

Federal Emergency Management Information System (FEMIS)

Bill of Materials (BOM)

for

FEMIS Version 1.5

October 26, 2001

Prepared for the US Department of Energy
under Contract DE-AC06-76RLO 1830

Acknowledgment

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Government-Off-The-Shelf (GOTS) Software Products

FEMIS integrates the following government-furnished software products.

D2PC (February 2000) US Army SBCCOM

PARDOS 3.1 (May 1997) US Army SBCCOM

Evacuation SIMulation Model (ESIM 2.1f1.3) Oak Ridge National Laboratory (ORNL)



FEDERAL EMERGENCY MANAGEMENT INFORMATION SYSTEM (FEMIS)

BILL OF MATERIALS (BOM)

for

FEMIS Version 1.5

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Contents

- 1.0 Introduction 1
 - 1.1 Point of Contact 2
 - 1.2 FEMIS Changes at a Glance 2
 - 1.3 Further Software and Hardware Information 2

- 2.0 Hardware Requirements 5
 - 2.1 UNIX Server 5
 - 2.1.1 Recommended Hardware Configuration 5
 - 2.1.2 Examples of Sun Systems 6
 - 2.1.2.1 Sun Enterprise 250 6
 - 2.1.2.2 Sun Enterprise 450 7
 - 2.1.3 Maintenance for Solaris Software and Sun Hardware 8
 - 2.1.4 Sun Y2K Validation Tools 8
 - 2.2 PC Client Workstation 8
 - 2.3 Stand-Alone FEMIS PC Workstation 9
 - 2.4 Remote Evacuee Registration Hardware 9
 - 2.5 Other Supporting Hardware 9

- 3.0 Software Requirements 11
 - 3.1 Server Software 11
 - 3.2 PC Client Software 12
 - 3.3 Stand-Alone FEMIS PC Software 13
 - 3.4 Remote Evacuee Registration Software 13
 - 3.5 E-mail Standards 14
 - 3.5.1 Required 14
 - 3.5.2 Strongly Recommended 14
 - 3.5.3 Existing System 15
 - 3.6 COTS on CD 15

- 4.0 Telecommunications 16
 - 4.1 Remote Access Servers 16

- 5.0 Computer Networks 17

Acronyms and Definitions

BOM	Bill of Materials
COTS	commercial-off-the-shelf
CPU	central processing unit
CSEPP	Chemical Stockpile Emergency Preparedness Program
DEI	data exchange interface
E-mail	electronic mail
EOC	Emergency Operations Center
ESIM	Evacuation SIMulation, part of Oak Ridge Evacuation Modeling System
ESMTP	SMTP for E-mail
ESRI	Environmental Systems Research Institute, Inc.
FEMIS	Federal Emergency Management Information System
GB	gigabyte–billion bytes
GIS	geographic information system
IMAP	Internet Message Access Protocol
IRZ	Immediate Response Zone
JIC	Joint Information Center
kbps	kilobit per second
kVA	kilovolt per ampere
LAN	local area network
LDAP	Lightweight Directory Access Protocol
MB	megabyte–million bytes
MB/s	megabytes per second
MHz	megahertz
MIME	Multipurpose Internet Mail Extensions
mm	millimeter
NFS	Network File System
ODBC	Open Database Connectivity
PAZ	Protective Action Zone
PC	personal computer
PNNL	Pacific Northwest National Laboratory
POP	Post Office Protocol
PPP	Point to Point Protocol
RAID	Redundant Array of Inexpensive Disks
RAM	Random Access Memory
RAS	Remote Access Service
RDBMS	relational database management system
RER	Remote Evacuee Registration
rpm	rotations per minute
SMTP	Simple Mail Transfer Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
UPS	uninterruptable power supply
UNIX	Generic name for the server operating system
UUENCODE	Unix-to-Unix Encode
WAN	wide area network
Y2K	Year 2000

1.0 Introduction

This document describes the hardware and software required for the Federal Emergency Management Information System version 1.5 (FEMIS[©] v1.5)^(a) released by Pacific Northwest National Laboratory (PNNL)^(b). Information included in this document about hardware and software requirements is subject to change.

FEMIS is designed for a single Chemical Stockpile Emergency Preparedness Program (CSEPP) site that has multiple Emergency Operations Centers (EOCs). Each EOC has 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 a wide area network (WAN).

A UNIX server provides a platform to support the Oracle relational database management system (RDBMS), ARC/INFO geographic information system (GIS) capabilities (optional), basic file management services, the evacuation model (ESIM), the data exchange interface (DEI), and the notification service.

FEMIS is a client/server system where much of the application software is located on the client PC. This client software includes the FEMIS application, government furnished dispersion model, and commercial-off-the-shelf (COTS) software applications, including ArcView GIS and Oracle.

Several configurations are possible at a CSEPP site. In this document, a site is understood to include several installations of FEMIS, including the depot, surrounding Immediate Response Zone (IRZ) and Protective Action Zone (PAZ) counties, and one or more state EOCs. In general, the main differences between possible configurations are the numbers of PC workstations at an installation, the location of the UNIX server(s), and the WAN links between installations.

FEMIS v1.5 can also be operated on an isolated PC workstation and is then referred to as “stand-alone” FEMIS. See Section 3.3, Stand-Alone FEMIS PC Software for more information.

FEMIS v1.5 also includes a remote evacuee registration capability. This dial-in tool will allow shelters to register evacuees at the shelter location and do a batch update of the information to the FEMIS database. Additional hardware and software required for this capability are described in the following sections of this document.

The remainder of this section lists PNNL’s Point of Contact for this document, software applications and version changes for FEMIS v1.5, and a reference section for software and hardware that can be used with FEMIS.

Section 2.0 discusses hardware requirements, including UNIX servers, PC client workstations, stand-alone PC workstations, Remote Evacuee Registration (RER) hardware, and other supporting hardware.

(a) FEMIS software was copyrighted in 1995 by Battelle.

(b) Pacific Northwest National Laboratory is operated for the US Department of Energy by Battelle under Contract DE-AC06-76RLO 1830.

In Section 3.0, the software requirements for the server, PC client, stand-alone FEMIS PC, and RER are described. This section also includes a discussion regarding electronic mail (E-mail) standards and the COTS CD that is available from PNNL.

Section 4.0 discusses telecommunications.

Section 5.0 discusses computer networks.

1.1 Point of Contact

If you have questions or need additional copies of this document, please contact

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1.2 FEMIS Changes at a Glance

The following table compares the software applications and versions that have changed for FEMIS v1.5.

COTS Software		
Server Software	FEMIS v1.4.7	FEMIS v1.5
Sun Microsystems Solaris	Solaris 7 (listed as 2.7 in BOM v1.4.7)	Solaris 7 or 8
PC Client Software		
Oracle Client	Net8 Client 8.1.5	Net8 Client 8.1.6
Oracle ODBC Driver	8.1.5.5	8.1.6
Microsoft Windows	Microsoft Windows NT Workstation 4.0 (CD edition)	Microsoft Windows 2000 Professional or Windows NT 4.0 Workstation

The following COTS software applications are no longer needed for FEMIS:

- Microsoft Project 98 and Service Release 1
- NFS Maestro
- Solstice NFS Client
- SUNWpcnfd

1.3 Further Software and Hardware Information

The following table lists references for software and hardware that can be used with FEMIS.

Required Software

Software Application	Software Company	Website Address
ArcView GIS	ESRI (Environmental Systems Research Institute, Inc.)	www.esri.com
Microsoft Windows 2000 Professional or Microsoft Windows NT 4.0 Workstation	Microsoft Corporation	www.microsoft.com
Oracle	Oracle Corporation	www.oracle.com
Samba	Samba Team (open source project)	www.samba.org
Solaris	Sun Microsystems, Inc.	www.sun.com

Optional Software

Software Application	Software Company	Website Address
ARC/INFO	ESRI	www.esri.com
Microsoft Office	Microsoft Corporation	www.microsoft.com

Telecommunications Hardware Suppliers

Hardware Supplier	Website Address
3Com	www.3com.com
Cabletron Systems	www.cabletron.com
Cisco	www.cisco.com
MultiTech Systems	www.multitech.com
Nortel Networks	www.nortelnetworks.com
US Robotics	www.usr.com

2.0 Hardware Requirements

To successfully run FEMIS, the following minimum UNIX server and PC client workstation hardware must be present.

2.1 UNIX Server

FEMIS v1.5 has been installed and tested on Sun SPARC systems running either Solaris 7 or 8 operating systems. Because it is not feasible to test the software on all hardware, it is recommended that you use like hardware. This section includes the minimum and recommended hardware and configuration requirements needed to properly run FEMIS as well as examples of systems that are available from Sun. Solaris Software and Sun Hardware maintenance and Sun Y2K validation tools are also discussed.

2.1.1 Recommended Hardware Configuration

The table below lists the recommended system hardware and configuration for using FEMIS. If applications other than the FEMIS database and software are being used, the applications should be evaluated for system resource usage, and the system should be upgraded accordingly.

Hardware	Notes
UltraSPARC II or III CPU Modules 250 MHz or better	
Main memory 256 MB per CPU	Oracle performance is greatly enhanced with additional memory.
Network interfaces 10/100 baseT	Evaluate your local network for compatibility.
System disk 4 GB	Preferably mirrored for redundancy.
Internal mass storage 1 Sun CD drive	Sun servers come with a CD-ROM drive.
External/Internal mass storage 3 or more physical disks using RAID configurations 18 GB or more of total formatted disk space 10,000 rpm or faster SCSI disks	RAID 1 or 10(1 + 0) will lose half of its physical disk space to redundancy, but it will have better performance than a RAID 5. The RAID 5 loses one of the physical disks for parity.
External backup drive Backup device should handle system capacity uncompressed and allow for system expansion.	

2.1.2 Examples of Sun Systems

The Sun Enterprise 250 and 450 and other Workgroup servers can meet the recommended server hardware and configuration requirements. High-end and mid-range servers can also be appropriate if more powerful systems are desired.

2.1.2.1 Sun Enterprise 250

The configuration for the Sun Enterprise 250 is listed below.

Sun Enterprise 250	Notes
<p>Processor</p> <p>1 or 2 UltraSPARC II processors</p>	
<p>Main memory</p> <p>256 MB or more</p>	<p>Recommend larger amount of memory (512 MB to 1.0 GB) for systems utilizing two processors.</p>
<p>Standard Interfaces</p> <p>1 Integrated 10/100 Ethernet</p> <p>2 separate PCI buses supporting 4 slots</p> <p>3 PCI slots for 32/64 bit 33 MHz 5v cards</p> <p>1 PCI slot for 32/64 bit 33- or 66-MHz 3.3v cards</p> <p>2 EIA232D/423 serial ports</p> <p>2 MB/s Centronics compatible EPP (parallel) port, DB25</p> <p>1 40-MB/s Ultra SCSI-3 bus for internal disk</p> <p>1 40-MB/s fast/wide SCSI-3 bus for external disk</p>	<p>For more details, see Sun's web site (http://www.sun.com/servers/workgroup/250).</p>
<p>Internal mass storage</p> <p>4 18 GB disk drive for operating system and data</p> <p>1 additional power supply for redundancy</p> <p>1 32X CD-ROM drive</p> <p>1 3.5-in. floppy drive</p>	<p>Disk storage capacity requirements are a function of the size of the installation database and the number of EOCs supported by the data server.</p> <p>Note: RAID configuration can be accomplished using Sun's DiskSuite software that is included with Solaris 7 and 8 media.</p> <p>Sun servers come with a CD-ROM drive.</p>
<p>External mass storage</p> <p>Optional:</p> <p>Mass storage option Sun StorEdge A1000</p>	<p>Note: StorEdge A1000 requires an additional differential SCSI controller, Part # X6541A.</p> <p>Note: The StorEdge A1000 disk array is a dual Ultra SCSI (2x40 MB/s) interface. It is not a Fibre Channel interface.</p>

Sun Enterprise 250	Notes
External backup device 1 72 GB 4 mm DDS-3 Autoloader 1 68 pin-68 pin SCSI cable	DDS-3 Autoloader is capable of handling six 12 GB 4 mm tapes. Under compression, 6x24 GB (144 GB) may be achieved.
Console 1 17 or 21 in. color monitor 1 Integrated PGX graphics card	

2.1.2.2 Sun Enterprise 450

The configuration for the Sun Enterprise 450 is listed below.

Sun Enterprise 450	Notes
Processor 2 or more (maximum of 4) UltraSPARC II processors	
Main memory 512 MB to 4 GB	
Standard interfaces 1 Integral 10/100 Ethernet 6 separate PCI buses 3 PCI for 33 or 66 MHz 3.3v cards 4 PCI 64 bit 33 MHz 5v cards 2 EIA232D/423 serial ports 1 2 MB/s Centronics compatible EPP (parallel) port, DB25 1, 3, or 5 40 MB/s UltraSCSI-3 buses for internal disks (See notes on Internal mass storage) 1 20 MB/s Fast/Wide SCSI-2 bus for CD-ROM and tapes; 8 pin external connector	The PCI connections support combinations of 32/64 bit, 33/66 MHz, and 3.3v/5v PCI cards. For more details, see Sun's web site (http://www.sun.com/servers/workgroup/450).
Internal mass storage 2 18 GB disk drive for operating system 8 18 GB disk drives for data 1 8 bay internal storage expansion kit 1 additional power supply 1 DVD/CD-ROM 1 3.5-in. floppy drive	The internal storage expansion kit and the additional power supply are required to support the 10 data disk drives. 8x18 GB disks will provide 2 – 4 disk RAID5s at 36 GB RAID 1+0 or 52 GB RAID 5. You may also consider purchasing 1 additional drive for hot swap.

Sun Enterprise 450	Notes
<p>Optional:</p> <p>1 X6602A SRC-P PCI Intelligent SCSI RAID controller</p>	<p>Note: RAID configuration can be accomplished using Sun's DiskSuite software that is included with Solaris 7 and 8 media.</p> <p>Note: Hardware RAID can also be accomplished with the addition of a SRC-P PCI Intelligent SCSI RAID controller card; however, the DiskSuite software must still be used to manage the RAID configuration. Using hardware to perform RAID functions can improve performance.</p> <p>Sun servers come with a CD-ROM drive.</p>
<p>External backup device</p> <p>1 72 GB 4 mm DDS-3 Autoloader</p> <p>1 68 pin-68 pin SCSI cable</p>	<p>DDS-3 Autoloader is capable of handling six 12 GB 4 mm tapes. Under compression, 6x24 GB (144 GB) may be achieved.</p>
<p>Console</p> <p>1 17 or 21 in. color monitor with integrated PGX graphics card</p> <p>1 cable</p>	

2.1.3 Maintenance for Solaris Software and Sun Hardware

For Solaris software and Sun hardware, PNNL recommends that sites obtain a Silver Maintenance contract. Each hardware and software item is a line item that is a costed item. The contract should be written to cover the following items: your EOC's CPU, disk arrays or StorEdge MultiPack, and disk management software. Equipment (such as CD-ROM drive, disks, or monitors) is considered as part of the CPU.

2.1.4 Sun Y2K Validation Tools

To validate your older Sun products for Y2K compliance, you can download Sun's tool set, which is free. SunScan 2000 compares existing Sun hardware, operating systems, and middleware to a list of Sun products that have been tested for Y2K compliance. Instructions and software are available at <http://www.sun.com/y2000/sunscan>.

2.2 PC Client Workstation

The PC client platform is the Pentium-compatible PC. The following table lists the recommended PC configurations to be considered for current procurement.

Recommended PC Configuration
600 MHz or better
512 MB RAM and 256 MB RAM for each CPU after two CPUs
10 GB hard disk or more
8X or better CD-ROM drive
Ethernet Adapter card or equivalent (100 MB/s or better, 10/100BaseT or better)
Color VGA monitor (SVGA capable) with 1024 x 768 resolution
Standard 101 keyboard
Mouse

2.3 Stand-Alone FEMIS PC Workstation

The stand-alone FEMIS PC workstation also uses a Pentium-compatible PC. The minimum configuration is similar to the recommended configuration for a PC client workstation (see Section 2.2, PC Client Workstation). A recommended configuration would have 256 MB RAM or better. It is also important to remember that the Oracle software application and FEMIS database uses approximately 2 GB of additional space above a standard FEMIS client system.

2.4 Remote Evacuee Registration Hardware

The Remote Evacuee Registration (RER) tool can be installed on the minimum PC configuration (see Section 2.2, PC Client Workstation) or better. If dial-up capabilities are desired, a 28.8 kbps or better modem is also required in addition to the minimal PC configuration. For more information, see Section 4.0, Telecommunications.

2.5 Other Supporting Hardware

For FEMIS v1.5, PNNL recommends the following supporting hardware.

Supporting Hardware	Notes
Network hardware including Nortel Networks, Cabletron, or Cisco routers	
Printer (HP LaserJet, color printer, or other LAN-compatible printer)	
Screen projection hardware compatible with a PC client workstation (optional)	Screen projection hardware must have a minimum of 800 x 600 resolution.

Supporting Hardware	Notes
Uninterruptable power supply (UPS) of sufficient capacity to operate the EOC system for a length of time acceptable to installation management	<p>Individual EOCs should calculate their power needs based on their existing and planned hardware and may elect to purchase a larger or smaller UPS accordingly.</p> <p>For example, an EOC with 1 data server and 25 PC clients (including a communications server if used) might have a UPS rated between 40 kVA and 50 kVA.</p>

3.0 Software Requirements

The following sections discuss the software requirements for FEMIS v1.5. For recommended patches, see Technical and User Support at our web site (<http://www.pnl.gov/femis>).

3.1 Server Software

The following table includes information about data server software configuration and maintenance recommendations.

Data Server Software Configuration	Maintenance Contract Recommendations	Notes
Sun Microsystems Solaris 7 or 8	See Section 2.16	For recommended patches, see our web site (http://www.pnl.gov/femis/tech/solar78.htm)
Oracle8i EE Release 2 (8.1.6) for Sun SPARC Solaris Oracle Patches: p8162 p1859778 (Oracle Listener)	1) phone-in software support or 2) phone-in software support and software upgrades.	Oracle licenses for the server are sold in sets. Purchase the number of licenses to match the number of user PCs that will connect to the server. FEMIS has been tested using both patches (p8162 and p1859778).
Samba 2.0.6	Not applicable—public domain, see www.samba.org (Samba Team).	Samba is open source software distributed under the GNU General Public License, Version 2, June 1991.
E-mail application	Application dependent	Any E-mail application meeting the requirements in Section 3.5, E-mail Standards.
FEMIS Server Application Set Evacuation SIMulation Model, ESIM 2.1f1.3	Not applicable	Distributed with FEMIS.
Perl 5.004-04	Not applicable—public domain, see www.perl.org (Larry Wall, author).	Distributed with FEMIS and needed to run AutoRecovery and Data Driven Notification.
Apache HTTP Web Server 1.3.12	Not applicable—public domain, see www.apache.org (Apache Group).	Distributed with FEMIS and needed to run the AutoRecovery WEB interface.
Network time synchronization protocol 3.4y (Sun v11.7.0)	See Section 2.16	Network Time Protocol is distributed with Solaris 7 and 8 operating systems.

Data Server Software Configuration	Maintenance Contract Recommendations	Notes
ARC/INFO 7.1.2 or later (optional)	Optional	Optional

3.2 PC Client Software

The following table includes information about PC client software configuration and maintenance recommendations.

PC Client Software Configuration	Maintenance Contract Recommendations	Notes
Microsoft Window 2000 Professional with Service Pack 2 or Windows NT 4.0 Workstation with Service Pack 6a	Maintenance contract may be available from PC vendor.	Microsoft Windows 2000 with Service Pack 2 is the preferred operating system. Windows NT 4.0 with Service Pack 6a will continue to be supported.
Oracle Net8 Client 8.1.6	Maintenance is included as part of the server software maintenance contract.	Oracle Net8 Client 8.1.6 is included with the Oracle server license.
ArcView GIS 3.1.1	No additional maintenance contract is needed.	PNNL's initial testing indicates FEMIS v1.5 will work appropriately with ArcView 3.2; however, PNNL has not extensively tested ArcView 3.2. For sites with ortho-photo maps or other large compressed images, ArcView 3.2 is recommended.
FEMIS Client Application Set	Not applicable	The Dispersion Model (D2PC [February 2000]) and the Dose/Time Model (PARDOS [May 1997]) are part of the FEMIS Client Application Set.
Network time synchronization protocol xntp3 5.90.3	Not applicable--public domain	Installed with the FEMIS software.
Network Monitor for Windows A17 95.03.11	Not applicable--public domain	Included in the FEMIS Tools as WS Network Monitor.
Oracle ODBC Driver 8.1.6	Maintenance is included as part of the server software maintenance contract.	Installed with Oracle Net 8 Client.
E-mail Application	Application dependent	Any E-mail application meeting the requirements in Section 3.5, E-mail Standards.

PC Client Software Configuration	Maintenance Contract Recommendations	Notes
Microsoft Office (optional)	No additional maintenance contract is available from vendor.	Includes Microsoft Excel, PowerPoint, and Word.
Word processor (optional)	Application dependent	Corel WordPerfect or Microsoft Word

3.3 Stand-Alone FEMIS PC Software

A PC may be configured to run FEMIS as a stand-alone PC. In this configuration, there is no connection to the server database, and no information is exchanged with any other user. The FEMIS application and the Oracle databases are installed on the stand-alone PC. A network connection is only required during the setup when FEMIS files are loaded on the stand-alone PC. Once the setup is complete, the network may be disconnected.

The software required for a stand-alone PC is the same as that listed in Section 3.2, PC Client Software, with the exception of an Oracle product—either Oracle8i Standard Release 2 (8.1.6) for Windows NT/2000 or Personal Oracle Release 2 (8.1.6) for Windows NT/2000. Oracle Enterprise Edition contains more capability (and is consequently more expensive) than FEMIS requires.

If you are purchasing either product, please contact us for the latest information (see Section 1.1, Point of Contact).

Stand-Alone PC Client Software	FEMIS v1.5	Notes
Oracle Workgroup Server or Personal Oracle	Oracle8i Standard Release 2 (8.1.6) for Windows NT/2000 or Personal Oracle Release 2 (8.1.6) for Windows NT/2000	
Oracle Patch	Oracle 8i Patch Set 8.1.6.3	Available on the COTS CD.

3.4 Remote Evacuee Registration Software

The Remote Evacuee Registration (RER) tool uses all of the software products listed in Section 3.2, PC Client Software, except ArcView GIS, network time synchronization, and an E-mail application. The following table lists the software for the PC Client and how the RER tool uses it.

Remote Evacuee Registration Software	Notes
Microsoft Windows 2000 Professional	The FEMIS RER software runs on Windows environment.
Oracle Net8 Client v8.1.6	The RER attaches to the FEMIS database for a short period of time to download and upload information to

Remote Evacuee Registration Software	Notes
	support evacuee registration.
FEMIS Client Application Set	The FEMIS Client Application Set must be installed to ensure that all of the supporting software is loaded onto the PC. The GIS files do not need to be installed.
Oracle ODBC Driver v8.1.6	The Oracle driver is used to connect to the FEMIS database during download and upload of evacuee information. It is also used during the offline entry of evacuee and tracked person information.

The FEMIS RER tool also requires a PPP (Point to Point Protocol) link, such as the Remote Access Services (RAS) components of Windows 2000. RAS has to be turned on for the PC using RER. Additionally, this tool requires a server software package (such as Solstice PPP) to be installed on the FEMIS UNIX server. For more information on the UNIX configuration, see Section 4.0, Telecommunications.

3.5 E-mail Standards

Electronic communication and the exchange of electronic documents for collaborative purposes is an increasingly critical form of communication. In the past, GroupWise 4.1 (a Novell, Inc. product) was the recommended E-mail application for FEMIS. For FEMIS v1.5, PNNL does not recommend a specific E-mail application; however an E-mail package is still required.

The E-mail application your site chooses should meet specific standards listed below, which are separated into two categories—required and strongly recommended. An existing system and future trends are also discussed.

3.5.1 Required

ESMTP/SMTP (Extended Simple Mail Transfer Protocol) is capable of sending E-mail messages between multi-user servers.

3.5.2 Strongly Recommended

MIME (Multipurpose Internet Mail Extensions) compatible. MIME is a specification for formatting non-ASCII messages (such as graphics, audio, and video) so they can be sent over the Internet. In addition, MIME supports messages in character sets other than ASCII.

IMAP4 (Internet Message Access Protocol, version 4) retrieves E-mail messages. IMAP4 is similar to POP3 (Post Office Protocol, version 3) but includes the following additional features:

- Searches through E-mail messages for keywords while the messages are still on the E-mail server. Users can then choose which messages to download to their machine.
- Fetches individual parts of a MIME message.
- Support for remote folders.
- Includes superior disconnected/remote user functionality.

UUENCODE (Unix-to-Unix Encode) is a set of algorithms that converts files into 7-bit ASCII characters suitable for transmitting over the Internet. UUENCODE is used to transfer files between different platforms (such as UNIX, Windows, and Macintosh) and is very popular for sending E-mail attachments.

LDAP (Lightweight Directory Access Protocol) is a set of protocols for accessing information directories. LDAP is based on the standards contained within the X.500 standard but is significantly simpler. LDAP supports TCP/IP, which is necessary for any type of Internet access. Because it is an open protocol, applications need not worry about the type of server hosting the directory.

3.5.3 Existing System

Several EOCs are using POP3, which allows a workstation to retrieve E-mail that the server is holding for it. Once the E-mail is downloaded, it is deleted from the server.

3.6 COTS on CD

Through an agreement with the COTS providers, PNNL has created a CD with a copy of the appropriate version of the PC client COTS software. The COTS CD allows users to install the COTS software prior to their initial FEMIS installation, and it is available from PNNL.

The COTS CD will make the installation of these applications easier. The COTS software can be installed directly on a PC or copied to the server and then installed on each PC from the server.

Before PNNL can ship you a CD, we must have proof of purchase of at least one license for each of the COTS on the CD. The proof of purchase can be a photocopy of each license and must accompany your request for the COTS CD. To request the COTS CD, contact Ranata Johnson (see Section 1.1, Point of Contact).

Note: This agreement does not exempt the site from the responsibility of purchasing the required number of licenses, but it does ensure that the site has the correct versions of COTS software for FEMIS. All versions of the COTS for FEMIS v1.5 are available for purchase from vendors.

For FEMIS v1.5, the following COTS applications are included on the FEMIS COTS CD:

- ArcView GIS 3.1.1
- Oracle PC Components–Oracle Net8 Client 8.1.6 and ODBC Driver 8.1.6
- Oracle 8i Patch Set 8.1.6.3
- Windows 2000 Service Pack 2
- Windows NT 4.0 Service Pack 6a

Note: If you are running an earlier version of FEMIS, **do not install** the COTS from this CD until your site is ready for the FEMIS v1.5 upgrade.

4.0 Telecommunications

FEMIS can be used remotely via telecommunication access using commercial telephone lines suitable for modem data transmission. The acceptability of remote access is dependent upon the capacity of the connection and the FEMIS functions being utilized. Ideally, these lines should be 28.8 kbps or better. Leased lines with a minimum capacity of 56 kbps are preferred for remote login to FEMIS, including shelters and the Joint Information Center (JIC). A 28.8 kbps service will provide adequate connectivity if only the Remote Evacuee Registration (RER) tool is used.

A PC dialing in to an EOC via Windows 2000 Remote Access Service (RAS) and Point to Point Protocol (PPP), a standard Internet protocol, can utilize the full capabilities of FEMIS. Using FEMIS in this configuration will obviously not provide response speeds as fast as when higher data transmission speeds provided by a WAN or LAN are available, and one such connection should never be used for more than a single remote PC.

Options available to establish this communication are discussed below.

4.1 Remote Access Servers

To enable remote dial-in at EOC LANs, sites need a network remote access server capable of PPP operation via V.34 compliant modem of 28.8 kbps or better. Popular networking/communication equipment vendors (such as Cabletron Systems, Cisco, and Nortel Networks) can supply the hardware to implement PPP remote dial-in connections. For example, the Cisco 2509 is one model of a remote access server with dial-in access (for more details, see <http://www.cisco.com/warp/public/cc/pd/rt/index.shtml>).

Additional dial-up options can also be utilized that are more software based. These include, but are not limited to, Microsoft's NT RAS server option (for NT platforms) or Sun's PPP dial-up software, which is currently bundled with the operating system. Sun also sells an unbundled product called Solstice PPP, which offers everything that the bundled operating system software does in addition to more complex scripting, better authentication methods, and synchronous data connectivity.

5.0 Computer Networks

Computer networks used for FEMIS data communication and database administration should be modern computer networks, which utilize router equipment that conforms to current industry standards.

FEMIS will perform best when the inter-EOC links are based on T-1 or better communication. Local networks in the EOCs should be based on a 10 MB or higher data communication rate.

Under certain situations, where low performance is acceptable, lower data transmission rates can be utilized with the expected longer delay in response of many FEMIS functions.

Better performance can be realized on switched LANS rather than hub-based LANS.