2/16

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES COMPUTER AND INTERFACE REQUIREMENTS FOR FISCAL YEAR 1998

Prepared for

Nuclear Regulatory Commission
Contract NRC-02-93-005

Prepared by

Henry F. Garcia
Rebecca A. Sanchez

Center for Nuclear Waste Regulatory Analyses
San Antonio, Texas

August 1997

3/16

CONTENTS

4/16

FIGURES

5/16

TABLES

6/16

1 INTRODUCTION

This letter report identifies computer-related requirements for the successful operation of the Center for Nuclear Waste Regulatory Analyses (CNWRA) computer systems and applications. It includes the known computer systems interface requirements to maintain compatibility in fiscal year (FY) 1998 with the Nuclear Regulatory Commission (NRC) Office of Nuclear Material Safety and Safeguards (NMSS) hardware and software systems. Specific hardware and software items necessary for the CNWRA to maintain compatibility with the NRC systems are identified in the text and tables in chapter 3.

The implementation of these requirements will ensure that the interfaces for the systems and networks described herein will be compatible with those at NMSS and support the schedules for deliverables based on computer applications in the various program areas. The timely availability of the necessary computer-related items will facilitate the utilization of the office automation, document and database management, and project management software, as well as technical computing capabilities by individual staff including team members from the NRC and the CNWRA.

7/16

2 CURRENT SYSTEMS AND NETWORK CONFIGURATION

The CNWRA systems are configured in a wide area network (WAN) and local area network (LAN) to support communications by the staff with all of the major NRC organizations in the high-level waste (HLW) program. The CNWRA San Antonio and Washington Technical Support Office (WTSO) network configuration is shown in figure 2-1. The network includes a Firewall Computer Security System to protect the CNWRA and the NRC against unauthorized intruders. The Firewall System is shown in the Perimeter Net (DMZ) (lower left-hand corner) in figure 2-1.

2.1 WIDE AREA NETWORK

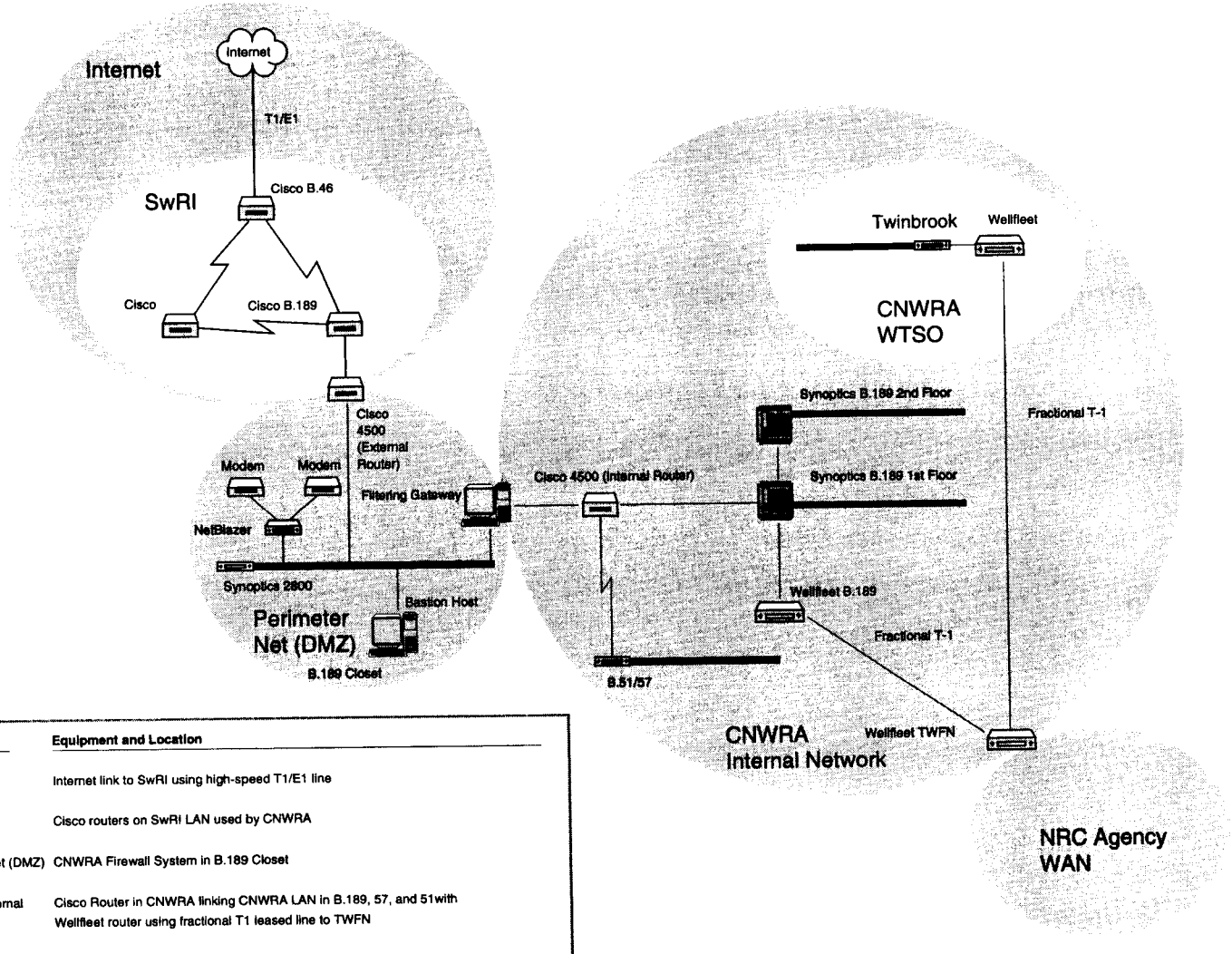
The major organizations in the CNWRA WAN are: (i) the NRC NMSS in Rockville, Maryland; (ii) the CNWRA in San Antonio, Texas; and (iii) the CNWRA WTSO in Rockville, Maryland. The U.S. Department of Energy (DOE) offices in Washington, DC, and Las Vegas, Nevada, its sponsored organizations, and other worldwide organizations that may provide information required in the execution of the HLW program use the Southwest Research Institute (SwRI) link on the Internet to access the WAN.

The CNWRA primary communication interface to its WTSO and the NRC is a fractional T1 leased line supported on the NRC WAN. The current configuration for the NMSS computer systems is based on the NRC Agency Upgrade to Office Systems, a LAN implemented throughout the entire agency, and the NMSS high performance UNIX technical computing system, referred to as the Advanced Computer System (ACS). The CNWRA assisted the NRC in the design and implementation of the ACS.

2.2 LOCAL AREA NETWORK

The current CNWRA LAN configuration is based on an Ethernet LAN using the Transmission Control Protocol/Internet Protocol. The major segments of the LAN support an open-system architecture that consists of six UNIX servers for major office automation, technical, and database applications. The CNWRA LAN office automation, technical, and database servers are shown in figure 2-2.

The current user workstations, personal computers, and peripherals on the CNWRA LAN in San Antonio, Texas, and the WTSO in Rockville, Maryland, are listed in table 2-1.



Networks	Equipment and Location
Internet	Internet link to SwRI using high-speed T1/E1 line
SwRI	Cisco routers on SwRI LAN used by CNWRA
Perimeter net (DMZ)	CNWRA Firewall System in B.189 Closet
CNWRA Internal Network	Cisco Router in CNWRA linking CNWRA LAN in B.189, 57, and 51with Wellfleet router using fractional T1 leased line to TWFN
CNWRA WTSO	Linked to Wellfleet at TWFN with fractional T1 leased line to Twinbrook
NRC Agency WAN	Linked to CNWRA SA and WTSO via fractional T1 leased line and Wellfleet Router

Figure 2-1. Center for Nuclear Waste Regulatory Analyses San Antonio and Washington Technical Support Office network configuration

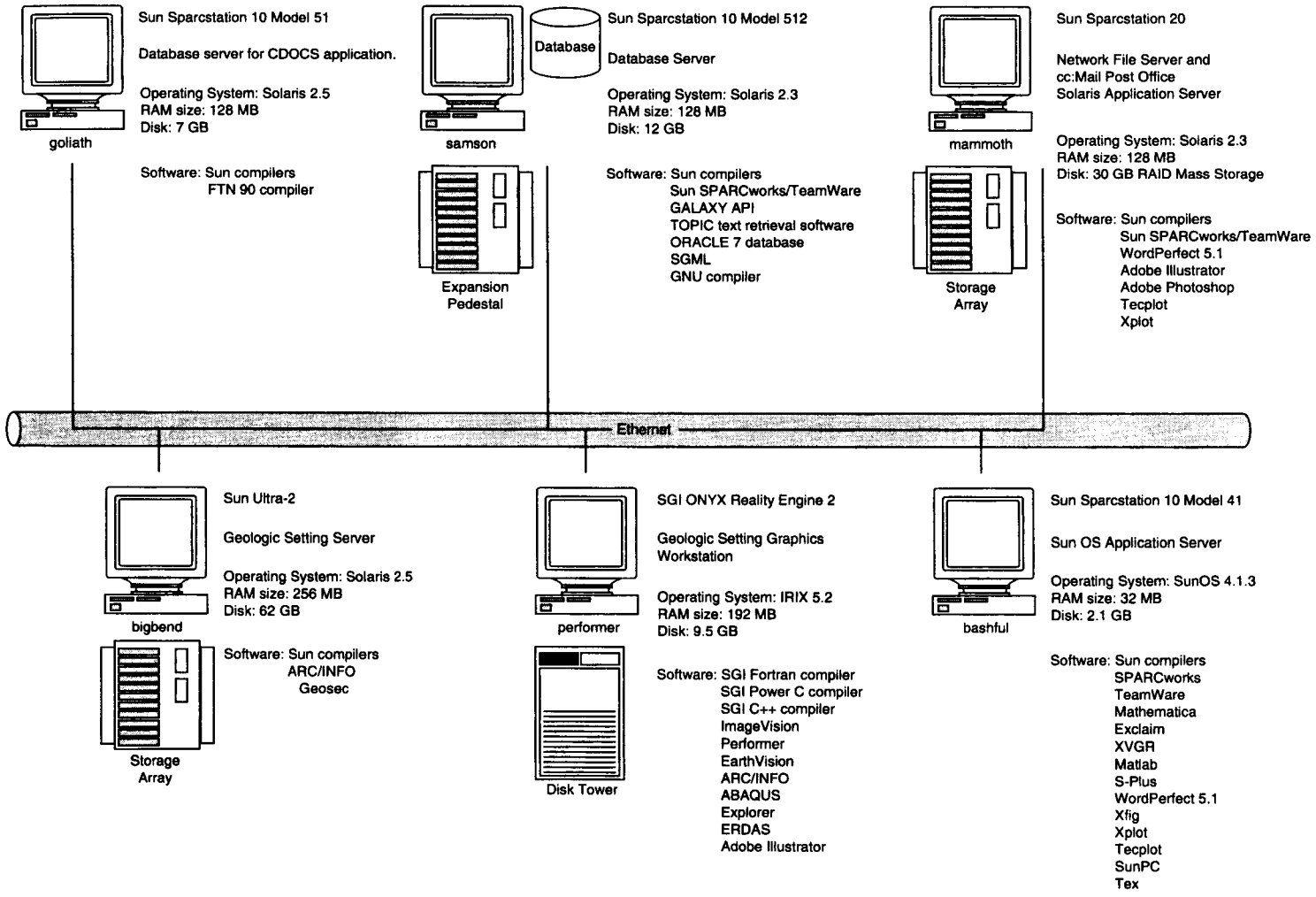


Figure 2-2. Center for Nuclear Waste Regulatory Analyses local area network technical, database, and office automation servers

9/16

10/16

Table 2-1. List of major computers and peripherals

Categories	Description	Quantity
Servers		
Sun Microsystems, Inc.	Network File Server Sun Ultra II and Sparc20 with mass storage Redundant Array of Inexpensive Disks System (60 and 30 GB)	2
	Sun Sparc10 Servers	3
Silicon Graphics, Inc.	SGI ONYX Reality Engine 2 Server	1
Workstations		
Silicon Graphics, Inc.	SGI Indigo 2 and Indy Workstations	3
Sun Microsystems, Inc.	Sun Sparc10 Model 41 Workstations	5
	Sun IPX 4/50 Workstations	7
	Sun Sparc20 Model 51 Workstations	8
	Sun Ultra I Model 140 Workstations	2
	Sun Sparc5 (Security)	2
Tektronix, Inc.	X-Terminal	3
Apple Computer, Inc.	Apple Macintosh/Quadra Workstations	9
	Apple Power Macintosh	5
Personal Computers		
International Business Machines, Inc.	IBM PS/2 Model 95 and clones	77
Printers		
QMS, Inc.	QMS Laser Printers	3
Hewlett Packard Co.	HP DesignJet 755CM Printer	1
	HP LaserJet IV Printers	12

11/16

Table 2-1. List of major computers and peripherals (cont'd)

Categories	Description	Quantity
Printers (cont'd)		
Apple Computer, Inc.	Apple LaserWriter II	1
Tektronix, Inc.	Tektronix Phaser III Color Printer	1
	Tektronix Phaser 550 Color Printer	1
Plotter		
Hewlett Packard Co.	HP Draftmaster Drum Plotter	1
Router		
Wellfleet Communications, Inc.	Wellfleet Router/Concentrator (NRC-provided)	2
Cisco Systems, Inc.	Cisco 4500M Router	2
Telebit, Inc.	NetBlazer Modem Server	1
Scanner		
Fujitsu Products of America, Inc.	Fujitsu Scanner	1

12/16

3 REQUIREMENTS FOR COMPUTERS AND INTERFACES FOR FISCAL YEAR 1998

The CNWRA computer-related acquisitions planned for FY98 are described in the following sections. Specific hardware and software required to support CNWRA applications are identified, together with cost estimates. The items described in the following tables will be leased on CNWRA overhead or purchased using SwRI capital equipment funds.

3.1 OFFICE AUTOMATION

The standard word processing software authorized for use by the NRC and the CNWRA is WordPerfect® (WP) 6.1 for Windows. Currently, all CNWRA systems use the previously approved WordPerfect 5.1 under the OS/2 operating system, or its equivalent for Macintosh and Sun systems. Both the NRC NMSS and the CNWRA will continue upgrading to WP 6.1 during the latter part of FY97. All CNWRA major and intermediate deliverables are expected to be submitted electronically in the contractually required version of WP along with the hard copy documents.

The e-mail system software currently used at the CNWRA is Lotus cc:Mail Release 1, and it will be upgraded to Lotus cc:Mail Release 8 in FY98. The CNWRA Lotus cc:Mail is interfaced to the NRC Groupwise e-mail. The CNWRA uses an ORACLE-based software for scheduling meetings and conference rooms, travel, and vacations. The upgrade cost for Lotus cc:Mail Release 8 is shown in table 3-1.

Table 3-1. Hardware and software for office automation, FY98

Quantity	Item Description	Estimated Cost
1	Infocus Color LCD Panel	$ 7,000
10	Mitsumi 16X CD ROMs	700
5	Sun Accelerator Cards	2,250
80	Upgrade Lotus cc:Mail Release 1 to Lotus cc:Mail Release 8	1,760
	SUBTOTAL	$11,710

3.2 CONSOLIDATED DOCUMENT MANAGEMENT SYSTEM

Since the CNWRA has delivered the Consolidated DOCument Management System (CDOCS) to the NRC, it has ceased any further development of this code. If the NRC requires an upgrade to the commercial software (e.g., Topic, ORACLE, Galaxy) used with CDOCS, the CNWRA will need funding support to secure such software to remain compatible with the NRC. Table 3-2 describes the upgrade cost associated with this commercial software. No additional funding is expected in FY98.

13/16

Table 3-2. Consolidated DOCument Management System, FY98

Quantity	Item Description	Estimated Cost
3	Upgrade Topic, ORACLE, Galaxy Maintenance	$10,000
	SUBTOTAL	$10,000

3.3 PROJECT MANAGEMENT AND REPORTING

The project management function consists of operations planning, periodic cost reporting, commitment control, and project scheduling at the CNWRA. During FY97, the CNWRA used Microsoft® Excel to support periodic cost reporting and Microsoft Access for commitment control. Microsoft Project has been selected for planning and scheduling purposes, since it interfaces seamlessly with Microsoft Excel.

Development of a capability for the NMSS and CNWRA staff to access the Network for reports, such as the Commitment Control Log, is still on hold. Additional NRC funding will be necessary to offer entree to the reports. The database products that would be required for such entree are shown in table 3-3.

Table 3-3. Project management and reporting, FY98

Quantity	Item Description	Estimated Cost
1	ORACLE/Access products for database/network	$15,000
	SUBTOTAL	$15,000

3.4 TECHNICAL COMPUTING SOFTWARE

The NRC and the CNWRA will be involved in the technical review of DOE documents, including the viability assessment, and development of guidance, procedures, Issue Resolution Status Reports, and other technical reports on the results of its technical assistance to the NRC. Fulfilling these tasks requires: (i) ready access to technical databases, (ii) analysis and display of spatial and temporal data, (iii) involvement in code assessments, (iv) conduct of literature searches and reviews, and (v) evaluation of DOE calculations and documents. These tasks require the use of Geographical Information Systems, two-dimensional (2D) and three-dimensional (3D) graphics displays, and other data management software.

In addition, technical review and technical assistance activities require confirmatory and independent calculations to be performed by the CNWRA staff. A list of currently active computer codes at the CNWRA is provided below. This list changes as NRC support requirements vary.

- 3DStress, Version 1.1/1.2
- ABAQUS, Version 5.5/5.6
- ASHPLUME, Version 1.0
- BREATH, Version 1.1/1.2
- CDOCS, Version 1.0
- CHAINT, Version 2.3

- CTOUGH, Version 1.0
- EBSPAC, Version 1.0/1.1
- EQ 3/6, Version 7.2b
- FAULTING, Version 1.0
- FITEQL, Version 2.0
- GENII-S, Version 1.485
- MAGNUM-2D, Version 3.2
- MINTEQA2, Version 3.11/3.12
- MODFLOW MF, Version 1.31
- MULTIFLO, Version 1.0/2.0
- NEFTRAN II
- PORFLOW, Version 2.50
- PVHVIEW, Version 1.0
- RADON, Version 1.2
- RESRAD, Version 5.62
- SEISM1, Version 1.1
- SIMUL, Version 1.0
- STABL, Version 5M
- STEPWISE
- SUFLAT, Version 1.0
- TPA, Version 3.0/3.1
- UDEC, Version 3.0

The cost to develop, modify, and maintain these codes is included in the budget for the appropriate key technical issue. Other hardware and software requirements for technical computing are shown in table 3-4.

Table 3-4. Technical computing hardware and software, FY98

Quantity	Item Description	Estimated Cost
2	Field/Travel Laptops	$ 7,500
1	ARC/INFO Upgrade License	5,000
1	ArcView Upgrade License	5,000
	SUBTOTAL	$17,500

3.5 COMMUNICATIONS AND SECURITY SYSTEMS

A fractional T1 line (576 kbps) is available on the NRC WAN to the CNWRA. Although no major increases in the volume of Lotus cc:Mail and CDOCS are anticipated, the T1 line can support greater use of Lotus cc:Mail and CDOCS. External CRAY usage was transferred to the University of Texas at Austin, using Internet access. Internet access to the DOE and other contractor databases is available also.

The CNWRA LAN Security System that provides security for the entire CNWRA network from Internet intruders was implemented in FY95. This system was tested by the DOE Lawrence Livermore National Laboratory, Computer Technology Center, Computer Incident Advisory Capability in FY97. Recommended changes to the system were approved by the NRC and are being implemented. New hardware and software necessary to increase the capacity of the CNWRA LAN are shown in table 3-5.

15/16

Table 3-5. Communications and security systems hardware and software, FY98

Quantity	Item Description	Estimated Cost
1	Additional Disk Storage (60 GB)	$36,000
1	Exabyte 480 80-Tape 4-Drive Backup Unit	6,800
1	Improved Firewall Proxy Software	5,000
	SUBTOTAL	$47,800

16/16

4 SUMMARY

The CNWRA computer hardware and software requirements in the five application categories are summarized in table 4-1.

Table 4-1. Summary of computer and interface requirements, FY98

Category	Quantity	Item Description	Estimated Cost
Hardware/Software for Office Automation	1	Infocus Color LCD Panel	$ 7,000
	10	Mitsumi 16X CD ROMs	700
	5	Sun Accelerator Cards	2,250
	80	Upgrade cc:Mail Release 1 to cc:Mail Release 8	1,760
Consolidated Document Management System	3	Upgrade Topic, ORACLE, Galaxy Maintenance	10,000
Project Management and Reporting	1	ORACLE/Access products for database/network	15,000
Technical Computing	2	Field/Travel Laptops	7,500
	1	ARC/INFO Upgrade License	5,000
	1	ArcView Upgrade License	5,000
Communications and Security Systems	1	Additional Disk Storage (60 GB)	36,000
	1	Exabyte 480 80-Tape 4-Drive Backup Unit	6,800
	1	Improved Firewall Proxy Software	5,000
		TOTAL	$102,010

This report defines the anticipated hardware and software requirements as well as their associated cost estimates. These cost estimates do not include any of the labor required for system design, development, implementation, testing, training, and documentation. The CNWRA has existing tasking to support FORTRAN codes and other technical computing applications in FY98.