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Pacific Northwest
National Laboratory
Operated by Battelle for the
U.S. Department of Energy

Federal Emergency Management Information System (FEMIS)

Bill of Materials (BOM)

for

FEMIS Version 1.4.6

March 5, 1999

Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RL01830

Acknowledgment

The FEMIS product is being developed by the Pacific Northwest National Laboratory as part of the U.S. Army's Chemical Stockpile Emergency Preparedness Program (CSEPP).

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

FEMIS integrates the following government-furnished software products.

D2PC (January 1999) US Army ERDEC
PARDOS v3.1 (May 1997) US Army ERDEC
Evacuation SIMulation Model (ESIM v2.1f1.3) Oak Ridge National Laboratory (ORNL)

FEDERAL EMERGENCY MANAGEMENT INFORMATION SYSTEM (FEMIS)

BILL OF MATERIALS (BOM) for FEMIS Version 1.4.6

TR Downing
PM Fangman
BJ Homer
DM Johnson
RL Johnson
SM Johnson
RM Loveall
WD Millard
LR Stoops
BM Wood

March 5, 1999

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Contents

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
IP	Internet 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
MBps	Megabytes per second
MHz	Megahertz
MIME	Multipurpose Internet Mail Extensions
mm	Millimeter
NFS	Network File Service
ODBC	Open Data Base 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
SMTP	Simple Mail Transfer Protocol
SQL	Structured Query Language
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 1.4.6 (FEMIS© v1.4.6)[a].

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) distributed by Pacific Northwest National Laboratory (PNNL)[b], 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 and evacuation models, and Commercial-Off-The-Shelf (COTS) software applications, including the ArcView GIS and Microsoft Project (electronic planning).

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 v1.4.6 can also be operated on an isolated PC workstation and is referred to as "stand-alone" FEMIS. Information included in this document about hardware and software requirements is subject to change. If a stand-alone installation is desired, please contact Ranata Johnson, (see Section 1.1, Point of Contact) for updated information before purchasing additional software.

FEMIS v1.4.6 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 each section of this document.

The remainder of this section lists PNNL's Point of Contact for this document, software applications and version changes for FEMIS v1.4.6, 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 U.S. 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 Remote Evacuee Registration 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 lists software applications and versions that have changed for FEMIS v1.4.6.

COTS Software		
Server Software	**FEMIS v1.4.5**	**FEMIS v1.4.6**
Oracle	7.3.3	7.3.4
NFS Maestro or SUNWpcnfd	6.0.0 1.1	6.1 1.2
PC Client Software		
SQL*Net (Oracle)	2.3.2	2.3.4
TCP/IP Adapter (Oracle)	2.3.2	2.3.4
NFS Maestro or Solstice NFS Client	6.0.1 3.1+	6.1 3.2
Microsoft Project	4.1a or 4.1b	Project 98 and Service Release 1
Stand-Alone PC Client Software		
Oracle Workgroup Server or Oracle Personal	7.3.3 7.3.3	7.3.4 7.3.4

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
NFS Maestro or Solstice NFS Client (SUNWpcnfd)	Hummingbird Communications Ltd. Sun Microsystems, Inc.	www.hummingbird.com www.sun.com
Microsoft Project	Microsoft Corporation	www.microsoft.com
Microsoft Windows NT	Microsoft Corporation	www.microsoft.com
Oracle	Oracle Corporation	www.oracle.com
SQL*Net, TCP/IP Adapter, and ODBC Driver	Oracle Corporation	www.oracle.com
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
WordPerfect	Corel Corporation	www.corel.com

Telecommunications Hardware Suppliers

Hardware Supplier	Website Address
Bay Networks	www.baynetworks.com
Cabletron Systems	www.cabletron.com
Cisco	www.cisco.com
MultiTech Systems	www.multitech.com
3Com	www.3com.com
3Com US Robotics	www.3com.com/carrier/nsd/products/rapd/30403.html

2.0 Hardware Requirements

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

2.1 UNIX Server

Each EOC requires access to a UNIX data server. This server can be either physically present in the EOC or remotely accessed across a WAN link.

In previous versions of the Bill of Materials (BOM), PNNL listed the Sun SPARCserver 1000e, Sun SPARCstation 20 Model 612, and Sun Ultra Enterprise 2 as the three UNIX server options for your CSEPP site. The Sun SPARCserver 1000e and Sun SPARCstation 20 Model 612 servers are no longer available. The Sun Ultra Enterprise 2 is available but is no longer the recommended migration path. For FEMIS v1.4.6, the recommended migration path for these servers is to the Sun Enterprise 450.

Because several sites have purchased the SPARCserver 1000e, SPARCstation 20 Model 612, or Sun Ultra Enterprise 2, we have retained Sections 2.1.1 through 2.1.3 to be used as references.

2.1.1 Sun SPARCserver 1000e (for Installations with More Than 15 Users)

Note: The Sun SPARCserver 1000e is no longer available. See Section 2.1.4 for a comparable system that is currently available from Sun.

To ensure an appropriate level of performance, PNNL recommends that the SPARCserver contain multiple central processing units (CPUs).

The SPARCserver 1000e requires Year 2000 (Y2K) enhancements to be compliant. The SPARCserver 1000e requires PROM Version 3.1a or later. If you have a maintenance contract with Sun, call 1-800-USA-4-SUN to order new PROM kits. Per Sun's website, the part number is 560-1962-07.

The SPARCstorage Array is Y2K compliant.

The following UNIX server configuration will meet FEMIS needs.

Sun SPARCserver 1000e	Notes
System Board 2 SPARCserver 1000e system boards with 2 SuperSPARC processors each, no memory.	Includes a 14GB 8mm tape drive, cable, and terminator.
Main memory 384MB (4x96)	
Standard interfaces 2 10BaseT via twisted-pair	One interface per system board.

Sun SPARCserver 1000e	Notes
Internal disk 2 internal disks (2.1GB formatted)	
Internal mass storage 14GB 8mm tape drive Sun CD drive	
External backup drive 16-32GB 4mm DDS-2 Autoloader cable terminator	
External mass storage 35.7GB SPARCstorage Array Model 112 SBus card fiber cable	Disk storage capacity requirements are a function of the size of the installation database and the number of EOCs supported by the data server. 15x2.01GB will provide ~18GB RAID (Redundant Array of Inexpensive Disks) capacity.
Console 20-in. color monitor with Turbo GX frame buffer cable	

2.1.2 Sun Microsystems SPARCstation 20 Model 612 (for Installations with 15 or Fewer Users)

Note: The Sun SPARCstation 20 is no longer available. See Section 2.1.4 for a comparable system that is currently available from Sun.

A lower cost alternative to the SPARCserver 1000e that is adequate to support EOCs with smaller numbers of clients is the SPARCstation 20 Model 612. To ensure an appropriate level of performance, PNNL recommends that this server contain multiple CPUs.

The SPARCstation 20 and the SPARCstorage Array are Y2K compliant.

The following UNIX server configuration will meet FEMIS needs.

SPARCstation 20 Model 612	Notes
System board A standard configuration includes 2 SuperSPARC processors	
Main memory 192MB (2x96)	
Standard interfaces 10BaseT via twisted-pair	
Internal disk 1 internal disk (2.1GB formatted)	

SPARCstation 20 Model 612	Notes
Internal mass storage Sun CD drive	
External backup drive 14GB 8mm tape drive, cable, terminator 16-32GB 4mm DDS-2 Autoloader cable terminator	
External mass storage 35.7GB SPARCstorage Array Model 112 SBus card fiber cable	Disk storage capacity requirements are a function of the size of the installation database and the number of EOCs supported by the data server. 15x2.01GB will provide ~18GB RAID capacity.
Console 20-in. color monitor with Turbo GX frame buffer cable	

2.1.3 Sun Ultra Enterprise 2

The Sun Ultra Enterprise 2 is available but is no longer the recommended migration path. The configuration for the Sun Ultra Enterprise 2 is listed below.

The Sun Ultra Enterprise 2 and the Sun StorEdge MultiPack are Y2K compliant.

The following UNIX server configuration will meet FEMIS needs.

Sun Ultra Enterprise 2	Notes
Processor 2 UltraSPARC processors	
CPU modules 2 CPU modules	
Main memory 256MB (2x128) per CPU	
Standard interfaces FastEthernet (100BaseT)/10BaseT via twisted-pair 4 SBus expansion slots	
Internal disk 2 internal disks (3.5-in. x 1-in. disks) (2.1GB formatted) Optional 3.5-in. floppy drive	
Internal mass storage Sun CD drive	

Sun Ultra Enterprise 2	Notes
External mass storage 14GB 8mm tape drive cable terminator 72-144GB 4mm Sun StorEdge FlexiPack DDS-3 Autoloader cable kits fast/wide SCSI adapter 54.6GB Sun StorEdge MultiPack with 7200rpm disk drive cable kits	Disk storage capacity requirements are a function of the size of the installation database and the number of EOCs supported by the data server. The MultiPack 6x9.1GB will provide ~27GB RAID capacity. **Note:** To obtain your RAID configuration, use Sun's Disksuite v4.1 software. You will need patch 104172-09 or higher for Y2K compliance.
Console 20-in. color monitor with Turbo GX frame buffer cable	

2.1.4 Sun Enterprise 450

The migration path from the SPARCserver 1000e and SPARCstation 20 Model 612 is to the Sun Enterprise 450. The configuration for the Sun Enterprise 450 is listed below.

The Sun Enterprise 450 is Y2K compliant.

The following UNIX server configuration will meet FEMIS needs.

Sun Enterprise 450	Notes
Processor Large EOC – 2 UltraSPARC II processors Small EOC – 1 UltraSPARC II processor	
Main memory Large EOC – 512MB Small EOC – 256MB	
Standard interfaces Integral 10/100 Ethernet 7 PCI slots, 3 PCI 66-MHz slots 7 64-bit slots	

Sun Enterprise 450	Notes
Internal mass storage 1 4.2GB disk drive for operating system 10 4.2GB disk drives for data 2 8 bay internal storage expansion kit 1 additional power supply 12X CD drive 8mm tape drive Optional 3.5-in. floppy drive	The internal storage expansion kit and the additional power supply are required to support the 10 data disk drives. Disk storage capacity requirements are a function of the size of the installation database and the number of EOCs supported by the data server. 10x4.2GB will provide ~25GB RAID5 capacity with 1 hot swappable drive. **Note:** To obtain your RAID5 configuration, use Sun's Disksuite v4.1 software. You will need patch 104172-09 or higher for Y2K compliance.
External mass storage 72GB 4mm DDS-3 Autoloader cable terminator	
Console 20-in. GPX color monitor with PCI graphics card cable	

2.1.5 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 site's CPU, SPARCstorage Arrays (SSA) or StorEdge MultiPack, Solstice NFS Client, and SSA software. Equipment, such as CD drive, 8mm tape drives, disks, and monitors are considered as part of the CPU.

2.1.6 Sun Y2K Validation Tools

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

2.2 PC Client Workstation

The PC client platform is the Pentium-based PC. The minimal PC configuration describes the lowest level at which FEMIS has been tested and run. The recommended PC configuration describes the configuration to be considered for current procurement. The following table lists minimum and recommended PC configurations.

Minimum PC Configuration	Recommended PC Configuration

Intel Pentium microprocessor PC	Intel Pentium microprocessor PC
90MHz	350MHz or better
64MB RAM	128MB RAM or better
1GB hard disk	4GB hard disk or more
Internal CD drive	8X Internal CD drive
1.44MB 3.5-in. internal floppy drive	1.44MB 3.5-in. internal floppy drive
1 parallel and 2 serial ports	1 parallel and 2 serial ports
Ethernet Adapter card or equivalent (10MBps, 10BaseT or Thinnet)	Ethernet Adapter card or equivalent (10MBps or better, 10BaseT or better)
17-in. color VGA monitor (SVGA capable)	19-in. color VGA monitor (SVGA capable)
Standard 101 keyboard	Standard 101 keyboard
Mouse	Mouse

2.3 Stand-Alone FEMIS PC Workstation

The stand-alone FEMIS PC workstation is the Pentium-based PC with a configuration similar to the recommended configuration for a PC client workstation (see Section 2.2, PC Client Workstation).

2.4 Remote Evacuee Registration Hardware

The Remote Evacuee Registration (RER) tool can be installed on the minimal PC configuration (see Section 2.2, PC Client Workstation) or better. A 28.8kbps 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 v1.4.6, PNNL recommends the following supporting hardware.

Supporting Hardware	Notes
Network hardware including Bay Networks, Cabletron, or Cisco routers.	
Printers (HP LaserJet, Sun Laser Printer, color printer, or other LAN-compatible printer).	
Screen projection hardware compatible with a PC client workstation (optional).	

Supporting Hardware	Notes
Uninterruptable Power Supply (UPS) of sufficient capacity to operate the EOC system for a length of time acceptable to installation management.	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. For example, an EOC with 1 data server and 25 PC clients (including a communications server if used), might have a UPS rated between 40kVA and 50kVA.

3.0 Software Requirements

The following sections discuss the software requirements for FEMIS v1.4.6.

3.1 Server Software

The following table includes information about data server software configuration and maintenance recommendations. The last column indicates whether the vendor of the software affirms their product to be Y2K compliant.

Data Server Software Configuration	Maintenance Contract Recommendations	Notes	Y2K
Sun Microsystems Solaris v2.6	See Section 2.15	For recommended patches, see our website (http://www.pnl.gov/femis/tech/solar26.htm)	Yes
Oracle v7.3.4 RDBMS with SQLPlus and SQL*Net	OracleBRONZE	Oracle licenses for the server are sold in sets, for example, 1, 8, 12. Purchase the number of licenses to match the number of user PCs that will connect to the server. Only one license per server is required for SQLPlus.	Yes
NFS Maestro v6.1	Maintenance for the server is provided with the standard PC maintenance available from the vendor.	The NFS Maestro daemon hclnfsd process should run on one or more of the local UNIX servers. The source code for hclnfsd is public domain and is distributed with the client product. After installation, the source files can be found in the utility subdirectory under the NFS Maestro product directory, C:\MAESTRO.	Yes
or SUNWpcnfd v1.2	See Section 2.15	Distributed on the Solaris Server Intranet Extension 1.0.	Yes
E-mail application	Application dependent	Any E-mail application meeting the requirements in Section 3.5, E-mail Standards.	Application dependent
FEMIS Server Application Set Evacuation SIMulation Model, ESIM v2.1f1.3	Not applicable	Distributed with FEMIS.	Yes

Data Server Software Configuration	Maintenance Contract Recommendations	Notes	Y2K
Perl v5.004-04	Not applicable– public domain, see www.perl.org (Larry Wall, author).	Distributed with FEMIS and needed to run AutoRecovery.	Yes
Apache HTTP Web Server v1.3.4	Not applicable– public domain, see www.apache.org (Apache Group).	Distributed with FEMIS and needed to run the Auto-Recovery web interface.	Yes
Network time synchronization protocol v3.5-90	See Section 2.15	Network Time Protocol is distributed with Solaris v2.6 or higher operating systems.	Yes
ARC/INFO v7.1.2 or later (optional)	Optional	Optional	Yes

For information about downloading SunScan 2000 (Sun's Y2K compliance tool set), see Section 2.1.6, Sun Year 2000 Validation Tools and Sun's web site (http://www.sun.com/y2000).

3.2 PC Client Software

The following table includes information about PC client software configuration and maintenance recommendations. The last column indicates whether the vendor of the software affirms their product to be Y2K compliant.

PC Client Software Configuration	Maintenance Contract Recommendations	Notes	Y2K
Microsoft Windows NT Workstation v4.0 (CD edition)	No additional maintenance contract is available from vendor.	The version specified includes documentation. Additional licenses may be obtained without documentation by procuring the Windows NT Workstation License Pack.	Yes with Service Pack 4
Microsoft Windows NT Workstation v4.0 Service Pack 4	No additional maintenance contract is available from vendor.	The Service Pack addresses security issues for Windows NT v4.0 and can be downloaded from Microsoft's web site (http://support.microsoft.com/support).	Yes
Oracle SQL*Net v2.3.4 with TCP/IP Adapter v2.3.4	Maintenance is included as part of the server software maintenance contract.	Oracle SQL*Net and TCP/IP Adapter are included with the Oracle server license.	Yes

PC Client Software Configuration	Maintenance Contract Recommendations	Notes	Y2K
ArcView GIS v3.0a	No additional maintenance contract is available from vendor.		Yes
NFS Maestro v6.1 or Solstice NFS Client v3.2	Standard maintenance contract by vendor is based on the number of seats (licenses) your site has purchased. See Section 2.15	Purchase the number of licenses (seats) to match the number of user PCs. Solstice NFS Client licenses for the PC are sold in sets, for example, 1, 5, 10, and 25. Purchase the number of licenses to match the number of PCs. If purchasing more than one license, you should also purchase one base pack that provides software and documentation.	Yes Yes
Microsoft Project 98 and Service Release 1	No additional maintenance contract is available from vendor.	Project **is not needed** for operations. Project **is needed** for generating/modifying plans in Planning mode.	Yes
FEMIS Client Application Set	Not applicable	The Dispersion Model (D2PC [January 1999]) and the Dose/ Time Model (PARDOS [May 1997]) are part of the FEMIS Client Application Set.	Yes
Network time synchronization protocol v3.5-90	Not applicable– public domain	Configured as part of the FEMIS installation.	Yes
Network Monitor for Windows vA17 95.03.11	Not applicable– public domain	Included in the FEMIS Tools as WS Network Monitor	
Oracle ODBC Driver v2.5.3	Maintenance is included as part of the server software maintenance contract.	The Oracle drivers are available at no cost. In FEMIS v1.4.6, the drivers will be installed as part of the FEMIS setup program.	Yes
E-mail Application	Application dependent	Any E-mail application meeting the requirements in Section 3.5, E-mail Standards.	Application dependent

PC Client Software Configuration	Maintenance Contract Recommendations	Notes	Y2K
Microsoft Office (optional)	No additional maintenance contract is available from vendor.	Includes Microsoft Excel, PowerPoint, and Word.	Yes
Word processor (optional, i.e., Corel WordPerfect or Word)	Application dependent	WordPerfect is sold as Corel WordPerfect.	Application dependent

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 to 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 Personal Oracle v7.3.4 or Oracle Workgroup Server v7.3.4, which is the RDBMS. Oracle Workgroup Server 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 v1.4.5	FEMIS v1.4.6
Oracle Workgroup Server or Oracle Personal	v7.3.3 v7.3.3	v7.3.4 v7.3.4

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, Microsoft Project 98, 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 NT Workstation v4.0 (CD edition)	The FEMIS RER software runs on a Windows NT environment.
Microsoft Windows NT Workstation v4.0 Service Pack 4	The Service Pack addresses security issues for Windows NT v4.0.
Oracle SQL*Net v2.3.4 with TCP/IP Adapter v2.3.4	The RER attaches to the FEMIS database for a short period of time to download and upload information to support evacuee registration.

Remote Evacuee Registration Software	Notes
NFS Maestro v6.1 or Solstice NFS Client v3.2	NFS is needed to do the initial installation of the FEMIS and RER. NSF is also needed if a registration site has access to the FEMIS network. A network connection for FEMIS RER will run much faster.
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. If space is needed, the application software can be deleted after the installation.
Oracle ODBC Driver v2.5.3	The Oracle drivers are used to connect to the FEMIS database during download and upload of evacuee information. They are 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 NT v4.0. RAS has to be turned on for the PC using RER.

Additionally this tool requires a server software package, such as SunLink PPP v3.0.1 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 v4.1 (a Novell, Inc. product) was the recommended E-mail application for FEMIS. Sites that want to continue using GroupWise will need to upgrade to v5.2 to be Y2K compliant. For FEMIS v1.4.6, 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

SMTP (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.

3.5.4 Future Trends

The future trend for E-mail standards is to use ESMTP, which is an extension of the SMTP protocol, and is designed for faster delivery of E-mail messages. In addition, ESMTP supports Notary (notification) standards, which provide return receipts and other message status information.

The Department of Defense (DoD) is migrating to the Defense Message System.

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 v1.4.6 are available for purchase from vendors.

For FEMIS v1.4.6, the following COTS applications are included on the FEMIS COTS CD:

- Microsoft NT Workstation v4.0 with NT Service Pack 4
- Oracle PC Components–ODBC Driver v2.5.3, SQL*Net v2.3.4, and TCP/IP Adapter v2.3.4
- NFS Maestro v6.1
- Solstice NFS Client v3.2
- ArcView GIS v3.0a
- Microsoft Project 98 and Service Release 1

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 v1.4.6 upgrade.

The Oracle PC components needed for the stand-alone PC configuration **are not** on the FEMIS COTS CD.

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 28.8kbps or better. Leased lines with a minimum capacity of 56kbps are preferred for remote login to FEMIS, including shelters and the Joint Information Center (JIC). A 28.8kbps service will provide adequate connectivity if only the Remote Evacuee Registration (RER) tool is used.

A PC dialing in to an EOC via Windows NT 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.

The two options available to establish this communication are via a remote access servers or server and 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 at least 28.8kbps. Popular networking/communication equipment vendors (such as, Bay Networks, Cabletron, and Cisco) 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 (see http://www.cisco.com/warp/public/558/18.html for more details).

4.2 Server

SunLink PPP v3.0.1 is a PPP server package. It is a separate product and not included with Solaris v2.6. One or two dial-up connections can be accommodated via Sun's serial A/B ports. We have tested the 3Com US Robotics/Courier V. Everything/V.34 Model 1224 external modem with PPP and FEMIS (http://www.3com.com/carrier/nsd/products/rapd/30403.html). We recommend this model or one that is equivalent. Through additional hardware from Sun, additional modem dial-in lines can be supported using the SunLink PPP package.

For both options, networking/communication equipment supports the following: one Ethernet port, two wide area synchronous T-1 connections, and eight asynchronous dial-in 28.8kbps V.34 connections. With Cisco's IP software, PPP can be accommodated. In addition to the TCP/IP required by FEMIS, this equipment supports IPX, AppleTalk, Banyan VINES, and XNS. WAN services such as leased lines, frame relay, ISDN, and X.25 are also supported.

In addition to the above equipment, EOCs need to provide enough modems for the number of remote dial-ins they intend to accommodate. These modems should be V.34 compliant and of at least 28.8kbps. These modems are available from several vendors. For more information on telecommunication equipment, see Section 1.3, Further Software and Hardware Information, for web site addresses.

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 10MB 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.