sh`.

2.4.3.2 Kill Child Protocol

To kill/abort a running child process, send the message:

`kill`

`Femis_shell` replies with:

FSS-KILL-NO-PROCESS : if there is no child currently
FSS-KILL-SUCCESS : if kill was successful

2.4.3.3 Getting Status of Child Protocol

To get the status of a child, send the message:

`status`

`Femis_shell` replies with:

FSS-STATUS-NO-PROCESS : if there is no child currently
FSS-STATUS-ACTIVE : if child is active

2.4.3.4 Setting Default Directory

To set the default directory for your child processes:

`default <directory name>`

`Femis_shell` replies with:

FSS-DEFAULT-NO-DIR : no such absolute directory or cannot get to
relative directory from here.
FSS-DEFAULT-CANT-SETDIR-# : `chdir()` returned an error - # = `errno`
FSS-DEFAULT-SUCCESS : default directory was changed

The default command should be used prior to `execute`. It affects all `execute` commands that follow, and until the next default command.

The argument to default can be either an absolute or a relative path. Examples:

```
> fss
default /home/population/washington
execute census benton-county
default benton-county
execute census richland
execute census pasco
default ..
default ..
default oregon
execute census morrow-county
^D
>
```

2.4.3.5 Setting stdout/stderr Path Protocol

To set the directory for stdout and stderr:

```
outerr <directory name>
```

Femis_shell replies with:

```
FSS-OUTERR-NO-DIR      : no such absolute directory or cannot get to
                        : relative directory from here.
FSS-OUTERR-CANT-SETDIR-# : chdir() returned an error - # = errno
FSS-OUTERR-SUCCESS    : stdout/stderr directory was changed
```

As in the default command, the outerr argument can be either an absolute or a relative path name. The default for outerr is /tmp. Example:

```
> fss
default /home/user/beetle
outerr /home/user/beetle/files
....
```

2.4.3.6 Bad/illegal Command Protocol

In response to unknown commands, femis_shell replies with:

```
FSS-COMMAND-BAD
```

2.4.4 Command Service Utilities

2.4.4.1 UNIX Test Client - fss

The command server subsystem includes a test client for the UNIX system environment. The UNIX client can be used to test features of the command server, both new and old, and to perform certain diagnostics.

Note: This client is not an integral FEMIS system component.

The file name of the test client is fev. The UNIX test client is installed at the same subdirectory as the command server. Example: /home/femis/exe.

2.4.4.2 UNIX Test Client Command Line Options

Valid command line options for fss have the same format and usage as the command server. Example:

```
> fss host nnnn # nonstandard port and host from command
> fss - nnnn # nonstandard port local host (testing only)
> fss -p PPPP # nonstandard port from environment variable
> fss -s SSSS # nonstandard port from /etc/services file
> fss -S # use standard service name femis-command
```

See descriptions of these options in Section 2.4.2, Command Service Configuration Options.

2.4.4.3 Test Client Protocol

To run the command server test client, do the following:

```
> set path = (/home/femis/exe $path)
> fss # connect to local host, standard port
> fss <remote host> # connect to a remote host
> fss - <port> # connect to nonstandard port on this host
> fss <remote host> <port># connect to nonstandard port on remote host
```

The command server test client provides several shorthand commands to the actual command server protocol, as follows:

```
x : execute : execute a remote command
s : status  : get status of child process
k : kill    : kill current child process
d : default : set default directory for child processes
o : outerr  : set stdout/stderr directory
```

2.4.4.4 Test Client Example

Enter simple commands to the test client. Any and all reply messages from the command server are echoed on your window. Example:

```
> femis_shell -c -o /home/user/JR_Ewing
> fss
FEMIS_SHELL port is 9010
recv :: 20 :: FSS-CONNECT-SUCCESS
x ls
send :: 11 :: execute ls
recv :: 20 :: FSS-EXECUTE-STARTED
recv :: 26 :: FSS-EXECUTE-DONE-4815-0-0
^D
> ls -l /home/user/JR_Ewing/*4815*
-rw-rw-rw- 0 Dec 15 12:48 /home/user/JR_Ewing/fss4815.err
-rw-rw-rw- 566 Dec 15 12:48 /home/user/JR_Ewing/fss4815.out
> cat /home/user/JR_Ewing/fss4815.out
Backup.jr_ewing Backup.jr_ewing.tar.gz Greetings
News Xhost a.out
abbrev_list adpcm archie.ppp
bench_bin bozo.log
core crypto dead.letter
trash try utils
visa.card wp
> fss
```

```
s
recv :: 22 :: FSS-STATUS-NO-PROCESS
d /
send :: 10 :: default /
recv :: 20 :: FSS-DEFAULT-SUCCESS
x ls -l
send :: 12 :: execute ls -l
s
send :: 7 :: status
recv :: 18 :: FSS-STATUS-ACTIVE
k
send :: 5 :: kill
recv :: 17 :: FSS-KILL-SUCCESS
^D
>
```

In the example, the operator runs `fss`, executes the `ls` command to get a directory listing in file `/tmp/fss4815.out`. Next, `fss` is reentered and a series of `s`, `d`, `x`, `s`, and `k` commands are entered with the corresponding command and reply messages shown.

2.4.4.5 Test Client Diagnostics

The test client `fss` has features whereby it can spy on what the command server is doing and what the status of each connection is. The two commands are

```
$i : sends back information and statistics
$s : sends back socket connections information
```

2.4.4.6 Test Client Information Diagnostic

Enter `$i` at the `fss` test client's terminal causes statistics information to be returned to the client. Example:

```
> fss server1
FEMIS_SHELL port is 9010
$i
FEMIS_SHELL - Version 1.0.12 - Thu Oct 20 13:13:30 PDT 1994
started time . . . . Mon Dec 5 13:50:47 1994
current time . . . . Thu Dec 15 15:07:42 1994
pid . . . . . 16883
ppid . . . . . 1
uid . . . . . 4229
gid . . . . . 4229
dir . . . . . /home/femis/exe
home . . . . . /home/d34229
host . . . . . server1
port . . . . . 9010
background . . . . Yes
malloc arena . . . . 24584
```

From the display above, we can tell that the command server daemon has been up for 10 days, that it is the Oct 20 version, that the process ID of the command server is 16883, that its background (because `ppid == 1`), that its uid is 4229 (user code), that user's home is `~d34229`, that the host's name is `server1`, that the service port number is 9010, that the command server is running as a clone in background, and that the server currently has 24584 bytes of dynamic memory allocated.

2.4.4.7 Test Client Socket Connections Diagnostic `$s`

Entering `$s` at the `fss` test client's keyboard causes socket connection information to be sent to the test client's display. Example:

```
> fss server1
FEMIS_SHELL port is 9010
$s
ii : host : IP : file : pid
4 : server2.pnl.gov : 130.20.92.31 : /bin/csh : 3166
5 : 130.20.226.29 : 130.20.226.29 : (null) : 0
6 : server4.pnl.gov : 130.20.92.30 : /bin/sh : 28205
8 : server3.pnl.gov : 130.20.92.87 : (null) : 0
```

From the display, we can say that 3 clients currently have active connections, that the 2 active jobs are the Bourne Shell `/bin/sh` and the C Shell `/bin/csh`, and the 2 pid numbers are 3166 and 28205.

2.4.5 Command Service Troubleshooting

The command server is stable; however, this program runs in a network environment, and thus, is prone to any and all failures which can occur in network computing and distributed data management systems.

2.4.5.1 Checking the Command Server Active

To check if the command server is active, log in to the UNIX server, and issue the following command:

```
> ps axw | grep femis_shell
```

If the command server is active, you will get a reply such as:

```
5060 pe S 0:00 femis_shell -c
8341 pe S 0:00 grep femis_shell
```

If the command server is not active, only the second line above will be displayed. The pid of the `femis_shell` command server is the first number shown. Example: 5060.

2.4.5.2 Checking the Command Server Communication

To check the command server communication, run the UNIX test client either from the server host or from another UNIX system. You should be able to run `fss` and issue command server instructions. Example:

```
> cd /home/femis/exe
fss
```

If the command server is not active, you will get a reply such as the following, and then be returned to the command line processor:

```
FEMIS_SHELL port is 9010
connect failed: Connection refused
>
```

If the command server is active, you should get a reply such as the following:

```
FEMIS_SHELL port is 9010
recv :: 20 :: FSS-CONNECT-SUCCESS
```

After receiving the above reply, you can issue an instruction to the UNIX test client.
Example:

```
s
send :: 7 :: status
recv :: 22 :: FSS-STATUS-NO-PROCESS
```

If you can verify that the command server is active and communicating, then the problem is probably either in the network or on the PC side.

2.4.5.3 Aborting the Command Server

If you need to abort the command server during testing or troubleshooting, you must manually log in as the user account `femis_shell` was started from. In FEMIS Version 1.1u, that user account probably is user `femis` or you can log in as `superuser`.

Note: The Command Service should NEVER be started at the root account.

You next need to learn the process ID number (pid) of the `femis_shell` server needing to be killed. There are two ways to learn the pid of a FEMIS server process.

The first is to use the `ps` and `grep` commands. Example:

```
> ps axw | grep femis_shell
```

If the command server is active, you will get a reply such as:

```
19007 pe S 0:00 femis_shell -c -e femis_shell.e.log.941219.1140
8280 pe S 0:00 grep femis_shell
```

If the command server is not active, only the second line above will be displayed. The pid of the `femis_shell` command server is the first number shown, e.g., 19007.

The second way to learn the pid of `femis_shell` is to run the test client and use the `$i` spy command. Example:

```
> fss - # connect to local host
fss - test client for femis_shell server
FEMIS_SHELL port is 9010
$i
pid . . . . . 19007
```

From the `$i` reply, the `femis_shell` pid is 19007.

Now that you have the pid number, you can abort the command server. The preferred way is

```
> kill -2 19007
```

Recheck if the server is still active. If the above `kill -2` (the graceful exit), did not work, then use

```
> kill -9 19007
```

Using `kill -9` will kill the command server, but the state of any open connections will be lost -and- possibly may not be recoverable until some long TCP/IP timeout period elapses. A script file, such as the following, may be used

```
foreach killnum ( -2 -9 )

ps auxww >! ..PS..
set serverpid = ( `fgrep femis_shell ..PS.. | awk '{print $2}' ` )

foreach pid ( $serverpid )
echo kill $killnum $pid
kill $killnum $pid
end

end
```

2.4.5.4 PC WinSock Errors

This list includes the errors encountered during development and testing of the command server software. A complete list of WinSock errors can be found in *Windows Sockets, Version 1.1* documentation.

PC WinSock Error 10022

This error is an internal Windows Sockets error which is caused when a Windows application crashes/terminates without properly closing down. In doing so, the Windows application has wasted and lost critical dynamic memory. Error 10022, which means invalid argument, is reported by mistake. The real problem is Windows running out of a critical resource. Shut down other Windows applications and reboot the PC.

PC WinSock Error 10024

This error is an internal Windows Sockets error which is caused when a Windows application crashes/terminates without properly closing down. In doing so, the Windows application has wasted and lost critical dynamic memory. Error 10024, which means too many files open, is reported by mistake. The real problem is Windows running out of a critical resource. Shut down other Windows applications and reboot the PC.

PC WinSock Error 10038

This error is an internal Windows Sockets error which is caused by a software error, most likely manifested from Windows running out of a critical resource. In reaching this error, an application has tried to reuse an I/O channel which was previously connected to a network socket but has since been closed. Restart the affected applications. If this does not fix the problem, reboot the PC.

PC WinSock Error 10050

This error means the network is down; there is no network communication with the server host to which this PC is trying to connect with. Report the error to the System Administration Authority and wait for diagnosis. After all hardware and communication bugs have been fixed, restart the affected applications. If this does not fix the problem, reboot the PC.

PC WinSock Error 10053

This error means that connection to the server was aborted. This may be because the server was terminated, either intentionally or by a failure. This error can also mean that connection was never established because the server is not currently active. Check if the command server, `femis_shell` is currently active on the UNIX server. If not, restart it using scripts described in Section 2.3.1.3, Daemon Server Startup. The UNIX test client can be used to check for server health (see Section 2.4.4, Command Server Utilities).

PC WinSock Error 10054

This error means that the command server is not active. Check if the command server, `femis_shell` is currently active on the UNIX server. If not, restart it using scripts described in Section 2.3.1.3, Daemon Server Startup. The UNIX test client can be used to check for server health (see Section 2.4.4, Command Server Utilities).

This error can also mean that the client software on the PC does not have the correct service port number. The default port for the command server is 9010. Client software must use this same service port. If the port number is determined to be incorrect, fix it and restart the client software applications. Reboot the PC if necessary.

2.5 UNIX Met Data Receiver

The FEMIS External Communications application suite for UNIX has two parts: `fxcommd` and `fcmetld`. The server daemon `fxcommd` runs on the UNIX server platform and deals with Met data that it receives from the PC platform. The Visual Basic application on the PC, `FXCOMMPC.EXE`, receives raw Met data over a serial port from either a Handar met system or a simulation program, parses the Met data into blocks of tower information records, and periodically sends the parsed data to the UNIX server. A second UNIX program, `fcmetld`, loads the Met data received by the `fxcommd` daemon into the database.

2.5.1 Met Data Receiver Installation

The following UNIX programs are in the indicated locations.

<code>/home/femis/exe/fxcommd</code>	-	Receives Met data from the PC
<code>/home/femis/exe/fcmetld</code>	-	Loads Met data into the database
<code>/home/femis/exe/fxcomdrv</code>	-	UNIX version Met simulator.

2.5.2 Met Data Receiver Configuration

To operate, the `fxcommd` daemon requires an entry in `/etc/inetd.conf`, such as `fxcommd stream tcp nowait root /home/femis/exe/fxcommd fxcommd -d -p/home/femis` and in `/etc/services`, such as `fxcommd 9037/tcp`.

If you change an entry in the `/etc/inetd.conf` file, then you must force the `inetd` daemon to reload the file to make those changes take effect. This is done by restarting the daemon. For the Solaris operating system:

1. Login as root
2. Find the process ID of the `inetd` daemon using the command

```
ps -ef | grep inetd
```

3. Restart the daemon with the HUP signal

```
kill-HUP pid
```

The `pid` is the process ID of the daemon. If you use the `ps` command again, it will appear that daemon has not restarted (the date and time did not change).

The configuration file for the UNIX Met daemon (`fxcommd`), which is `/home/femis/met/cfg/fxcommd.cfg`, must contain the full path names for the two Oracle variables as follows:

```
ORACLE_HOME=/files0/apps/oracle/product/7.1.4
```

```
ORACLE_BASE=/files0/apps/oracle
```

`FXCOMDRV` requires the data file, whose default specification is `/home/femis/met/data/fxcomdrv.dat`. Other file specifications can be entered as a command line parameter.

2.5.2.1 UNIX Daemon

The Met Receiver relies on a UNIX daemon called `fxcommd`, which requires the file `/home/femis/met/cfg/fxcommd.cfg`. This daemon also needs the directories `/home/femis/met/log` and `/home/femis/met/data` because it writes log files after each tower record is received, and it creates data files to be processed by the loader program.

These configuration file entries register the `fxcommd` daemon with the network daemon `inetd`. The file specification shown above for the entry in `/etc/inetd.conf` must contain the correct path to the `fxcommd` executable.

2.5.2.2 Met Data Loader

Working in conjunction with the Met Receiver is the Met data loader called `fcmetld`, which interfaces with the Oracle database on the UNIX server. This process requires the files `/home/femis/met/cfg/fcmetld.cfg` and `/home/femis/met/data/mettower.dat`.

Note: The `mettower.dat` file MUST be exactly the same `mettower.dat` file that is on the simulator platform; also, this `mettower.dat` file must contain the tower information for the data that is contained in the `met.dat` raw data file on the simulator platform. The `fcmetld` also needs the data file created by `fxcommmd`, named something like `/home/femis/met/data/tower.nnnn`, where `nnnn` is a process ID number. These files are generated by the `fxcommmd` daemon for each block of tower data received from `FXCOMMPC.EXE`.

2.5.3 Met Data Receiver Utilities

2.5.3.1 UNIX Met Data Simulator

For test purposes, a UNIX-only version of the Met Simulator, called `FXCOMDRV`, can also be used. It requires only two files: `/home/femis/met/cfg/fxcomdrv.cfg`, which specifies the server and port; and `/home/femis/met/data/fxcomdrv.dat`, which was previously created (as `met.out`) by the `FXCOMMPC` program.

Note: Currently, `fxcomdrv.cfg` is unused. The input file can be specified on the command line as the first parameter.

Instructions for running the Met simulator and loading Met data into the `MET_CONDITION` table in the TEAD database on `server1` will then be replicated to the CTOO database on `server2`.

1. Verify the `MET_TOWER` table has been populated. If not, load it using the command

```
sqlplus umda/umda@fdevserver1 <./met/tooele/mettower.sql
```

2. Copy `./met/tooele/mettower.dat` to `./met/data/fxcomdrv.dat`.
3. Copy `./met/tooele/met.out` to `./met/data/fxcomdrv.dat`.
4. Edit `./met/cfg/fcmetld.cfg`; verify that Oracle is `umda/umda`; set `DEBUT`; and set `NOWTIME`.
5. Run simulator `fxcomdrv /home/femis/met/data/fxcomdrv.dat 9037 130.20.242.31`.

2.5.3.2 PC Met Data Simulator Support Files

For use with the simulator program `METSIM.EXE`, the raw data files for both Tooele and Blue Grass (`met.dat`) and their associated `mettower.dat` files exist in subdirectories under `/home/femis/met`.

For a detailed discussion about the simulator application `METSIM.EXE`, see Section 4.0, Meteorological (Met) Simulator.

2.5.4 Met Data Receiver Troubleshooting

The raw Met data can be supplied either by a Handar met system or by the simulator program, `METSIM.EXE`, which runs on another PC platform (under DOS).

`METSIM.EXE` extracts raw data from a data file (`\femis\met\data\met.dat`) that was created by Applied Computing Systems, Inc. (ACS) from actual data output by a Handar met system. For test purposes, a UNIX-only version of the Met Simulator, called `FXCOMDRV`, can also be used.

2.5.4.1 `fxcommd`

The UNIX external communications server process, `fxcommd`, is an `inetd`-compliant daemon. It has a dedicated TCP port through which it receives messages from the platform that runs the `FXCOMMPC.EXE` application. Because `fxcommd` runs as a background process, there is no user interface associated with it. To load the Met data into the FEMIS database, `fxcommd` uses the system function `exec1` to create a process that runs the executable `fcmetld`. This operation is accomplished by a forked child process; therefore, if there is any error encountered, it will not affect the running of the `fxcommd` process.

Use of an `inetd` daemon for the external communications server process provides several benefits. If a fatal error is encountered, the process will terminate, but it will be invoked again automatically when the next connection request arrives at the network port. As with all `inetd` processes, the socket coding is transparent to the application developer. Reads-from and writes-to the sockets are accomplished by reads from `stdin` and writes to `stdout`, respectively.

2.5.4.2 `fxcomdrv`

The `fxcomdrv` application is a simple socket-based data driver for use in testing the `fxcommd` external communications server daemon and the `fcmetld` Met database loader application for FEMIS. `fxcomdrv` runs on a UNIX platform. It has been compiled and tested on a Sun computer running Solaris 2.4.

`fxcomdrv` uses a data file that has been created by the PC application `FXCOMMPC.EXE`. This data file contains parsed and formatted Met data. `fxcomdrv` makes a socket connection to `fxcommd` and then sends individual tower data blocks across the socket with delays between each tower data block. The default delay value is 10 seconds (this value is set at compile time).

3.0 Meteorological (Met) Communications Server

Note: For the FEMIS Version 1.1u, the EMIS system is used onpost instead of the FEMIS system. The EMIS/FEMIS Data Exchange Interface is used to exchange information between these two systems. Met information is communicated offpost using this interface. For details, see the *Release Notes, Version 1.1u*. For future releases, the FEMIS Met communications server, the following sections will apply.

The design of FEMIS includes the capability to connect to a variety of external data sources via RS-232C serial links. In FEMIS Phase I only one external data source is implemented, a Handar meteorological data system. This section describes the system hardware and software components that provide the ability to acquire the Met data from the Handar system and pass it to a process on the FEMIS UNIX database server.

The Met Communications Server system comprises two major components: **FXCOMMPC.EXE** (PC platform) and **FXCOMMD** (UNIX platform). The executable **FXCOMMPC.EXE** resides on a dedicated PC Clone platform and acts as the multiplexor for the various external systems that will be connected to the serial ports. A single serial port is connected to the Handar meteorological system. **FXCOMMPC.EXE** is a Visual Basic application that takes data in on the serial port, parses and reformats the data, and then passes the data to the **FXCOMMD** UNIX daemon process, which resides on the UNIX database server platform. The **FXCOMMD** daemon receives data from the network, writes the data to a file, and forks and executes the database loader process **FCMETLD**, which loads the Met data into the database.

This section addresses the meteorological communications software on the PC platform.

3.1 Met Server Installation

The **FXCOMMPC.EXE** executable requires a platform that provides serial port (RS-232C) connectivity, a network connection with WinSock compatibility and a Windows for WorkGroups environment within which to run. The minimum processor recommended is a Intel 80486 processor, minimum 33 MHz with MS-DOS 6.22 or better. The platform should also have at least 4MB of extended RAM and a hard disk drive with at least 1MB of available disk space. The RS-232 serial connection to the **FXCOMMPC.EXE** platform requires only pins 1 (Hardware ground), 3 (DTE Rx/D), and 7 (Data ground) to be connected. This application only receives; it does not transmit. No hardware handshaking is used or required.

Copy the following program from the server's /home/femis/pc directory to the Met Server PC. Then run the program:

FXCOMMPC.EXE - Meteorological Communications Server program

The main form contains three menu items: 1) File, which currently has no functionality; 2) Configure Comms, which contains two submenu items, `SerialPort` and `TcpPort`; and 3) Run, this menu item establishes the connection to the remote server, opens the serial comm port or raw data file (depending on the source of raw data), initializes the 4 hertz timer, and enters the processing loop.

The `SerialPort` submenu item loads the form to allow setting serial port parameters. The parameters that can be set are Baud Rate, number of Data Bits, number of Stop Bits, Parity, and Com Port. In the current version, only `Com1:` through `Com4:` are valid options. The current version supports only one serial port at a time. Future versions of the FEMIS may include the capability of a serial port multiplexor board in the FXCOMM PC platform.

The `TcpPort` submenu item loads the form to allow setting the Local Host Name (that is, the name of the host running `FXCOMMPC.EXE`), the Remote Host Name (the name of the host running the server daemon), and the TCP port number that is being serviced by the server daemon. The `SerialPort` and `TcpPort` submenu items are disabled when the Run menu item is selected.

The main form contains several areas

- `StopButton` - Closes the network connection and stops the `FXCOMMPC.EXE` application
- A frame containing text fields that show the Remote Host Name, the Port Number in use, and the State of the network connection (`DisConnected`, `Connected`, `Listening`)
- A frame containing the text fields that show the COM Port in use, the serial port Settings of the selected COM Port, and the State of the COM Port (`Open`, `Closed`)
- A text box which displays the entire contents of each tower data block that has been successfully parsed. The previously parsed tower data blocks can be seen by scrolling in the text box.

3.2 Met Server Configuration

`FXCOMMPC.EXE` expect that a subdirectory whose specification is `\FEMIS\MET\CFG\` exists. It also requires the existence of the file `WINSOCK.DLL` in the `\WINDOWS` subdirectory, as well as the custom control `WSK.VBX`, which must reside in the same directory as the `FXCOMMPC.EXE` application.

3.3 Met Server Troubleshooting

Raw data is received from met towers by the `FXCOMMPC.EXE`, a Visual Basic program. When the main form loads, the `FXCOMMPC.EXE` attempts to find the configuration file `\femis\met\cfg\fxcommpc.cfg`.

If the file is found, then communications parameters are read from the file.

If the file cannot be found, a message box shows an error 53 and displays the message `Using Defaults`. The user then needs to set the serial parameters and TCP parameters before selecting `RUN`. Selecting the `OK` button in the configuration windows causes `\femis\met\cfg\fxcommpc.cfg` to be created, if it does not already exist or modified if it does exist.

If either of the `SerialPort` or `TcpPort` submenus are selected and their `OK` button is pressed, then the current values of the communications parameters will be written to the file `\femis\met\cfg\fxcommpc.cfg`.

If the source of the raw Met data is a file, then that file must have the specification `\femis\met\data\met.dat`.

If the global variable is set to cause creation of parsed data files, then the file written to will be `\femis\met\data\met.out`. If this file already exists, it will be overwritten.

An error 76 indicates the `\femis\met\data` directory does not exist, if `FXCOMMPC.EXE` is configured to save the output data that it is sending to the `FXCOMM` application on the UNIX server.

4.0 Meteorological (Met) Simulator

For testing purposes, a simulator application called `METSIM.EXE` can be run on a dedicated PC platform to simulate the Handar meteorological system. This platform connects over an RS-232 serial link to the multiplexor PC platform that runs `FXCOMMPC.EXE`. An additional test data generator application, `FXCOMDRV`, can be run on the UNIX platform. This application sends data to the `FXCOMM.D` daemon process via network sockets, thus allowing testing of the UNIX `FXCOMM` processes without using the PC platforms.

The raw Met data can be supplied either by a Handar meteorological system or by the simulator program `METSIM.EXE`, which runs on another PC platform (under DOS). `METSIM.EXE` extracts raw data from a data file that was created from actual data output by a Handar meteorological system.

4.1 Met Simulator Installation

Copy the following program from the server's `/home/femis/pc` directory to the Met Simulator PC. Then run the program.

`METSIM.EXE` - Meteorological Simulator program

The `METSIM.EXE` Met system simulator can be run on essentially any platform that can support an MS-DOS (version 3.3 or higher) environment. It has been tested on a PC-XT Clone with a 4.77 MHZ 8088 processor. `METSIM.EXE` requires a serial port (RS-232C) to send data to the platform running the `FXCOMMPC.EXE` application.

4.2 Met Simulator Configuration

`METSIM.EXE` requires two files to run. One of these is the tower configuration file whose default file specification is `\femis\met\data\mettower.dat`. This file is the met tower definition file that contains the configuration details of the Handar meteorological data system during the time the Met data file was generated. This file must contain exactly the same information that the `mettower.dat` file on the UNIX database server contains in order for `METSIM.EXE`, `fxcommd`, and `fcmetld` to work cooperatively. The other required file is the raw Met data file whose default file specification is `\femis\met\data\met.dat`. This data file must have been generated with the Handar meteorological data acquisition system configured as defined in the `mettower.dat` file. Both of these file specifications can be entered as command line arguments.

Note: The tower configuration file `mettower.dat` must be exactly the same `mettower.dat` that is being used for the `fcmetld` application on the UNIX server. Also, `mettower.dat` must contain configuration information for the raw data that is being used (`met.dat`).

4.3 Met Simulator Troubleshooting

`METSIM.EXE` executes as follows: during initialization, `METSIM.EXE` checks for the existence of the tower configuration file (default file specification `\femis\met\data\mettower.dat`) and the tower data file (default file specification `\femis\met\data\met.dat`). If an error occurs upon opening either of these files, `METSIM.EXE` displays an error message and exits.

The default communications settings are

Port	-	COM2
Baud	-	1200
Data Bits	-	8
Parity	-	NONE
Stop Bits	-	1.

Prior to entering the main code loop, `METSIM.EXE` displays a usage message, and waits for the user to press a key. The tower ID array is then constructed by reading in the tower ID numbers from the tower configuration file. It is assumed that the tower configuration file contains the ID numbers of all valid towers.

After initialization, `METSIM.EXE` executes a loop that sends the tower data blocks in succession as they are read from the raw Met data file. The data is sent over the serial port by direct access to the UART hardware. As each tower data block is sent, the element in the array `glipTsent[]` (corresponds to the element in `glipTidArray`) that contains the ID of the tower whose data was just sent is set to 1. This continues until a data block is read in; this data is from a tower that has already been sent. At this point, the assumption is made that data blocks for each of the towers has been sent. A delay loop, corresponding to the length of the delay parameter (default value is 900 seconds) to simulate the acquisition period of the Handar meteorological system, is then entered. This process continues until all data in the raw data file has been transmitted over the serial port.

5.0 Electronic Mail Service

As part of the FEMIS system, Novell GroupWise provides the electronic mail (E-mail) service.

5.1 E-mail Components

The mail server resides on the FEMIS data server and is comprised of a collection of COTS software, which work together to provide the mail services required for FEMIS. The following software will need to be installed on the mail server platform:

Novell GroupWise v4.1 Client/Admin Pack (admin portion)
Novell GroupWise v4.1 Message Server Pack for UNIX
Novell GroupWise v4.1 SMTP Gateway for UNIX

The Client/Admin Pack contains DOS-based GroupWise administrative software, the GroupWise for Windows client, and five mailbox licenses. Additional License Packs are needed to have one license per mailbox. The Client portion is installed on the PC client, and the Admin portion is installed on the mail server. Each FEMIS workstation will have the Novell GroupWise Client software installed. Refer to the Novell GroupWise documentation for complete COTS installation instructions.

5.2 E-mail Installation Overview

The E-mail installation includes the completion of the steps listed below:

Install Novell GroupWise 4.1 Client/Admin Pack
Create the Primary Domain and Post Office
Install and Configure the Primary Message Server
Set up Secondary Mail Servers
Install and Configure the SMTP Gateway
Set up Account Passwords
Set up Proxy Access.

These steps are discussed in more detail in this section.

5.2.1 Before Installation

The Admin portion of the Client/Admin pack requires an account to access the FEMIS data server. On the FEMIS data server, create a `gwadmin` account which belongs to the `femis` group.

The mail server requires a directory on the FEMIS data server for the installation and storage of the domain and post office. On the FEMIS data server, create a `grpwise` directory with the UID set to `gwadmin`, the GID set to `femis`, and the sticky bit on.

5.2.2 Installation and Configuration of Novell GroupWise 4.1

At sites with more than one EOC, each EOC will have its own message server. To provide access to other EOC address books and gateways, GroupWise connects these servers using a primary and secondary hierarchy. One EOC will be considered the primary domain and the other EOCs will be considered secondary domains. The EOC that is the primary domain will need to create database files for the secondary domains and deliver the database files to the secondary domains. The secondary domains will configure the links between message servers, create a post office, and create user mailboxes.

Throughout this section, the following directories and names will be referenced: the NT NFS drive mounting the FEMIS data server is `1:`, primary domain name is `prm`, primary domain directory is `1:\prm`, post office name is `po`, and post office directory is `1:\po`.

5.2.2.1 Install the Novell GroupWise 4.1 Client/Admin Pack

To install the Groupwise Client/Admin Pack on the FEMIS data server, complete the following steps:

1. From a Windows NT machine, open a DOS Window and connect to the FEMIS data server:
`nfs link 1: \\<hostname>\<partition>\.../grpwise /1:s`
Drive `1:` will be used to load the GroupWise software.
2. Create the `1:\prm` directory which will be the primary domain directory.
3. Use the vendor's install program on the Admin 1 disk to install the software in the `1:\prm` directory. Select the Administration and Windows Client files for installation.

5.2.2.2 Create the Primary Domain and Post Office

The DOS administrative interface, `ad.exe`, is used to create the domains, post offices, user mailboxes, and a system administrator. Run `1:\prm\ad.exe` to perform the following procedures:

Create the primary domain:

1. Select the time zone and make the daylight savings changes as required, by typing 1 - to change the clock, 2 - to change the DST start time, and 3 - to change the DST end time.
2. Select **Other** for the network type.

Create a post office for the primary domain:

1. From the Copy Software window, select **Copy Windows Client Software to the Post Office**.
2. Add the users, i.e., personal and position mailboxes.

Add a system administrator for the primary domain, complete the following steps:

1. Using **ad.exe**, highlight the primary domain directory and press F6.
2. Open the administrator information window by selecting 9 for administrator.
3. Configure a system administrator (someone the message server can alert of any problems) by choosing 1 for administrator and selecting an administrator from the list of mailboxes.

5.2.2.3 Install and Configure the Primary Message Server

The following outline for installing and configuring the message server software is taken from the Novel GroupWise Message Server Guide. Please see the guide for detailed instructions to perform the following steps:

1. Install the message server software from the distribution media.
2. Define the necessary environment variables.
3. Start the message server to create the message server subdirectories.
4. Configure the application servers and transports.
5. Configure the message server using **ad.exe**.

Open the Domain Information window and select **m** for Message Server Configuration. From this window set the Execution Method to **Server Always** and press enter. A warning message will be displayed; select **continue**. Choose 5 for TCP/IP Settings and input the message server's IP address.

6. Define the message server's link to the post office in the primary domain.
7. Start the message server.

5.2.2.4 Set up Secondary Mail Servers

Due to the complexity of a multiple mail server system, it is recommended that you read the Novell GroupWise Message Server Guide and Administration Guide before proceeding.

1. Create a secondary domain using `1:\prm\ad.exe`.
2. Use the secondary data server and `1:\sec` as the domain directory to install the Client/Admin Pack as in Section 5.2.2.1.
3. Copy the Secondary Domain Directory (`1:\sec`) to the second FEMIS data server. This will replace the empty database created by the Client/Admin installation with a secondary domain database that contains references to the primary domain and its post office and users.
4. Install the message server on the second FEMIS data server using the distribution media.
5. Run `1:\sec\ad.exe` on the second FEMIS data server to configure the message server and links between the domains.
6. Run `1:\sec\ad.exe` on the second FEMIS data server to create the post office, user mailboxes, and a system administrator mailbox for the secondary domain as in Section 5.2.2.2.

5.2.2.5 Install and Configure the SMTP Gateway

To install the SMTP Gateway, perform the following steps at each EOC:

1. Decide on an external name for the SMTP gateway.
2. Install the gateway from the distribution media.
3. Modify the FEMIS data server's `sendmail.cf` so the FEMIS data server recognizes the SMTP gateway for message delivery.
4. Edit the Domain Name Services (DNS) database to add the SMTP external gateway name.
5. Configure the gateway using Novell GroupWise Admin program.
6. Start the message server.
7. Start the GroupWise SMTP Gateway.

5.2.2.6 Set up Account Passwords

To set up an account password, perform the following procedure:

1. Run `ad.exe`.
2. Tab to the `Users` window and highlight the user for whom you would like to create a password.
3. From the `Actions` menu, select `GroupWise 4.x Options`. Select 4 for `Security Access`.
4. From the `Security Access` menu select 1 for `Set Password`. Enter and confirm the password.
5. Press enter to close the `Security Access` and `GroupWise 4.x Options` window. Press F7 to exit `ad.exe`.

5.2.2.7 Set Up Proxy Access

The System Administrator should be considered the owner of the position mailboxes for purposes of granting access. Passwords for position mailboxes should not be given out unless they are to be used solely for direct login and not for proxying.

Set up all personal GroupWise mailboxes and all position GroupWise mailboxes, and then log in to each proxy mailbox and perform the following steps:

1. Select `File|Preferences|AccessList` from the menu to bring up the `Access List` screen.
2. Click on `Minimum User Access`, uncheck all boxes, and click `Apply`.
3. For each position mailbox, from the `Access List`, click `Add Users`.
4. Double click on each user name that should have access to the position mailbox and Click `ok`.
5. In `Access List`, click on first user name. Then, with the `Shift` key pressed, click the last user's name that will have access to the position mailbox. All of the user names between the first and last name selected will be highlighted. These users will have access to the position mailbox.
6. Click `Mail/Phone Read and Write` and `Subscribe To My Notifications`.
7. Click `Apply`. You can double check the accesses you have given by clicking on the names one at a time and seeing what boxes appear checked.

8. When you are satisfied that the Access List and permissions are correct, click OK.
9. Click **File|Preferences|Subscribe to Notify**. As above, add the same users so they can be notified of new mail received by this proxy.

5.3 Tips for Using the GroupWise Client

5.3.1 Accessing Position Mailboxes

Requests to access a position mailbox are only kept for one session, so Steps 1-3 will need to be repeated each time a user logs in unless the workaround below is used.

1. Log in to your personal mailbox.
2. Click the **File|Proxy** menu item. The proxy mechanism is what will be used to access the position mailboxes from your personal mailbox.
3. Enter the name of the position mailbox for the User ID that you want to access. Otherwise, click the **Users** button, click on a position name in the list, then click OK. Repeat Steps 2 and 3 for each position mailbox you need to access.

Note: If you attempt to establish a proxy connection to a position mailbox that has not given you permission to access it, you will receive a message saying, **Access to user denied**. See your E-mail System Administrator if you should have been given access to that position mailbox.

Once Steps 1 and 2 are completed, users can switch between their personal mailboxes and authorized position mailboxes by using the proxy button in the bottom left corner of the screen. The button is labeled with a person icon. Clicking on it will cause a menu to appear containing the user's own mailbox name and the names of the position mailboxes that were requested in Step 3.

Workaround - To keep the proxies from disappearing on logout:

Having completed Steps 1-3, open the InBox for each proxy. Drag the icon in the upper left corner of each InBox to the white "shelf space" area in the Groupwise main screen, and then close all of the InBoxes. The **File|Properties** menu item can be used to change the label on the resulting icons to reflect the proxy name. There are two drawbacks to this workaround. First, shelf space settings are stored by GroupWise per system, not per user. If another user, that does not have access to the same proxies, tries to log on to mail on that system, the message **access denied** is displayed for each unauthorized proxy. However, the user is allowed to logon and use authorized proxies. Second, in some cases, renaming the icons causes the icon to disappear leaving only the icon label. Clicking on the label is sufficient to access the mailbox. This seems to occur on NT systems but not on Windows or WFW systems.

5.3.2 Tips for Using Notify

GroupWise Notify, the application that notifies the user when there is new mail, does not tell the user which mailbox received the new mail. However, the user is given an indication new mail is in their personal mailbox or in a proxy mailbox. Clicking on the subject line of a new message listed in Notify will cause the Read button to be enabled if the mail is in the personal mailbox and disabled if the mail is in a proxy mailbox. Alternatively, you can have Notify beep the user. The user can then go directly to GroupWise and use the proxy button menu to quickly scan the InBoxes.

6.0 PC Client Workstations

The FEMIS Client software permits emergency management personnel to perform their jobs. It consists of a user interface which provides a variety of functions necessary for managing an emergency. This software interfaces seamlessly with the installed COTS applications and the network software. It is a user interface that brings together the familiarity of the COTS software and the power of client-server computing and emergency management information interchange.

The FEMIS Client software is delivered on a UNIX compatible media. This media contains the user interface software and its supporting programs and files required to configure a standard IBM compatible PC into an emergency management workstation. These files should be loaded to the UNIX computer serving as the data server to the FEMIS workstations.

The recommended PC platform should have a Pentium central processing unit (CPU) with 32MB of RAM, and 500MB of disk space. It is recommended that the target PC workstations be configured with the standard SVGA video drivers. The minimum display resolution is 640x480 pixels, using 256 colors.

FEMIS will run on an 80486 platform that features 60 megahertz (MHz) or better, 32MB RAM and a 500MB hard disk but performance in graphics applications will be unacceptably slow. Users who need FEMIS GIS or graphics functionality should select the preferred Pentium-equipped, faster PC platform.

The preferred PC Client platform is the Pentium-equipped PC configured as follows:

Intel Pentium Microprocessor PC

- 60MHz or better

- 32MB RAM

- 500MB Disk (1.2GB optional)

- 32 bit, 30 (or better)MHz Local Bus

- 32 bit (or better) graphics accelerator card, Local Bus design

- Internal CD ROM drive

- 1.44 3.5" internal floppy drive

- 1 parallel / 2 serial ports

- 3COM (3C509, 3C509-TP) Ethernet Adapter card (10Mbits/sec, 10Base2)

- 17" color VGA monitor (SVGA capable)

- Standard 101 key keyboard

- Mouse.

6.1 COTS Software to be Installed

The COTS software that needs to be installed prior to installing the FEMIS software are the following:

ArcView v2.0b GIS

BW-Connect: NFS Client for Windows NT x86 v3.5

Microsoft Office v4.3 including:

 Microsoft Excel v5.0 or better

 Microsoft PowerPoint v4.0 or better

Microsoft Project v4.0

Microsoft Windows NT Workstation (CD-ROM edition), v 3.5 ⁽¹⁾

Novell GroupWise v4.1 Client/Admin Pack for Windows (client portion) ⁽²⁾

Oracle SQL*Net v2.0

Oracle TCP/IP adapter v2.0

WordPerfect for Windows v6.0 or better.

Notes:

1. The version specified includes documentation. Additional licenses may be obtained without documentation by procuring the Windows NT License Pack.
2. Client portion is installed on the PC client and admin portion is installed on the mail server.

Refer to each software's manual to install the COTS software.

6.2 FEMIS Windows NT and B&W NFS

Gather the following information before continuing:

CD-ROM Type

Network Card Type

 Base I/O Address

 Interrupt Request

 Shared Memory (if any)

Machine Name

Workgroup Name

IP Address

Gateway Address

Domain Name Server Address (if available).

This document makes the assumption you will be installing from a CD-ROM and you have identified your system hardware and verified it was on the hardware compatibility list supplied with Windows NT.

6.2.1 Installation of FEMIS Windows NT NFS

1. Insert the Windows NT Setup Boot Disk in drive A and reboot on the machine.
2. Follow the prompts. The Welcome to Setup window will appear.
3. Press Enter to setup Windows NT now. Windows NT provides two setup methods, Express Setup or Custom Setup. When asked to choose the setup method choose c for Custom Setup.
4. The setup program can try to auto detect your CD-ROM drive. Insert the Windows NT Workstation CD into the CD-ROM drive.
5. Press Enter to auto detect the CD-ROM drive. If the CD-ROM drive is detected press Enter to continue. If the CD-ROM is not detected press s to specify a mass storage device.
6. Highlight the CD-ROM drive description and press Enter. If the CD-ROM drive is still not detected consult the Windows NT manuals and the CD-ROM manual.
7. Follow the prompts through the install.
8. When asked for a file system, choose a FAT file system.
9. Follow the prompts to continue the install.

6.2.2 Configuration of Windows NT and B&W

Follow the prompts through the setup. When asked what you would like the Setup program to configure, choose set up only windows components you select and set up the network. Verify the windows components you would like installed.

The Setup program will try and automatically detect your network adapter card. Follow the prompts to setup the network card. The network transports to setup are TCP/IP and NetBEUI.

1. Install the following TCP/IP options: Connectivity Utilities, TCP/IP Network Printing Support, and Simple TCP/IP Services.
2. The Network Settings window will open, insert the Beame & Whiteside Disk 1 into drive A. Click the Add Software button.
3. Choose Other Requires disk from the manufacturer.
4. Follow the prompts to install Beame & Whiteside to the c:\BWNT directory.

For the Beame & Whiteside configuration,

1. Enter the IP address of the FEMIS data server as the Default Authentication Server.
2. Set the Default Protection to User RWX, Group RWX, and Other RX.
3. Change the Default Read Size to 8192.
4. The InetD Configuration window will open, these components do not need to be configured, close the window.
5. Choose OK to close the Network Settings window.

The TCP/IP Configuration window will open.

1. Enter the IP address and Default Gateway.
2. Click the DNS box to open the Domain Name Services window.
3. Verify the Host Name is the same as the machine name.
4. Enter the Domain Name and add a Domain Name Server, if available (If a Domain Name Server is unavailable, you will need to edit the \WINNT35\SYSTEM32\DRIVERS\ETC\HOSTS file).
5. Close the Domain Name Services window.
6. Click the Advanced button.
7. Under the Windows Networking Parameters, check the Enable DNS for Windows Name Resolution box, if DNS is available.
8. Close the TCP/IP Configuration windows.
9. Under the Domain/Workgroup Settings, enter the workgroup name and click OK.
10. Enter the Admin account password in the Admin Account Setup window.
11. At the Create Local Account window, enter the username and password for the machine user.
12. Verify the Virtual Memory Settings and continue. Follow the prompts to enter the date and time and select the display settings.
13. When asked to create and emergency repair disk, answer Yes and follow the prompts.
14. Shutdown and restart the computer.

6.2.3 Setting Up System Variables

Windows NT specific system variables for Oracle are added through the following path: Windows Program Manager, Main, Control Panel, and System icon. Add the variable:

ORACLE_HOME = C:\ORAWIN

Add to your system path:

%ORACLE_HOME%\BIN;

6.2.4 Installing the Database Connection

To install the database connection software SQL*Net and TCP/IP, insert the Oracle installer disk into drive A. From the Windows Program Manager, click on File, then Run. At Run, type the following to start the install program:

A:\ORAINST

To install the Required Support Files, insert disk 1. If the Required Support Files do not show up on the menu, select Required Support Files and click the install button.

To install SQL*Net and TCP/IP Adapter, insert the Oracle TCP/IP Adapter disk and install it from the Oracle Installer menu. Choose the Microsoft Windows NT TCP/IP via Winsock Adapter and follow prompts.

To copy the Configuration Files, copy the three Oracle configuration files listed below to the C:\ORAWIN\NETWORK\ADMIN directory

SQLNET.ORA
TNSNAMES.ORA
TNSNAV.ORA

The TNSNAMES.ORA file must be modified to your EOC. The initial part of this step is to edit C:\ORAWIN\NETWORK\ADMIN\TNSNAMES.ORA to identify the server IP address of each server accessible from the workstation. To complete this step see Section 6.0, PC Client Workstations.

6.2.5 Installing and Configuring the GroupWise Client

Before installing the GroupWise Client, the server portion of Novell GroupWise E-mail must have been installed and configured (see Section 5.0, Electronic Mail Service). To install the GroupWise Client, complete the following steps:

1. Verify drive 1: is connected to the FEMIS data server mail directory (see Section 1.3.3.2, Connect E-mail Network Drive).

2. Run `1:\setupwin.exe` to install the GroupWise Client.

To configure the GroupWise icons, complete the following steps:

1. Select the GroupWise icon in the GroupWise program group.
2. Choose `File|Properties` from the Program Manager menu.
3. Add the parameter `/@u-?` at the end of the command line. This parameter forces GroupWise to prompt the user for a User ID (i.e., mailbox name) when entering mail, rather than defaulting to the NT username.
4. Repeat Steps 1-3 for the Notify icon.

6.3 Installing the FEMIS Client Software

This software is for the PC workstations that are connected to the FEMIS data server. The file `femis.tar` contains the FEMIS client software and a collection of GIS theme files. The installation of the FEMIS client software assumes separate installations of the necessary COTS software have been completed.

The FEMIS client software can be installed over the network from a UNIX server onto any FEMIS configured PC workstation. The client software contains over 80 files representing more than 9MB of file space. In addition, another 8MB of space is needed for about 50 files supporting the GIS functions.

The primary programs are

<code>FEMIS.EXE</code>	-	The main FEMIS client program
<code>FMD2I.EXE</code>	-	D2 plume modeling interface
<code>FDATAMGR.EXE</code>	-	Data manager utility interface
<code>F_RMMGR.EXE</code>	-	Facilities, resources, personnel interface
<code>FMODSB.EXE</code>	-	Model results status boards
<code>FEXRMGR.EXE</code>	-	Exercise manager
<code>FRSDDDES.EXE</code>	-	Status board designer
<code>FSYSMGR.EXE</code>	-	System Administration utility interface
<code>ATTACH.EXE</code>	-	Microsoft Project database configuration utility
<code>MKDBINI.EXE</code>	-	FEMISDB.INI configuration utility
<code>PARDOS.EXE</code>	-	Dosage estimator interface
<code>D2PC.EXE</code>	-	D2 for the PC.

1. Locate the directory called `/home/femis/pc` on your network drive. If needed, see your System Administrator for instructions to access the appropriate network drive.
2. Run the program `/home/femis/pc/setup.exe` from the network drive.

The program will display a background with the heading **FEMIS Version 1.1u Setup** and a dialog window. If necessary, enter the location of where the software is to be installed. The path is typically **C:\FEMIS** on the PC workstation.

Files will be loaded to the following locations:

1. Your current **WINDOWS** directory
2. In the **System** subdirectory
3. In the **FEMIS** directory.

6.4 Client Software Configuration

This subsection discusses the configuration for the hardware, software, network, and FEMIS system configurations as well as the FEMIS database connection.

The following files need to be in the corresponding directories. Some of these files may appear initially in the **C:\FEMIS** directory and may need to be moved to the appropriate directory.

C:\WINDOWS	C:\WINDOWS\SYSTEM
FEMIS.INI	OLE2.REG
FEMISDB.INI	VSVBX.LIC
FNOTIF1.INI	
OBDC.INI	
PROJ2ACC.INI	
WINPROJ4.INI	

6.4.1 FEMIS System Configuration

6.4.1.1 Setting Up NFS Drives

The Window NT software allows you to set up a NFS drive as if it was simply another hard disk on your PC workstation. While you can set up various optional NFS drives, the FEMIS client applications require at least one which points to the top-level directory of the FEMIS software on the UNIX server. The **M:** drive must be connected to **\\server\home\femis**, under which the **user** and **gis** directories are located. This **M:** drive is used in the **FEMIS.INI** file for **FemisUserTopDirNFS (M:\USER)** and **GISTopDirNFS (M:\GIS)**. If for some reason you are already using the **M:** drive, you can substitute an unused drive instead, but you must remember to update the **FEMIS.INI** file.

To connect to a NFS drive from Microsoft Windows NT

1. Start the File Manager
2. Select Disk -> Connect Network Drive.
3. Select an unused drive and enter the path (similar to \\server\home/femis)
4. Click the Reconnect at Logon box
5. Click the OK.

6.4.1.2 FEMIS.INI - Generic Settings

Under the [FEMISPC] category, edit C:\WINDOWS\FEMIS.INI. by changing the FemisThisPCName variable to your workstation IP address. For Windows NT, use Alt-Tab to the Program Manager. The PC name is the name immediately following the hyphen in the Program Manager title bar. You should also verify that the FemisTopDir is set to C:\FEMIS. Review the entries under [FemiscOTS] to be sure that each global variable is pointing to the directory where you have installed the commercial software.

6.4.2 GIS Configuration

To configure the GIS software, locate the /home/femis/gis directory on the network drive and copy the GIS tree from the network drive to the C:\FEMIS directory to make the C:\FEMIS\GIS directory. This configuration should only have to be done one time per PC.

The C:\FEMIS\GIS directory contains several (33) subdirectories and the FGISEMPT.APR and FEMISGIS.INI files. The subdirectories contain the spatial data used in FEMIS and the Avenue scripts (ArcView's scripting language) necessary to perform the FEMIS GIS functions.

FEMISGIS.APR contains all the Avenue scripts that perform the FEMIS GIS functions and references the spatial data. This file is site specific and is created by running the Load data script in the FGISEMPT.APR using the FEMISGIS.INI file.

FEMISGIS.INI contains data required to initialize GIS parameters that generate the FEMISGIS.APR and to ensure the proper GIS contents each time the FEMIS GIS is invoked by the FEMIS application.

An example FEMISGIS.INI file is illustrated in the table below.

Part A of the table specifies the UTM (Universal Transverse Mercator) projection parameters required for each installation. The parameters shown are for Zone 12 (used in Utah). To obtain a fit of the themes and the background image map, the scale factor set to 0.99953 instead of the usual 0.9996.

Part B of the table specifies a geographic area of interest, which is a rectangle that starts at the origin (lower left corner) of -114.00 degrees longitude and 37.00 degrees latitude and spans 5.5 degrees longitude (first "size" parameter) and 5.5 degrees latitude (second "size" parameter). The area of interest is specified to minimize the consequences of ill defined data points. In certain occasions, the user is given the opportunity to define the longitude and latitude where an event has occurred. FEMIS GIS does not allow the specification of plumes or threat wedges that originate outside the area of interest.

Part C of the table specifies the themes to be loaded in the FEMIS GIS with a set of parameters as follows:

Theme:	The theme name used in the FEMIS object table, if any.
DB Object:	Flag that specifies whether the theme exists in the FEMIS object table. (The cedblock should be set to yes although it is not currently in the FEMIS object table).
Type:	Theme type (event theme, shape theme, or image theme).
Status:	Flag that specifies whether the theme should be displayed (on or off) when the GIS is invoked.
Label Field:	Theme attribute field to be used for labeling.
Classification field:	Theme attribute field to be used for legend classification. If the theme is not classified, i.e. displayed only with one kind of symbol, this field MUST be set to 0 (zero). If it is a polygonal theme, this setting is ignored.
Min Scale:	The theme is not displayed when the denominator of the scale expression is smaller than Min Scale.
Max Scale:	The theme is not displayed when the denominator of the scale expression is larger than Max Scale.
Legend Name:	The name that appears on the GIS display legend.
Symbol:	Point and line themes shown with a single symbol (no classification), will use this symbol number to create a legend when they are loaded for the first time or if a legend does not already exist. The user may see the symbol used in the symbol palette. The first symbol in the palette is symbol number 0 (zero). For example, in the point symbol palette, symbol number 0 is a circle, and symbol number 1 is a square.
Color:	Used to color point and line themes shown with a single symbol (no classification). The user may see the symbol used in the symbol color palette. For example, color number 0 is the transparent color, and color number 1 is white.

Size: Used for the size point markers and the width line symbols when the themes are shown with a single symbol (no classification).

Path: The theme name and path relative to the C:\FEMIS\GIS directory. The theme file name extensions (e.g., .shp and .dbf) should not be used.

Part A: UTM Projection Parameters

Central Meridian: -111
Reference Latitude: 0
False Easting: 500000
False Northing: 0
Scale: 0.99953

Part B: Area of Interest (in decimal degrees)

origin: -114.00, 37.00
size: 5.50, 5.50

Theme Parameters

Theme	DB Object	Type	Status	Label Field	Classification Field	Min Scale	Max Scale	Legend Name	Symbol	Color	Size	Path
im_500k	No	Image	Off	0	0	50000.0	1500000.0	Map image	1	2	3	im_500k\tead500k
cedblock	Yes	Shape	Off	5	0	10000.0	1500000.0	Census blocks	0	0	1	cedblock\tead_tb
stcounty	No	Shape	Off	4	0	20000.0	0	State/county boundaries	0	0	2	stcounty\tead_sc
adminbnd	No	Shape	Off	1	0	20000.0	15000000.0	Administrative boundaries	0	0	1	adminbnd\tead_ab
abpc	Yes	Shape	On	2	2	20000.0	20000000.0	Accident Based Plan Cat.	8	40	1	abpc\tead_pc
zone	Yes	Shape	On	3	2	5000.0	15000000.0	Emergency Zones	5	14	2	zone\tead_ez
stream	No	Shape	Off	2	0	5000.0	1500000.0	Streams	0	26	1	stream\tead_st
railroad	No	Shape	Off	3	0	500.0	20000000.0	Railroads	0	34	1	railroad\tead_rr
roadall	No	Shape	Off	7	8	500.0	150000.0	Tooele Co Roads	1	8	1	roadall\toeo_ra
roadall	No	Shape	Off	7	8	500.0	150000.0	Utah Co Roads	1	8	1	roadall\utco_ra
roadall	No	Shape	Off	7	8	500.0	150000.0	Salt Lake Co Roads	1	8	1	roadall\slco_ra
roadmaj	No	Shape	Off	7	8	500.0	20000000.0	Major Roads	0	8	2	roadmaj\tead_rm
igloo_p	Yes	Shape	On	4	5	10.0	2000000.0	Igloos	14	8	12	igloo_p\tead_ip
mettower	Yes	Shape	On	5	0	1000.0	2000000.0	Met Towers	8	5	6	mettower\tead_mt
siren	Yes	Shape	On	5	0	1000.0	2000000.0	Sirens	9	20	6	siren\tead_sr
tc_UTST	Yes	Shape	On	5	0	1000.0	15000000.0	State Traffic Control Pts	5	22	8	tc_utst\utst_tc
tc_CTOO	Yes	Shape	On	5	0	1000.0	13000000.0	Tooele Traffic Control Pts	5	32	8	tc_ctoo\ctoo_tc
fa_UTST	Yes	Event	On	5	0	1000.0	15000000.0	State Facilities	1	22	4	fa_utst\utst_fa
fa_CTOO	Yes	Event	On	5	0	1000.0	13000000.0	Tooele Co Facilities	1	32	4	fa_ctoo\ctoo_fa
fa_TEAD	Yes	Event	On	5	0	1000.0	3000000.0	TEAD Facilities	1	14	4	fa_tead\tead_fa

Actual FEMISGIS.INI file is a comma-delimited text file.

To alter the default appearance of the map, the `FEMISGIS.INI` file must be edited to 1) remove the appropriate lines for each theme to be deleted, 2) add a line for each theme to be added, and 3) modify the parameters of themes to change their appearance. The empty project file (`FGISEMPT.APR`) should then be started and the `L` button invoked to load the customized set of themes. When the themes are loaded, the message "Themes loaded without error" will appear. After acknowledging the message, invoke the `F` button to acquire the usual FEMIS GIS graphical user interphase (GUI). The project should be saved as `FEMISGIS.APR` using the Save As button in the File menu of the ArcView project GUI. Exit the project and use the file manager to set the `FEMISGIS.APR` file access properties to "read only."

The `FEMISGIS.INI` and `FEMISGIS.APR` files are used each time the FEMIS GIS is invoked. `FGISEMPT.APR` is used only to create the appropriate `FEMISGIS.APR` or when changing the default appearance or contents of the displayed map.

6.4.3 Database Configuration

PNL has included a network configuration that support three EOCs at TEAD in Utah. The EOCs are named TEAD, CTOO, and UTST.

6.5 PC Client Troubleshooting

Notification Service Error #10054

This error means the notification process is not running on the server. To correct, either start the process or use `RunAsStandAlone=True` in the `FNOTIF1.INI` file in the Windows directory or start the notification process on the server.

Notification Service Error #11004

This error means the server for the Notification Service cannot be found. Select the Socket Message Window by using Alt-Tab or Ctl-Esc to bring up the Windows Tasks List. If the failure is with the initial connection to the server defined in `FNOTIF1.INI`, then the problem is in matching the server listed in `/etc/hosts` on the UNIX platform with the server declared in `\WINDOWS\FNOTIF.INI`. If the initial connection is correct but fails on the second connection, then the problem is in matching the FEMIS database EOC tables, `EOC_SERVER_NAME`, entry with the servers listed in `/etc/hosts` on the UNIX platform. Use the provided utility in `C:\FEMIS\FDATAMGR.EXE` to edit the EOC table.

7.0 System Management

This section includes information on the authorization of FEMIS users, user login, access privileges, FEMIS usage and user interface; and system manager utilities, which includes maintenance of user accounts and site profiles.

Note: FEMIS system security is provided through the FEMIS system administration utilities and is the responsibility of the system administrator.

7.1 Authorization

The purpose of authorization is to provide the FEMIS system with a means to validate user authorities as they pertain to the access of functions and information. The objective is to provide this service at the workstation level of the system architecture. This approach depends on a user profile which stipulates the user roles and information access authorities. Given this, it is possible to construct a session authorities profile. This is in turn used to configure the user interface that would limit the range of functions and information available to the specific user.

To ensure that access to information is given through proper authorization procedures, access validation works in conjunction with login, control points, and user session profiles to grant access permissions. This is implemented as a local validation engine which knows all the authorities associated with the current user's session. This engine is called upon to validate privileges required to pass beyond a control point within the user interface software. This validation matches required privileges with those of the current user. The current user's privileges are contained in a session profile which was constructed during login. Any query for validation is handled by matching the required authorities with a subset of the current user's authorities.

The control points provide a measure of control in how much information is displayed to the user at a given time. They also provide a measure of security in the access of the system. Information presentation is controlled by controlling the availability of functions at the user interface. The control points are used to enable or disable menu items, buttons, and other means that activate functions that provide data.

7.1.1 FEMIS Users

Titles, numbers, and responsibilities of EOC personnel vary from site to site. In smaller organizations, several roles are played by a single person; while in larger organizations related responsibilities may be assigned to more than one person. It is also common for many positions in the local EOC to be filled by volunteers during emergency response. The

descriptions that follow are intended to be as generic as possible. These descriptions are not comprehensive of all possible functions of an EOC. They describe functions to which FEMIS expects to make a positive contribution.

7.1.1.1 Decision Maker

This person or group of persons must rely on information provided by their staff to make decisions regarding protective action decisions, deployment of resources, and public communication. FEMIS support to decision makers will be clear presentation of information including geographic representations (maps), resource and task status information, and communication from other EOCs.

7.1.1.2 EOC Operator

On a day to day basis, this person will use FEMIS to perform (or confirm) hazard analysis, make protective action recommendations or decisions (Such decisions will have been considered and approved for this situation by the decision makers ahead of time), check resource availability, and confirm their jurisdiction's ability to respond in the pre-agreed manner.

7.1.1.3 EOC Director of Operations

In an event, this person is in charge of the EOC. While the director may not actually be touching the keys, it is important that this person be thoroughly familiar with FEMIS so that the information FEMIS is able to provide is properly used.

7.1.1.4 Communications Officer

Most EOCs currently have a person in charge of communication traffic. The communications officer's responsibilities include routing and logging of messages received by phone, fax, and radio. FEMIS will allow a more widespread access to information than was previously available. Control of this information, including assurance that the information gets to its proper destination and the information is managed to prevent overload, is an issue of concern to both the EOC personnel and FEMIS developer.

7.1.1.5 Agency Coordinator

During an emergency, representatives from other agencies such as police, fire, Red Cross, department of natural resource, and department of education come to the EOC to provide liaison between the emergency management organization and their organization. They need to provide their agency with current information in order to provide support to the emergency effort.

7.1.1.6 Planner

On a day to day basis, the emergency planners will be the most intense users of FEMIS. It is the planner's responsibility to preplan the agency's response. This response includes assessing potential hazards, writing plans, arranging for availability of resources, and coordinating plans with other responding agencies. During response to an emergency, the planners can be expected to use FEMIS (because of their in-depth knowledge of the system) to obtain the information requested by decision makers in the EOC.

7.1.1.7 Training/Exercise Coordinator

This person is in charge of ensuring that members of their agencies are trained appropriately for their responsibilities. One training method often used in emergency management that must be supported by FEMIS is to "exercise" response to a specific hazard under specified conditions.

7.1.2 User Login

Users logging in are identified by their user ID and password, which are predefined in the FEMIS database by the system administrator. When users login at a FEMIS workstation, they are asked for their user ID and password. This is validated against the database, and a session is established.

Figure 7.1. User Login Sequence

The database uses the user ID to retrieve the privileges defined for this specific user. This set of privileges is forwarded to the workstation where it is kept as part of the user's session. When the FEMIS software is initialized after a successful login, the session privileges of the current user disable certain access to functions in the user interface.

Figure 7.2. User Session Construction

7.1.3 Privileges

Applications executed by the current user programmatically validate access privileges through the use of control points. Control points define and validate the privileges required to pass beyond the current point in the user interface. Other information, accessible through functions, can be further restricted based on the user's information access privileges. Access privileges are provided to grant or deny the viewing and/or changing of the information held in the FEMIS system. The four categories of privileges are Use, Browse, Edit, and Create, and they are in an ordered precedence relationship. This means that a Use privilege is a singular privilege, while Edit subsumes Browse and Use privileges. Create is therefore the highest privilege and subsumes all others.

Privilege Guidelines:

1. Each mode listed below has a set of privileges
 - real_world/operations
 - real_world/planning
 - exercise/operations
 - exercise/planning
 - exercise_control.

2. The privileges established for a user in the Planning mode are applicable to ALL planning.
3. The privileges established for a user in the Exercise mode are applicable to ALL exercises.
4. Privileges are hierarchical in that a user with Edit privileges will be able to Browse the information and Use the subsystem and/or module. The user will be able to have the following privileges for each FEMIS decision control point:

Use - Allows the user access to the subsystem or module, but this user may not have direct access to information. Whatever limited functionality to information exists for this user is indirectly supported.

Browse - Allows the user to view data directly but cannot edit any viewed records. Subsumes Use.

Edit - Allows the user to view data directly and modify any viewed records. Subsumes Use and Browse.

Create - Allows the user to create new data records and can read or edit any records already written. Subsumes Use, Browse, and Edit.

5. There are cases where the linear precedence relationship among the privileges will not be adequate. These cases will be documented and handled on a case-by-case basis.

7.1.4 FEMIS Usage

Permission to display information to the current user must be validated. Any interaction with the displayed information must likewise be validated and could be manifested as disabled or enabled menu items or other controls. During the course of using the FEMIS system, the user will access functions provided by the user interface. Whenever a control point is encountered, a check with the user session is made to ensure valid access to the information. If valid, the user's privileges are used to configure the next window prior to its display. Appropriate buttons and other controls are disabled according to the current user's privileges as stipulated by the session. The system will propagate the authorities for the functions and authorized information in whatever form is compatible with the ultimate provider of the functions and information (e.g., the FEMIS database). The objective is to provide a user with enough capabilities at the user interface to permit effective performance of the emergency management roles and to protect others from unexpected results.

Figure 7.3. Final Operational Configuration

7.2 System Administration Utilities

The system administration utilities of the FEMIS software provide functionality to define and modify user accounts, the site profile, and clear database locks. This portion of the document will provide instructions for the operation of the system administration utilities of the FEMIS software.

7.2.1 User Accounts

The FEMIS client software supports, among other functions, the maintenance of user accounts. The System Manager tool is used for this purpose and is available at the top-level menu bar from the Utilities menu.

After you select System Administration from the Utilities pull-down menu, a small System Administration screen similar to the following example will display.

Click the Site Profile button to edit the EOC objectives and to Define Positions.

Click the User Accounts button to add a new user, delete a current user, or update information about users. The following User Accounts screen will display. The User Accounts screen is divided into five steps.

A screenshot of the "User Accounts" screen, which is divided into five steps. Step 1: "Select User" with a text box and a dropdown arrow. Step 2: "User's Accounts" with a "Select ID" button, a text box, and a dropdown arrow, and "User Account ID" with a text box. Step 3: Radio buttons for "Add/Change Account", "Delete Account", "Enable Account", and "Disable Account". Step 4: "Enter Password" and "Reenter to Confirm" with two text boxes. Step 5: "Assign Privileges" with a button. At the bottom are "Save", "OK", and "Cancel" buttons.

Follow the steps marked on the screen.

For example, to add a user, perform the following procedures.

7.2.1.1 Step 1

1. Click on the **Select User** button. From the drop-down menu, select the **New User** option at the top of the list, or select the name of a current user. To find the user name faster, type in the first letter of the user's last name.

2. Selecting <New User> will start the Add a Person function of the personnel database. The Add a Person screen will display.
3. Fill in the pertinent information about the new user and click the OK button. The User Accounts window will redisplay with the name of the new person in the User's Accounts field.

Note: To delete a user, open the Personnel database and delete the user.

7.2.1.2 Step 2

1. Click the **Select ID** button and select **New Account** from the User's Accounts drop-down menu. The User Account ID must be unique, alpha/numeric with only lower case characters and a length of seven characters. Users can have as many accounts as necessary. When you click on **Select ID**, a list of accounts for the user designated in Step 1 will be added to the User's Accounts drop-down list. As in Step 1, the first item on the list is **New Account** and is followed by the established accounts for this user, if there are any.
2. After selecting **New Account**, the User Account ID field is enabled. Enter a new and unique ID for a new account. All characters entered will be displayed in only lower case because that is how they will be stored. Press the Tab key to indicate that you have finished entering the the account ID. If you choose a non-unique user ID, the system will alert you and move you back to the User Account ID entry box. Once you have entered a unique user ID, the User Account ID entry box will be disabled, and Steps 3, 4, and 5 will be enabled.

If you select an already established Account ID, the ID will be entered into the User Account ID entry box and Steps 3, 4, and 5 will be enabled.

You can return to Step 2 at any time by clicking on the **Select ID** button. You will be prompted to save the information entered so far.

If you click the **Select User** button after completing Step 2, you will be prompted to save the information entered so far.

Users will be able to log in using upper and lower case characters as the login window will convert the login ID to lower case characters.

7.2.1.3 Step 3

The screenshot shows a window titled "Step 3" with a border. Inside, there are two columns of radio button options. The left column has "Add/Change Account" (selected) and "Delete Account". The right column has "Enable Account" (selected) and "Disable Account".

1. Select whether you want to add/change, delete, enable, or disable the account. When Step 3 is enabled, the default is **Add/Change Account**. If the account was an established account that had been disabled, then **Disable Account** will be selected, otherwise the default is **Enable Account**.
2. Unless you want to delete or disable the account, no action is necessary. If you choose **Delete Account** for a new account, a message box will display advising that you cannot delete a new account. If you are in the process of adding a new account and have changed your mind, click on the **Cancel** button rather than the **Delete Account** button.

When account information is being saved to the database, a temporary account status of "changing" is recorded. Once all of the account information is saved, the indicated account status is recorded. Should the database or FEMIS software fail during the account information update, the status of "changing" may remain in the database as the account status for that user. If this occurs, the user will not be able to login because the account status is not enabled, and when modifying the user's account, the software will advise you that the account status is changing and will query you to correct the status to **Enabled**. Answer **Yes** to modify the account status to **Enabled** and reenter all of the account information since it may have been lost from the previous session.

7.2.1.4 Step 4

A screenshot of a software window titled "Step 4". Inside the window, there are two labels: "Enter Password:" and "Reenter to Confirm:". To the right of these labels is a single-line text input field.

1. Passwords are required for all accounts. If you are modifying an existing account's privileges or status, but do not want to change the account password, no action is necessary in Step 4.
2. If you are entering a new account or modifying an existing account's password, enter the password in the Enter Password field and the Reenter to Confirm field of Step 4.

Note: The encryption of some passwords creates unacceptable strings for use in the FEMIS software. If you enter a password where the encrypted form cannot be accepted by FEMIS, you will be prompted to enter a different password.

7.2.1.5 Step 5

A screenshot of a software window titled "Step 5". In the center of the window is a button labeled "Assign Privileges...".

1. Click the Assign Privileges button. The Set Privileges screen will display.

The user information you entered or previously selected will be displayed in the User Information fields. User's positions are defined in the Add Person module of the personnel database. Any positions assigned to the user will be displayed in the User's Positions list.

2. When this screen displays, <all> available control points (privileges) and their descriptions are displayed in the checkbox grid. The current privileges given to the user for each control point is shown as a red check in the applicable checkbox for each mode.

To view only the control points assigned to a specific position and the level of privileges given as the default for that position, select the position from the Default Position Privileges drop-down list. The grid will then display only those control points that have privileges assigned for that position. The level of privilege assigned to the position is indicated by an x next to the applicable checkboxes. The actual privileges assigned to the current user still display as a red check in the checkbox. To again view all of the possible privileges, select the <all> option from the Default Position Privileges drop-down list.

3. Use the drop-down menus in the Copy Privileges From section of the screen to copy the privileges of a selected Position(s) and/or User(s) to the account. You can copy privileges from a position and another user simultaneously. You can also

select the mode(s) you want the privileges to be copied to from the To Mode drop-down list. Click the Copy button to copy the privileges from the position(s) or user(s) selected.

	Control Point	Description	Use	Edit	Create	Delete
1						
2	CM Misc	Miscellaneous Case Manag	☒	☒	☒	☒
3	CM Repair	Repair Case Management	☐	☐	☐	☐
4	CM Update	Update Case Management	☐	☐	☐	☐
5	EP Plan	Controls access to election	☐	☐	☐	☐
6	EX Create	Main process to create exe	☐	☐	☐	☐
7	EX Delete	Control to allow deletion of	☐	☐	☐	☐
8	IM Fac_mgt	Controls facility manager	☐	☐	☐	☐
9	IM Pers_mgt	Controls personnel manager	☐	☐	☐	☐
10	IM Resourc_mgt	Controls Resource Definitio	☐	☐	☐	☐
11	M.EVAC Create	Control Point for creating a	☒	☒	☐	☐

4. Copy each applicable position's privileges that have the necessary privileges for the account being set up or modified. The position privileges are defined in the Site Profile section of this document.
5. Select the appropriate level of permission for each privilege name. Create is the highest level of permission while Use is the lowest. The highest to lowest permissions are as follows: Create, Edit, Use, and Browse. Create enables you to create, edit, browse and use the files. Edit means you can open, edit, browse, and use the files. Use means you can read and use the files for other activities, but you cannot save, edit or delete them. Browse means you can only read the files.

Note: See the online Help for more information on modes and phases.

6. Click the Save button to save your privilege settings and the User Accounts screen will redisplay. To exit without saving the settings, click the Close button.
7. Click the OK button to save the account information and the System Administration menu will redisplay. To save the account information and remain at the User Accounts screen, click the Save button. To exit without saving the settings, click the Cancel button.
8. The system will display a message similar to the following: Account Information Saved. Click the OK button. The System Administration screen will redisplay.

7.2.2 Site Profile

The FEMIS client software supports, among other functions, the maintenance of site profiles. The System Manager tool is used for this purpose and is available at the top-level menu bar from the Utilities menu. After selecting System Administration from the Utilities pull-down menu, the System Administration screen will display.

After you click the Site Profile button in the System Administration screen, the Site Profile screen will display. From this screen you can define EOC Objectives, and Define Positions. You must have the correct privileges to edit the Site Profile.

Click on the EOC Objectives button to display the EOC Objective Settings screen.

7.2.2.1 EOC Objectives

The EOC Information displayed in the upper half of the screen is view only and cannot be changed from this screen.

The EOC Policy Settings can be edited and changed to reflect the policy of your EOC. Change the various times, description, and dosage level as required. To save the changes, click the OK button. To exit without saving, click the Cancel button.

7.2.2.2 Define Positions

From the Site Profile screen click on the Define Positions button. The Define Positions screen will display. To define positions, perform the following procedures.

1. The Edit Positions screen enables you to Add Position and Delete Position, and to Assign Privileges to positions.
2. To add a position, click the Add Position button. The Select a Position to Add screen will display. Select a position from the Available Positions list, or type in a new position code and position name in the Create a New Position section. Click the Create New Position button to add the new position to the Available Positions list. After adding the position, highlight the position in the Available Position list, then click Add to add the position to the EOC's list of defined positions. Click the Close button to return to the Define Positions screen.

3. Select the position from the Positions Listed for This EOC list. The position will display in the Current Position field. Type the position E-mail Address, Phone, and Description in the fields available. Click the Assign Privileges button to assign privileges to the new position.
4. The Set Privileges screen will display with the name of the selected position in the Position Information Name field. You can view the default privileges for existing positions by selecting a position from the View Privileges As Default Position Privileges drop-down list.
 - A. Select the level of privileges for each privilege by clicking on the check boxes under the type of privilege you want. The available privileges are Use, Browse, Edit, and Create (lowest to highest level).
 - B. You can also elect to copy privileges from a Position or User by selecting from the drop-down lists at the bottom of the screen. Click the Copy button to copy the privileges over to the new position. These will display as red checks in the privilege grid.
5. Click the Save button to save the privileges and return to the Edit Privileges screen. Click Reset to reset the privileges to any preexisting defaults. Click Clear All to remove all privileges. Click Close to return to the Define Privileges screen.
6. Click OK or Cancel to close this screen and return to the Site Profile screen.

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