

**DIVISION OF WASTE MANAGEMENT COMPUTER
REQUIREMENTS FOR FY95**

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Prepared by

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1 INTRODUCTION

This letter report identifies computer-related requirements for the successful integration of Division of Waste Management (DWM) and Center for Nuclear Waste Regulatory Analyses (CNWRA) computer systems and applications. To identify this information CNWRA computer-related plans are described sufficiently to define DWM computer system interface requirements, including lists of DWM hardware and software necessary to maintain compatibility with the CNWRA in Fiscal Year (FY) 1995. This report, Intermediate Milestone No. 20-5702-151-510, contains those requirements.

The implementation of these requirements will ensure that the interfaces for the systems and networks described herein will be compatible 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 management, regulatory program database, software for project management, and technical computing capabilities by individual staff and DWM and CNWRA team members.

2 CURRENT CONFIGURATIONS OF DIVISION OF WASTE MANAGEMENT AND CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES SYSTEMS AND NETWORKS

The overall network configuration, shown in Figure 2-1, links the DWM and CNWRA with the major organizations in the National High-Level Waste (HLW) program. These organizations include: (i) the U.S. Nuclear Regulatory Commission (NRC) DWM, and NRC Office of Nuclear Regulatory Research (RES) in White Flint, Maryland; (ii) the CNWRA in San Antonio, Texas; (iii) the CNWRA in Arlington, Virginia; (iv) the Department of Energy (DOE) offices in Washington, District of Columbia and Las Vegas and its sponsored organizations, and (v) the Idaho National Engineering Laboratories (INEL) in Idaho Falls, Idaho. The DWM staff and the CNWRA staff may also link to other world-wide providers of computer services required in the HLW program via a variety of public and private networks not shown in Figure 2-1.

2.1 DIVISION OF WASTE MANAGEMENT CONFIGURATION

The current configuration for the DWM computer systems is based on the NRC Agency Upgrade to Office Systems (AUTOS), a Local Area Network (LAN) implemented throughout the entire agency, and the DWM High-Performance UNIX Technical Computing Systems, referred to as the Advanced Computer Review System (ACRS). Figure 2-2 illustrates the application distribution and disk storage on specific ACRS servers.

The CNWRA has assisted the DWM in the design and implementation of the ACRS during the past three years. Users of both the AUTOS and the ACRS within the DWM can access the associated computer resources on each LAN. The computers and peripherals that make up the DWM portion of the AUTOS and the ACRS are listed below:

DWM AUTOS Network (White Flint)

- 1-PC Model 486 Server with Novell & TCP/IP with DOS and Windows Support
- 9-PC Model 486/50 with DOS/Windows, TCP/IP and X-Windows
- 40-PC's with DOS/Windows
- 4-HP LaserJet III Printers
- 1-Router/Concentrator

DWM ACRS Network (White Flint)

- 1-Sun Sparc 1000 Server
- 1-Sun Sparc 10, Model 41 Server
- 1-Sun Sparc IPX Server

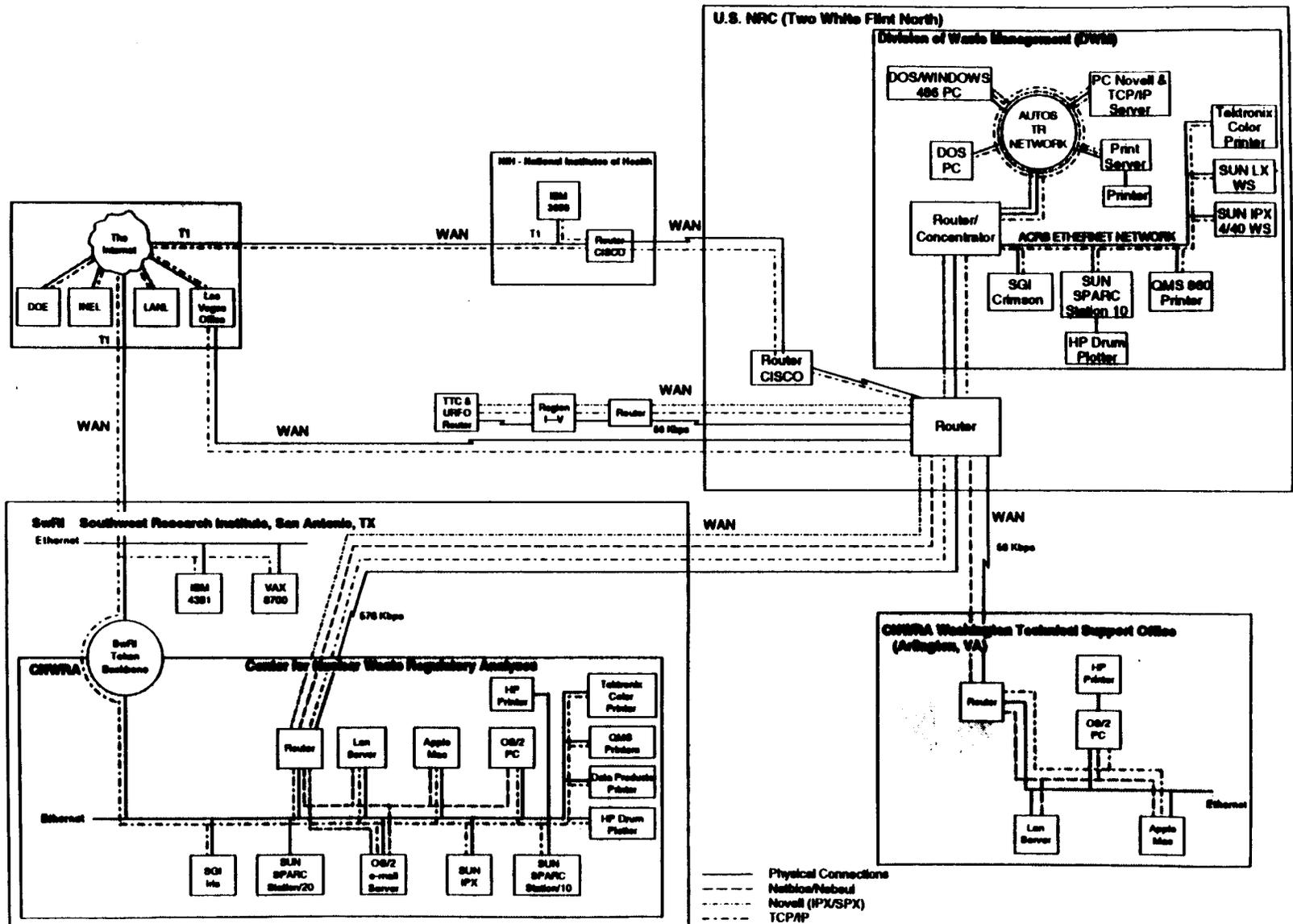
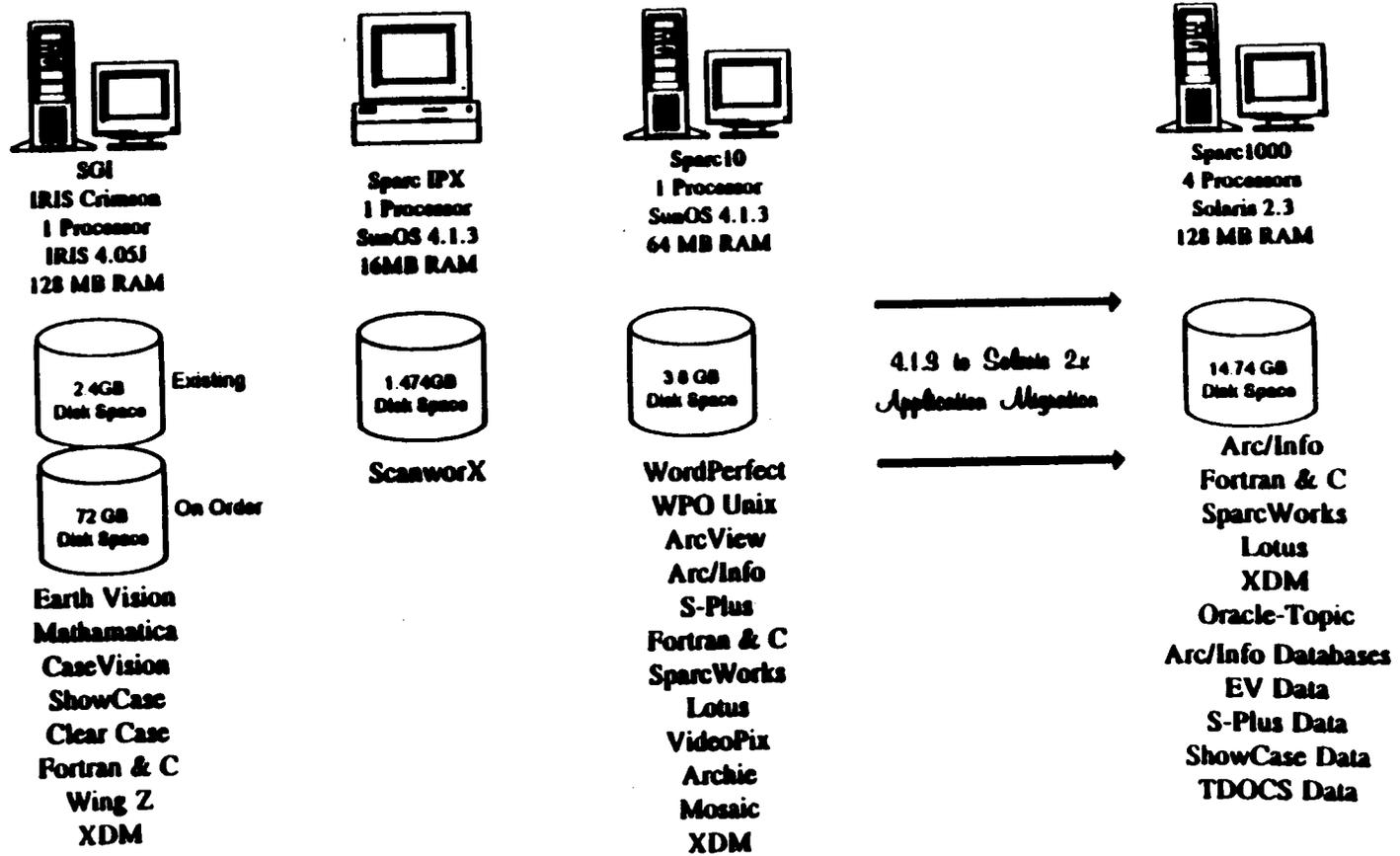


Figure 2-1. DWM and CNWRA network configuration

Division of Waste Management



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Figure 2-2. DWM application distribution and disk storage

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- 1-Silicon Graphics IRIS Crimson Server
- 8-Sun IPX 4/40 Workstations
- 6-Sun LX Workstations
- 1-Tektronix Phaser III Color Printer
- 1-HP Draftmaster Drum Plotter
- 1-QMS 860 11×17 in. Laser Printer
- 1-Xerox Scan Worx Scanner

2.2 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES CONFIGURATION

The current CNWRA configuration is based on using TCP/IP protocols on an Ethernet LAN. The major segments of the LAN support an open system architecture that consists of seven servers, high-performance workstations and personal computers. Figure 2-3 illustrates the CNWRA database and application servers. Users on each Ethernet segment can access all of the resources available on the LAN with the exception of the Macintosh users who are unable to access the IBM LAN and its applications directly. The current configuration of CNWRA computer systems for the San Antonio, Texas, and Arlington, Virginia, offices is as follows:

CNWRA Ethernet Network

- 4-Sun Sparcstation 10 Servers
- 1-Sun Sparcstation IPX Server
- 2-IBM PS/2 Model 95 LAN Server
- 1 - Silicon Graphics ONYX Reality Engine 2 Server
- 1 - Silicon Graphics Indy Workstation
- 4-Sun Sparc 10, Model 41 Workstations (3 Core Staff and 1 other)
- 8-Sun IPX 4/50 Workstations (7 Core Staff and 1 other)
- 2-Sun Sparc 20, Model 51 Workstations (2 Core Staff)
- 70-IBM PS/2, Model 95's with OS/2 (49 Core Staff and 21 other)
- 11-Apple Macintosh/Quadra Workstations (8 Core Staff and 3 other)

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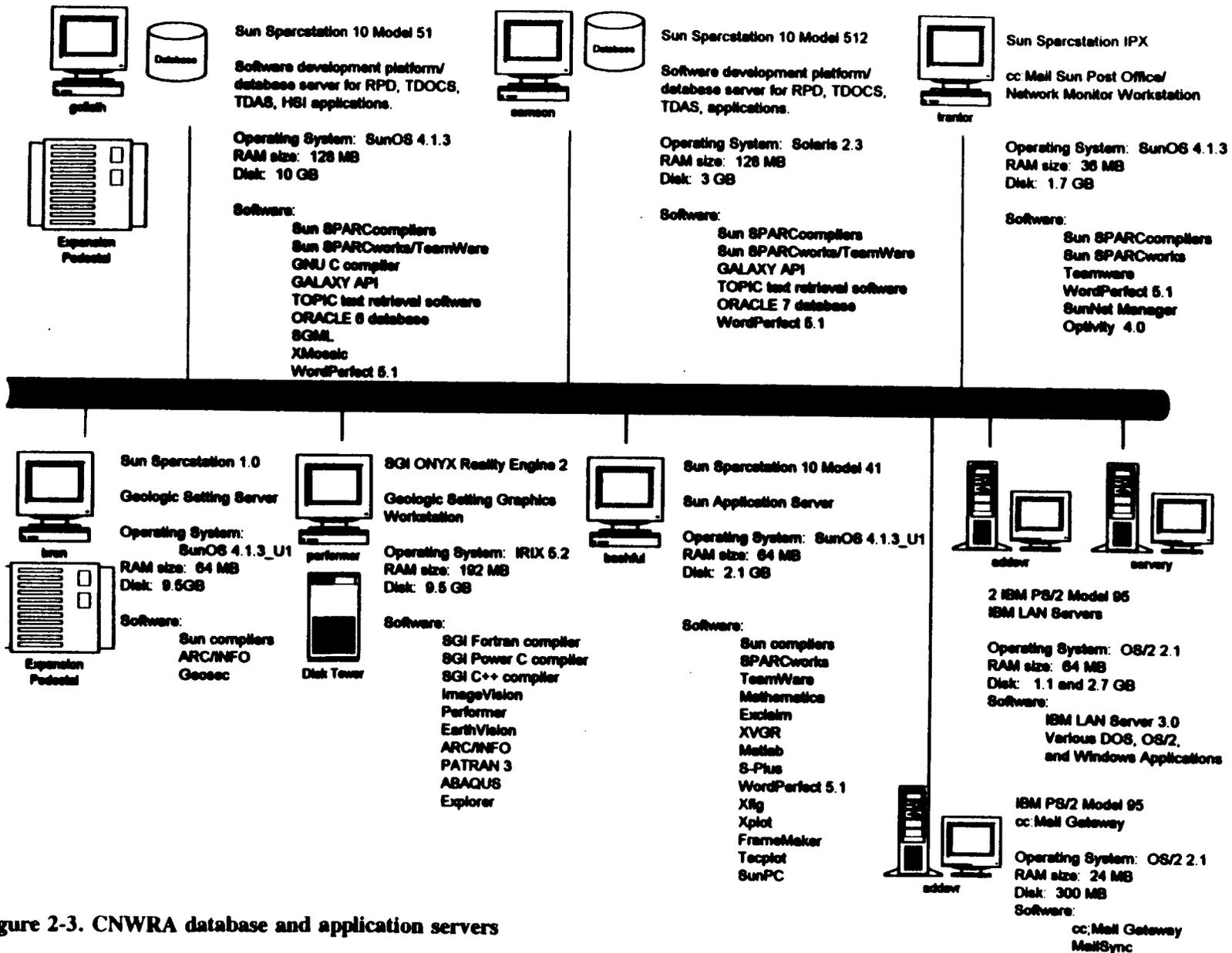


Figure 2-3. CNWRA database and application servers

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- 2-Apple Power Macintoshes (2 Core Staff)
- 3-QMS Laser Printers
- 1-Data Products Laser Printer
- 12-HP LaserJet III Printers
- 3-HP Laserjet IV Printers
- 1-Tektronix Phaser III color printer
- 1-QMS 5320 Imagen High Speed Laser Printer
- 1-HP Draftmaster Drum Plotter
- 2-Wellfleet Router/Concentrator (NRC Provided)

2.3 DEPARTMENT OF ENERGY AND OTHER CONFIGURATIONS

The systems and networks at the various DOE locations are compatible to those of the DWM and the CNWRA, and technically can be linked for data transfers with minimum effort and cost. Most data transfers to date have been made using electronic media devices such as tape and disk. Recently, DOE has authorized Internet access for both the CNWRA and DWM to access the Automated Technical Data Tracking System (ATDTS).

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3 FISCAL YEAR 1995 COMPUTER INTERFACE AND OPERATION REQUIREMENTS FOR THE DIVISION OF WASTE MANAGEMENT BY APPLICATION

The computer applications planned for FY95 at the CNWRA and the DWM are described in the following six sections. Specific lists of hardware and software required at the DWM to support the applications are identified. In addition, a cost estimate is provided for those hardware and software items.

The requirements for the planned applications, systems, and networks are provided in the FY94-95 Operations Plans for the CNWRA (CNWRA, 1993; Meehan, 1993; Meehan, 1993), and reports will be prepared for each application requiring an expansion or modification during FY95.

3.1 OFFICE AUTOMATION

The standard Word Processing (WP) software used by the DWM is WordPerfect 5.1 for DOS. Therefore, it is also the standard at the CNWRA. FrameMaker was introduced by the CNWRA this past year to support the Semi-Annual Research report. FrameMaker facilitates the presentation of many equations and figures. All Major and Intermediate Milestone deliverables are submitted electronically in WordPerfect (FrameMaker documents are held at the CNWRA and an abstract in WordPerfect is submitted) along with the hard copy documents.

The e-Mail system software currently used in the CNWRA is cc:Mail. The CNWRA cc:Mail system is interfaced to the NRC WordPerfect Office (WPO) e-Mail system by a pair of gateways using the Novell Mail Handling System (MHS) standard. One gateway is located at the CNWRA and the other is located at NRC. The CNWRA uses an Oracle-based system for scheduling meeting and conference rooms, travel, and vacations. The DWM uses calendaring capability in the WPO system.

3.2 DOCUMENT MANAGEMENT

At the present time, the DWM uses the Nuclear Document System (NUDOCS) system and their own hardcopy document files for document management. At the CNWRA, the Technical Document Reference Database System (TDOCS) has recently been implemented to replace the Correspondence Control (CC), Technical Document Indexing (TDI) and QA Records (QA) systems. While TDOCS is a full-text management system, only the headers for CC, TDI, and QA have been loaded at this time. TDOCS currently supports physical filing and check-out of technical documents by the staff. Full-text of selected documents will be loaded on a document loading plan to be developed jointly with the NRC in FY95.

TDOCS will be installed early in FY95 at the DWM as a "Read Only" system when the necessary hardware and software already on order, as shown in Table 3-1, is delivered. A synchronized server version of TDOCS that links the CNWRA and DWM TDOCS servers is being designed. Plans and cost estimates for implementation will be included in the CNWRA delivery of the "Database Synchronization Design Report and Prototype Implementation" on February 24, 1995.

Table 3-1. DWM hardware and software for TDOCS read-only server in FY95

Quantity	Item Description	Estimated Cost
1	Sun Microsystems Sparc 5/85 (Temporary TDOCS Server)	\$ 6,000
1	Oracle Software (Server)	\$ 40,000
1	Verity Topic Software (Server)	\$ 85,000
25	Verity Topic Software (Clients) ¹	—
1	Scanner	\$ 35,000
SubTotal		\$166,000
¹ Same Topic Requestor Software as purchased for RPD clients by DWM (see Table 3-2)		

3.3 REGULATORY PROGRAM DATABASE

The Regulatory Program Database (RPD) is used to: (i) capture results of Systematic Regulatory Analysis (SRA); (ii) support the efficient retrieval, review, and confirmation of information; and (iii) support and maintain a corporate memory of decisions and considerations pertaining to the licensing process. The RPD 2.0 provides a Standard Generalized Markup Language (SGML) coding structure, relational database record control, and full-text search and retrieval for all SRA records (DeWispelare, A., et al., 1994). These records are produced from analyses preparing Compliance Determination Strategies (CDS) and Compliance Determination Methods (CDM) to resolve Key Technical Uncertainties (KTU) in the licensing of the HLW repository.

The RPD implementation incorporates an "Open Item" Tracking System (OITS) for three types of open items: (i) regulatory, (ii) institutional, and (iii) technical uncertainties. Support is provided for tracking open items by "responsible" party and "action" party. Status reports are available on-line, along with a history of actions taken to resolve the open items.

During FY94, the RPD was implemented at the CNWRA. A generalized report writer was implemented to support standard reports such as the License Application Review Plan (LARP). During FY95 UNIX and Windows clients for RPD/OITS will be delivered for the DWM to access the RPD Server at the CNWRA, and Table 3-2 identifies the additional software required for the DWM users.

Table 3-2. DWM client software for RPD in FY95

Quantity	Item Description	Estimated Cost
25	Verity Topic Software (Client) ²	\$50,000
SubTotal		\$50,000
² 25 copies of Topic Requestor at \$2,000 each for Windows and UNIX		

3.4 SOFTWARE FOR PROJECT MANAGEMENT

The project management function supports the administration of operations planning, periodic cost reporting, commitment control, and project scheduling at the CNWRA. During FY94, the CNWRA began using Microsoft EXCEL and Microsoft PROJECT to support this application. The CNWRA will continue to use these two products. Additionally, the Oracle database and database tools such as Gupta SQL Windows 5.0 or Primevera Parade 4.0 are presently being evaluated. Recommendations for their use in providing DWM and CNWRA staff access to reports, such as the Commitment Control Log (CCL), will be made by the end of calendar year 1994. These database tools are shown in Table 3-3 below.

Table 3-3. DWM project management software for FY95

Quantity	Item Description	Estimated Cost
1	SQL Windows 5.0 or Parade 4.0	\$3,000
SubTotal		\$3,000

3.5 SCIENTIFIC AND ENGINEERING MODELS AND CODES

The DWM and the CNWRA will be involved in the technical review of activities and development of guidance, procedures, and technical positions. Fulfilling these tasks involves: (i) ready access to technical databases; (ii) analysis and display of spatial and temporal data; (iii) code assessments; (iv) literature searches and reviews; and (v) checking DOE calculations and documents. These tasks require the utilization of Geographical Information Systems (GIS), 2D/3D graphics, and other data management software. The Ingress database software maybe required for compatibility with the DOE technical databases. Additional Network File System (NFS) mass storage and Fiber Distributed Data Interface (FDDI) hardware and software and upgrading of the SUN IPXs and 10s to Sun Sparc10s and 20s are required to accommodate loading and reviewing of DOE technical databases. The operating system for SUN computers should be upgraded to Solaris 2.3 to take advantage of additional features, when the application software becomes compatible.

Computer activities in the CNWRA's Iterative Performance Assessment (IPA) Task include reviewing DOE's performance assessment (PA) program and conducting independent iterative PAs with the DWM and RES staffs. Additionally, the codes (FORTRAN-based primarily) must be maintained and developed further to meet ongoing PA requirements.

The options for access to databases at DOE as well as those of other major organizations [e.g., United States Geological Survey (USGS)] containing primarily DOE and HLW-related technical data are the subject of a related project. This project is being conducted to implement appropriate access protocols and systems for the DWM to use for this purpose. The LYNX System and ISATIS or comparable software maybe required for compatibility with DOE technical data processes. The LYNX and ISATIS provide both a three dimensional (3D) geological model framework development platform, that complements the existing EARTHVISION software used by the CNWRA and DWM, and the capability to handle engineering structures and incorporate geostatistics externally. Each of the technical computing requirements are as shown in Table 3-4.

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Table 3-4. DWM technical computing hardware and software for FY95

Quantity	Item Description	Estimated Cost
1	LYNX Comparable Software	\$ 40,000
1	ISATIS	\$ 16,000
14	Upgrade Sun to Solaris 2.3	\$ 10,000
1	Upgrade Sun Sparc10, Model 41 to 52 or Sparc 20	\$ 20,000
1	Ingress Database System	\$ 25,000
Subtotal		\$ 111,000

3.6 COMMUNICATIONS AND SECURITY SYSTEMS

A Fractional T1 line (576 kbps) is being installed, and it will be fully tested and ready for production mode in October 1994. The faster transmission rates will support increased usage of RPD, OITS, and TDOCS applications. External CRAY usage will continue at INEL, using Internet primarily, by both the DWM and CNRWA staff. Internet access of the DOE and other contractor databases is also expected to increase. All items necessary to provide the Fractional T1 line capability are installed at this time.

A Firewall system that provides security of the entire CNWRA network from Internet users access is planned for implementation in early FY95. No additional hardware and software is required by the DWM for the firewall system.

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4 SUMMARY OF FISCAL YEAR 1995 COMPUTER REQUIREMENTS FOR THE DIVISION OF WASTE MANAGEMENT

The total DWM requirements in the six application categories are summarized in Table 4-1.

Table 4-1. Summary of DWM computer requirements for FY95

Category	Quantity	Item Description	Estimated Cost
Office Automation	—	—	—
Document Management/ Read Only	1	Sun Microsystems Sparc 5/85 (Temporary TDOCS Server)	\$ 6,000
	1	Oracle (Server)	\$ 40,000
	1	Verity Topic Software (Server)	\$ 85,000
	1	Scanner	\$ 35,000
Systematic Regulatory Analysis	25	Verity Topic Software (Client)	\$ 50,000
Project Management	1	SQL Windows or Parade	\$ 3,000
Technical Computing	1	LYNX or Comparable Software	\$ 40,000
	1	ISATIS Software	\$ 20,000
	14	Upgrade SUN to Solaris 2.0	\$ 10,000
	1	Upgrade SUN SPARC10, Model 41 to 52 or SPARC 20	\$ 20,000
	1	Ingress Database System	\$ 25,000
Communications and Security Systems	—	—	—
Total			\$334,000

This report defines the hardware and software only and does not include any labor for system design, development, implementation, testing, training, and documentation. The CNWRA has existing project tasks to design and implement the RPD/OITS, TDOCS (read only), and to support FORTRAN codes and other technical computing applications in FY95.

Additionally, hardware and software installation, maintenance, and warranty services are not included. They are provided through the NRC Office of Information Resource Management (IRM) and its vendor/contractor support of the DWM.

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5 REFERENCES

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