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1 Introduction

The U.S. Nuclear Regulatory Commission (NRC) has a requirement for establishing and operating a hearing room with digital information retrieval, utilization, and display capabilities in conjunction with anticipated licensing proceedings for a high-level radioactive waste (HLW) repository at Yucca Mountain, Nevada. These capabilities also are expected to be available for use in other licensing proceedings conducted by the Atomic Safety and Licensing Board Panel (ASLBP) in the NRC's Rockville, Maryland facility. Additionally, it is envisioned that portable and remote capabilities would be used to support local hearings conducted across the United States.

These circumstances give rise to the Commission's need for a Digital Data Management System (DDMS) equipped hearing room whose technology is simple to operate, reliable and fast. The remainder of this document describes the preliminary design for the Production DDMS to be used in conducting the HLW licensing proceedings in Rockville, Maryland.

1.1 Background

The ASLBP is responsible for conducting the adjudicators' proceedings regarding the Department of Energy's (DOE) application for construction authorization for a HLW repository at Yucca Mountain, Nevada. The current estimated date for beginning evidentiary hearings is May 2005. The scope and nature of this proceeding dictate the need for efficient capture and management of the enormous volume of multimedia data that must be processed and displayed in a very short time frame for this hearing. The Office of the Secretary (SECY) estimates that upwards of 50,000 documents will be submitted to the HLW hearing, which is 300 times the volume associated with a typical ASLBP hearing and 24 times the volume of the largest hearing currently being conducted. In the current environment, ASLBP hearings are conducted using paper-based information and limited audio/visual (A/V) capabilities. This current approach clearly cannot support a hearing of the magnitude of the HLW repository licensing proceeding and cannot meet Commission rules established for the proceeding including the provision for online access to the SECY maintained electronic docket during the hearing. [Reference: 10 C.F.R. 2.1013(d)]

NRC has conducted a comprehensive analysis to examine alternative solutions, including the utility of its existing Agency-wide Document Access and Management System (ADAMS) (see http://www.nrc.gov/reading-rm/adams.html), for establishing an "electronic courtroom"/hearing room DDMS to fulfill this mission need. As part of this analysis, NRC has developed a vision of a DDMS that will be used in the Rockville hearing room and in a hearing room to be established in the Las Vegas, Nevada area to conduct the majority of the proceeding. The system will enable the creation and use of an integrated, comprehensive digital record for the HLW repository licensing proceeding. Using information that is pre-filed electronically by hearing participants in the agency's ADAMS-based Electronic Hearing Docket (EHD), DDMS will record, store, and display the text and image of documents and other digital data presented in the hearing and permit access and retrieval of the entire documentary and video record of the proceeding in an electronic format. The system will allow counsel for the parties to bring prepared materials to

the evidentiary hearing electronically and have it integrated and accessible concurrently with the record being presented in the hearing room. The record will be continually accessible by the presiding officer and the parties in the litigation. The DDMS will support hearing activities and information management during the pre-hearing, hearing, and post-hearing phases.

NRC has identified an aggressive schedule for providing this courtroom data and document management capability, from initial planning and coordination activities through delivery and maintenance of an operational system. This project is intended to deliver the required range of services in a four-phase project, with each phase separately authorized and funded. The first three phases of work will be completed under this contract. The fourth phase, implementation of the Las Vegas area capability, will be implemented at a later date.

1.2 Objectives

The major objective of the DDMS is to help the NRC meet the congressionally mandated three-year time requirement for the HLW repository licensing proceeding and to meet the regulatory requirement that there be online access to the HLW repository hearing docket during the hearing. Properly structured, the DDMS will support other ASLBP hearings as well. The DDMS is intended to achieve time and resource savings by improving the efficiency of conducting this high profile HLW repository licensing hearing with the anticipated large volume of electronic discovery and evidentiary information and is essential to the ASLBP in preparing timely decisions throughout the proceeding. It will also support the Office of General Counsel (OGC) and the Office of Nuclear Materials Safety and Safeguards (NMSS) staff and other parties in preparing for evidentiary proceedings and may be useful to Commissioners' staff in performing appellate review/oversight activities.

1.3 Scope

The DDMS is a critical component in ASLBP's plan to fulfill Congress' mandate to NRC to efficiently process the Yucca Mountain HLW license application. DDMS employs stable information technologies that will provide the NRC community access to shared information and processes. The key to the success of the DDMS is the effectiveness of its user interface - to save time in conducting hearings. DDMS will enable users to rapidly and easily access information on demand.

PEC has been tasked with the design, development, and implementation of the DDMS. This objective will be met through a series of tasks:

1. Task 1 – Define the DDMS requirements—both for a proof-of-concept (POC) system and for the full Production System, create the design, field, and evaluate the POC.
2. Task 2 – Design, install, and test new audio/visual components in the NRC's Rockville, Maryland, Hearing Room.
3. Task 3 – Develop the DDMS full Production System, based on derived input from the POC operations, and field the DDMS Production System in Rockville, Maryland.

It is important to note that the design of the Production DDMS was originally created as part of Task 1. Further refinement, revision and completion of this design were performed during our work in Task 3. The detailed design and installation of Audio/Visual components is ongoing as part of Task 2. Only then the Task 2 work installation is complete, can a final design of an integrated DDMS be described.

1.4 Assumptions

The following assumptions were made for DDMS planning purposes:

- This version (2.0) incorporates known design decisions as of **January 30th, 2004**. The Production Design is ongoing, and updates to this document will be provided as necessary and the final version will be delivered per the Task 3 schedule.
- Detailed design for a remote installation of the DDMS is not fully incorporated into this document. PEC has included high-level design suggestions for remote sites, but decisions as to specific detail are not currently available.
- The detailed design for the Las Vegas implementation of DDMS is not included in this document. For planning purposes, PEC assumed a potential Las Vegas configuration, but the actual design and implementation will occur as part of Task 4. Specific changes to the Rockville, MD DDMS installation will not be known until the design phase of Task 4.
- Initial integration and development of the production system will be performed at PEC facilities. At the conclusion of internal testing, the production system will be configured at NRC in Rockville, Maryland. PEC will then perform initial testing and support the conduct of NRC evaluation testing.
- Electronic exchange of documents and metadata among the DDMS and High Level Waste Electronic Hearing Docket (HLW-EHD) and ADAMS systems will be performed according to the interface standard set forth in the *DDMS Interface Control Document* (**ICD, Version 2.0**).
- Court Reporters involved in the high level waste hearings will utilize the real-time transcription and closed captioning Advantage Software package named Eclipse/ AccuCap.
- The NRC Office of the Chief Information Officer (OCIO) staff will perform monitoring and audit of DDMS design and implementation activities.
- The DDMS will not require formal certification by NRC for compliance with the Americans with Disabilities Act. Plumtree® will provide a statement certifying their portal interface as ADA 508 compliant.

1.5 Applicable Documents

The following documents were either used in generating this design document, or are used in conjunction with this document to provide a complete picture of the DDMS design:

- System Development and Life-Cycle Management Methodology (SDLCM), Handbook, Version 2.2, December 1999 (the official SDLCM process in place at the time of contract award).
- Nuclear Regulatory Commission Hearing Room Digital Data Management System Study, Aspen Systems (Redacted), July 26, 2001.
- Digital Data Management System Statement of Work originally dated March 15, 2002 and amended on April 12, 2002.
- PEC's Digital Data Management System (DDMS) Updated Technical Proposal dated June 18, 2002.
- PEC's Digital Data Management System Project Action Plan dated October 2003.
- PEC GSA Schedule Contract No. GS-35F-4366G.
- Code of Federal Regulations 10, Part 2, Subpart J.
- NRC Management Directive 12.5 NRC Automated Information Systems Security Program, Revised February 1, 1999.
- Hearing Room Video/Computer System Training Transcript.
- DDMS *Interface Control Document* (ICD)—this document describes in detail the interfaces between DDMS and the other NRC systems. This document will be submitted under separate cover.
- DDMS *Hearing Room Audio/Video System Design Document*—this document was completed under Task 2 of the DDMS development and was submitted under separate cover. The A/V Design document contains detailed descriptions and physical layouts of the hearing room A/V installation for Rockville.

1.6 Document Overview

This section, Section 1, serves as an introduction describing the background, objectives and scope of the DDMS project. The remainder of the document is structured as follows:

- Section 2 describes the approach used in developing the DDMS.
- Section 3 describes, at a high level, the requirements of the Production DDMS.
- Section 4 describes the new and enhanced functional areas for DDMS.
- Section 5 summarizes the system architecture. This includes a description of the high-level system architecture, the application architecture and the platform components.
- Section 6 describes the logical design of the DDMS including a description of all the major processes.
- Section 7 describes the physical design of the DDMS including screen layouts and descriptions of the components utilized
- Appendix A contains the DDMS Production Requirements Matrix.
- Appendix B contains the Alternatives Analysis for the COTS calendaring packages.
- Appendix C contains a Glossary.

1.7 Acronyms and Abbreviations

ACL	Access Control List
ADAMS	Agency-wide Documents Access Management System
ASCII	American Standard Code for Information Interchange

ASLBP	Atomic Safety and Licensing Board Panel
ASP	Active Server Pages
A/V	Audio/Visual
CD	Compact Disk
C.F.R.	Code of Federal Regulations
COM	Communications
COTS	Commercial Off-The-Shelf
CRT	Cathode Ray Tube
DBMS	Database Management System
DDMS	Digital Data Management System
DMZ	Demilitarized Zone
DNS	Domain Name Server
DoS	Denial-of-Service Attack
DPC	Document Processing Center
DVD	Digital Video Disk
EHD	Electronic Hearing Docket
EIE	Electronic Information Exchange
FIPS	Federal Information Processing Standard
FODA	Facilitated Operational Design Assessment
FTP	File Transfer Protocol
GB	Gigabyte
GHz	Gigahertz
GOTS	Government Off-The-Shelf
GSA	General Services Administration
HLW	High Level Waste
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transfer Protocol Secure
ICD	Interface Control Document
ICMP	Internet Control Message Protocol
IIS	Internet Information Server
IP	Internet Protocol
ISP	Internet Service Provider
Kbps	Kilobits per second
KVM	Keyboard, Video, Mouse switch
LAN	Local Area Network
LDD	Logical Data Document
Line 21	Video track where closed-captioning text is placed
MPEG	Moving Picture Expert Group
MTA	Mail Transfer Agents
MUA	Mail User Agents

NAT	Network Address Translation
NIST	National Institute of Standards and Technology
NOC	Network Operations Center
NRC	Nuclear Regulatory Commission
NSA	National Security Agency
OCIO	Office of the Chief Information Officer
ODBC	Open Database Connectivity
O&M	Operations and Maintenance
OS	Operating System
OSI	Open System Interconnection
PAP	Project Action Plan
PDAD	Project Definition and Analysis Document
PDF	Portable Document Format
PDD	Physical Design Document
PMR	Program Management Review
POC	Proof of Concept
RAID	Redundant Array of Independent Disks
RAM	Random Access Memory
SCSI	Small Computer System Interface
SDLCM	System Development and Life-Cycle Management
SECY	Office of the Secretary
SMTP	Simple Mail Transport Protocol
SNMP	Simple Network Management Protocol
SOC	System Operations Concept
SOW	Statement of Work
SQL	Structured Query Language
SRS	System Requirements Specification
TBD	To Be Determined
TBR	To Be Revised
TCP/IP	Transmission Control Protocol/Internet Protocol
TIFF	Tag Image File Format
TS	Touch Screen
URL	Uniform Resource Locator
USB	Universal Serial Bus
UPS	Uninterruptible Power Supply
VCR	Video Cassette Recorder
VGA	Video Graphics Array
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
WAN	Wide Area Network
WMV	Windows Media Video

WWW	World Wide Web or the Web
XML	Extensible Markup Language

2 Approach

2.1 System Development Methodology

The DDMS development comprises two parts: a POC system and the full production system. The POC was developed and delivered in August 2003, utilizing a subset of the full production system's functional and technical requirements. These included document management, hearing management, exhibit and transcript handling, video/audio presentation and real-time transcription. The POC phase intended to prove the technical feasibility of the DDMS approach, including the architecture, security, interoperability, and 'basic' functions of the full production system. The POC utilized existing audio and video inputs to the DDMS. The key users, including judicial staff, NRC staff, and possibly party attorneys, were provided full access to the appropriate functions within the DDMS.

The POC proved that the concept for DDMS is sound. Once the basic functionality was operational, development began for the full-scale production system for the NRC HLW hearings. The production system builds upon the POC, with enhanced functionality and additional performance and redundancy features. The production system will meet all validated functional, performance, security, and availability requirements for the DDMS.

This development methodology focuses on the use of rapid prototyping to validate the system's operational concept and the user interface, both critical areas of design. PEC conducted multiple reviews with judges and court administrative personnel, ensuring the DDMS design is easy to use within the constraints of real-time hearing-room conditions.

The production system will center on the use of COTS products such as Plumtree® Corporate Portal and Collaboration Servers, Microsoft SQL Server, Adobe Capture and Adobe Acrobat. These COTS products provide the required functionality, and the modularity and flexibility needed to customize the integrated system to best meet the needs of the ASLBP. This document specifically addresses the design of the DDMS production system.

2.2 Design Method

The DDMS takes extensive advantage of both hardware and software off-the-shelf products. The DDMS is based on an architecture consisting of an internet/intranet-portal using current Internet technology standards. The multi-media and courtroom products are utilized in courtrooms nationwide. This approach is intended to provide the NRC with a hearing management solution that will be architecturally relevant for many years.

The DDMS architecture will meet all NRC performance and availability requirements. Many components of the Production design are redundant, ensuring extended system availability. Multiple servers will provide load balancing and fail-over capabilities.

The DDMS will employ technologies such as touch sensitive flat panel screens, simple graphical interfaces, and a user interface that organizes and prioritizes what judges and other users see

when operating DDMS in the hearing room. The solution will interface with legacy systems, and will expedite proceedings.

3 Requirements

3.1 Sources of information

PEC utilized multiple sources of information in validating, clarifying, and refining the Production requirements for the DDMS. This section identifies the sources used in this requirements analysis process.

3.1.1 SOW Requirements

The original requirements for the DDMS stem from the *Aspen Study*, and are codified in the DDMS Statement of Work. All subsequent clarifications and revisions can be traced back to the original requirements.

3.1.2 Technical Proposal Requirements

A subset of the original requirements was included in the PEC Technical Proposal for the POC system. The subset includes all of the required functionality, performance, and security requirements, but eliminated the original redundancy requirements and some of the more complex hearing management requirements. These eliminated requirements were then added to the proposed DDMS Production design.

3.1.3 Requirements Analysis Documents

NRC provided several hardcopy documents and manuals to assist in the requirements analysis effort. Documents ranged from templates for electronically entering information into NRC to manuals and presentations helping describe data elements.

Documents provided and used in the requirements analysis included:

- PEC's DRAFT Technical Reference Document (June 2002)
- Docket Input Form
- EIE-web interface forms and sample screens
- EIE XML file sample
- Data Mapping document showing ADAMS—EHD—DDMS data fields.
- ADAMS LDD and PDD
- Presentation discussing electronic dockets (from DOE)
- Description of Adjudicatory Docketing Process within the Existing ADAMS Environment.
- Sample ADAMS document processing templates
- Sample Protective Orders

- Sample Witness List
- *Aspen Study* JAD notes.
- *Aspen Study* (October – November 2000)
- *10 CFR Part 2, Subpart J* Presentation (presented June 25-26, 2002)
- Briefing on Rulemaking on Electronic Maintenance and Submission of Information
- Description of the Adjudicatory Docketing Process in the Existing ADAMS Environment
- *NRC Foreign Networks (Trusted / Untrusted)* working definition paper

3.2 PEC Requirements Analysis Approach

As part of this project, PEC was tasked with validating, clarifying, and revising the baseline DDMS requirements provided by the Nuclear Regulatory Commission in the Statement of Work (SOW). This has occurred in two distinct phases. Previously, during the POC phase, PEC revised and validated a subset of all DDMS requirements. This subset provided the major functionality for the Proof of Concept DDMS. For the second, or Production phase, the performance and system availability requirements and some additional hearing management functions were added to the baseline requirements listing, per the SOW. These additional requirements were then clarified and validated through a series of technical meetings and system demonstrations.

PEC managed the requirements using a database to track original versions of each requirement, along with clarifications, business rules, and any other pertinent information.

PEC's primary approach to validating the Production requirements was to conduct a series of interviews and technical discussions with key NRC personnel and future DDMS users. The overall goal of the interviews was to clarify and validate the existing requirements, and identify any potential new requirements. The primary functionality of the DDMS will be carried over from the POC. In addition, numerous Production requirements meetings were held with technical NRC personnel to clarify the performance and availability requirements.

An indispensable function of the DDMS is to provide a reliable interface with the existing NRC document repositories, EHD (through the HLW-EHD server) and ADAMS, to help ensure document control. Several technical meetings were held to formalize the DDMS Interface Control Document (ICD) for the POC phase. These meetings included key NRC personnel from OCIO, ADAMS, SECY, and ASLBP. This process was repeated during the Production design phase, to accommodate any changed assumptions and understandings. The most recently submitted ICD is available under separate cover.

As the requirements were validated, PEC conducted several requirements meetings with NRC technical representatives to review and approve the clarified requirements, and to ensure a common understanding of each requirement. Any action items or issues resulting from the meetings were tracked and resolved separately.

An additional methodology employed during the production design phase was to conduct Facilitated Operational Design Assessment (FODA) sessions. PEC conducted targeted FODA sessions tailored to each major user group utilizing the POC system, to help elicit procedural and navigational comments and suggestions. Each user group was encouraged to provide feedback based upon the initial designs for the functions and screens. PEC then took the comments and feedback and provided a report to NRC summarizing the findings and making recommendations for changes based upon the sessions. PEC categorized the potential changes as minor fixes, enhancements, or major requirements' changes and will incorporate the changes as directed by NRC.

3.3 Production Requirements Breakdown

This section provides a more in-depth description of the DDMS functional areas. The requirements are grouped into the following categories:

- **Administrative**— requirements related to general hearing room administrative functions, both prior to and during the hearing.
- **Architecture**— requirements related to the hardware components, the installation, configuration, and setup of the equipment in both the local area, and any remote installations.
- **Data Management**— requirements related to system, database, and data security controls necessary for the DDMS.
- **Document Management**— requirements related to the mechanisms for storing, managing, retrieving, and producing output of all documents related to the hearing.
- **Hearing Management**— requirements related to the overall workflow, procedural, and document processing within the hearing environment.
- **Multi-Media Management**— requirements related to the capturing, storing, and playback capabilities for the audio and video files from the hearing.
- **Security—** requirements related to the DDMS physical security, data integrity, and data security.

Each category is further described below. For a complete listing of DDMS Production requirements, refer to Appendix A.

3.3.1 Administrative

The administrative category includes many functions closely related to Hearing Management. However, this category includes functions accomplished both prior to and during the actual hearings. Functions include:

- Managing documents and other information in support of administering pre-hearing conferences and evidentiary hearings; and
- Hearing and system administration.

3.3.2 Architecture

The architecture category includes hardware configuration, system layout, and terminal locations for the DDMS, both in the Rockville location and potential remote sites. This category holds all hardware related requirements including:

- Terminal locations within the Rockville environment, including the Hearing room, judge's chambers, judges bench, conference rooms, and judges conference rooms;
- Integration with current NRC enterprise architecture with the capability to integrate with industry standard audio/video technologies; and
- Servers meeting NRC procurement standards.

3.3.3 Data Management

The system and data management category encompasses all of the background processes and functions required to effectively support the DDMS. These functions include database management, security and access management, interface standards, and data control functions. Data management functions include the ability to:

- Utilize an architecture accommodating integration with legacy systems (ADAMS);
- Apply industry standards for the system's graphical user interfaces;
- Provide system administrator duties to include establishing and managing access rights for users and groups;
- Provide secure database/data administration capabilities including creating, updating, and deleting records and tables;
- Provide both standard and ad-hoc reporting capabilities for users;
- Provide basic and advanced search capabilities for all DDMS data, including documents and video records; and
- Display of all stored information.

3.3.4 Document Management

DDMS document management represents one of the key areas of the system. With the projection of the HLW proceedings being the largest and most technically complex administrative hearing on record, it is expected that DDMS will manage upwards of hundreds of thousands of documents. Within this broad umbrella of functions, the design specifically cites other document management areas to include:

- Electronic marking of exhibits and evidence;
- Full text search of documents, exhibits, evidence, and other hearing documentation;
- Electronic capture and conversion (via scanning) of paper documents;
- Overall integration with commercially available document packages such as Microsoft Word®; Microsoft Excel®; Corel WordPerfect®; and Adobe® Reader;
- Receipt of pre-filed documents and electronic pleading(s) from the EHD;

- Capture of decisions issued by a licensing board [via EIE].

3.3.5 Hearing Management

DDMS hearing management functions include the procedural and workflow requirements for the hearing. Other requirements include the electronic access and dissemination of documents, witness lists, depositions, exhibits, evidence, and transcripts. Specific functions include:

- Sealing and unsealing of records;
- Electronically accessing witness lists, depositions, pleadings, exhibits, and evidence;
- Managing evidence;
- Producing Real time transcripts;
- Synchronization of transcripts with video proceedings and electronic documents;
- Search for electronic and physical evidence;
- Access controls for all hearing documents and files;
- Access to external research databases and subscription services;
- On-line access to the electronic hearing docket (EHD); and
- Calendaring and Scheduling of boards, issues, parties, witnesses, and judges.

3.3.6 Multi-Media Management

Another key area of the DDMS, and one of the most visible, are the audio/video functions. One of the primary functions of the DDMS will be instant replay of hearing videos and their synchronized transcripts from the entire hearing. This category groups those functions related to audio or video management, such as video capture and storage, and playback capabilities. Specific requirements include:

- The capturing, indexing, encoding, storing, and play back of hearing room proceedings;
- The electronic capturing of physical evidence; and
- The presentation of hearing information from a variety of multimedia sources to multiple monitors and terminals.

3.3.7 Security

The security category of the DDMS Production requirements comprises all functions related to physical security, data integrity, and data security of the information stored within the system. This category includes:

- System access and login rights and procedures for DDMS users and groups;
- Warnings and alerts generated by the DDMS to inform users of security precautions; and
- Creation and management of an audit trail to track data access and manipulation.

3.4 Performance and Availability Requirements

The production system incorporates several performance and availability requirements to ensure the NRC meets the mandated time and efficiency standards. These performance and availability requirements drive the architecture and design of the components, including the use of backup servers and replicated databases. The full listing of performance requirements are included in Appendix A. These performance and availability requirements include:

- DDMS to HLW-EHD interface shall be available 7 days per week, for a minimum of 1 hour per day;
- DDMS shall support local and remote access for a scheduled 21 hours per day, 7 days per week; and
- DDMS shall display a full result list within 10 seconds of the request, for 90% of all requests.

These requirements impact the backup and redundancy schema, the maintenance and downtime schedules, and the scalability of the DDMS servers. Typical periodic maintenance includes regular data backups, system administration, and ingestion of HLW-EHD inputs.

3.5 Production Requirements Review Meetings

The following table lists the PEC-conducted production requirements analysis and review meetings with the appropriate NRC personnel, to include the date and overall purpose of each meeting.

Date	NRC Attendees	Topic for Discussion
03/12/03	Mack Cutchin; Joe Turner; Beth DeWoody; Pat Smith; Jack Wetstine	DDMS Technical Working Group meeting, to discuss exhibit processing and PFS lessons learned.
03/18/03	Judge Bollwerk; Judge Moore; Michelle Mendelson; Joe Turner; Pat Smith	High-level discussion primarily on pre-filed testimony, both the current process, and the process under DDMS.
03/20/03	Judge Bollwerk; Dan Graser; Pat Smith; Mack Cutchin; Joe Turner	First detailed discussion of Production DDMS requirements matrix.
03/25/03	Pat Smith; Mack Cutchin; Judge Moore; Beth DeWoody; Judy Triekle	Interview with Party attorney to discuss visions for DDMS and electronic courtroom.
04/03/03	Beth DeWoody; Larry Danziger; Cameron Woods; Devon Crawford; Pat Smith; Emile Julian; Joe Turner; Mack Cutchin; Judy Burke	DDMS ICD Review Meeting to discuss draft ICD.
04/03/03	Pat Smith; Mack Cutchin; Beth DeWoody; Joe Turner	Detailed discussion of Production requirements, 2nd session.

Date	NRC Attendees	Topic for Discussion
04/09/03	Judge Bollwerk; Pat Smith; Beth DeWoody	Discussion of Production requirements, and judge's contention reports.
04/17/03	Pat Smith; Mack Cutchin; Beth De Woody; Judge Bollwerk	Pre-filed Testimony Processing
04/17/03	Pat Smith; Mack Cutchin; Beth DeWoody;	Detailed discussion of Production requirements, 3rd session.
04/29/03	Moe Levin, John Linehan, Joe Turner, Jim Schaeffer, James Corbett, Emile Julian, Jeff Ciocca, Mike Williams, Mack Cutchin, Wil Madison, Mitzi Young, Judy Schectman, Roland Frye, Judge Bollwerk, Lawrence Chandler	Stakeholder's meeting and review of DDMS to date.
05/07/03	Pat Smith; Beth DeWoody; Cameron Woods; Emile Julian; Larry Danziger, Judy Burke, Wil Madison; Joe Turner; Mack Cutchin	DDMS ICD meeting to discuss final draft of ICD.
05/13/03	Anita Capiferri, Nick Dinunzio, Martha Crosland, John Gandi, Pat Smith, Judge Moore, Mack Cutchin	Meeting with DOE attorneys to discuss potential uses of DDMS from Party perspective.
05/19/03	Marty Malsch, Joe Egan, Mike O'Melia, Judge Moore, Pat Smith, Mack Cutchin	Meeting with State of Nevada representatives to discuss use of DDMS from party perspective.

Figure 3-1 – Descriptions and Participants of Requirements Meetings

3.6 Facilitated Operational Design Assessment (FODA) Sessions

In November and December of 2003, PEC conducted a series of Facilitated Operational Design Assessment (FODA) sessions with several DDMS user groups. The objective of the sessions was to further refine the usability of the existing DDMS design. Primary system functions were demonstrated to users, and comments and feedback were elicited to provide a better understanding of how user groups would actually use the system. Comments and suggestions for improvement were noted, and a summary of the meetings is in Table 2 below. A complete list of meeting notes is available separately.

Date	Participants	General Comments
11/03/03	**ASLBP Judges**: Thomas Moore, Richard Cole, Paul Bollwerk, Ann Young, Charles Bechhoefer, Tony Baratta, Peter Lam, Charles Kelber, Anthony Eitreim; **Other participants**: Beth DeWoody, Mack Cutchin, Joe Turner, Margie Janney,	Session focused on the Judge's community. PEC demonstrated the major functions and received comments and feedback

Date	Participants	General Comments
	Brandon Ross, Amy Roma, Jack Whetstine; PEC participants: Rick Schutz; Joe Simpson, Michael Parchen, Peter Estabrook, Paul Gwaltney, Clint Locker, Tony Mangerie.	related to usability and ease-of-use.
11/04/03	**NRC**: Sher Verne Cloyd, Karen Valloch, Mack Cutchin, Sharon Marks Perini, Ann Young, Paul Bollwerk, Jack Whetstine, Joe Turner, Beth DeWoody, Tony Barrata, Margie Janney, Brandon Moss, Amy Roma, Susan Lin; **PEC participants**: Rick Schutz, Joe Simpson, Michael Parchen, Peter Estabrook, Paul Gwaltney, Clint Locker, Tony Mangerie.	Session focused on Clerk's Community. Comments and feedback were elicited related to usability and ease-of-use.
11/10/03	**OGC**: Mitzi Young, Laura Zaccari, Marisa Higgins; **NEI**: Rod McCullum, Michael Bauser, John McIntire; **NRC**: Beth DeWoody, Mack Cutchin, Joe Turner, Paul Bollwerk; **PEC participants**: Rick Schutz, Joe Simpson, Michael Parchen, Peter Estabrook, Clint Locker, Paul Gwaltney	Session focused on the Parties' community, with both the OGC and NEI present.
11/17/03	**OGC:** Lawrence Chandler, Sherwin Turk; **Nevada:** Michael O'Mealia; **NRC:** Beth DeWoody, Mack Cutchin, Paul Bollwerk, Thomas Moore, Dan Graser, Margie Janney, Jack Whetstine; **PEC participants**: Rick Schutz, Joe Simpson, Michael Parchen, Peter Estabrook, Paul Gwaltney, Clint Locker.	Session focused on the Parties' community, with the State of Nevada present.
11/17/03	**DOE:** Martha Crosland, Nick DiNunzio; **NRC:** Beth DeWoody, Mack Cutchin, Paul Bollwerk, Thomas Moore, Dan Graser, Margie Janney, Jack Whetstine, Joe Turner; **PEC participants**: Rick Schutz, Joe Simpson, Michael Parchen, Peter Estabrook, Paul Gwaltney, Clint Locker.	Session focused on the Parties' community, with the Department of Energy.

Figure 3-2 - Descriptions and Participants of FODA Sessions

3.7 Detailed Design Meetings

PEC conducted a series of detailed design meetings with NRC to fully discuss and document critical production design issues. These discussions led to a more refined design for the DDMS. Design meetings included discussions related to appearance management, remote site functionality and architecture, board selection, and electronic note taking. The meetings provided input for many of the other sections of this document.

Also, during the design period, PEC evaluated three COTS calendaring packages and conducted several reviews with NRC to identify benefits of each of the packages. PEC conducted an alternatives analysis (contained in Appendix B) to assist NRC in determining the best option. NRC has tentatively selected the Center Court product from Levare, Inc. This design document reflects this choice.

3.8 Task 2 Design Meetings

Task 2 of the DDMS development was in progress during the Task 3 design phase. Task 2 provides an Audio/Visual subsystem for the Rockville hearing room. Under Task 2, a separate design document was produced and delivered to NRC describing in-depth the audio and video subsystem components, cabling, and capabilities. Several design meetings were held during this phase to gather requirements and refine the design. Teleconferences were conducted between the PEC team and the technical staff of the ASLBP. These meetings produced the initial design of the control panels for the A/V equipment, and ensured that the impending installation of the system will run smoothly. Installation is scheduled to start within two weeks of the date of this document.

4 Functional Design

Section 4 provides a detailed functional description and design for the production DDMS. Functional descriptions, process flows, and high-level logical diagrams are all included in this section.

4.1 Functional Description

Section 3 highlighted the major functional areas or categories of DDMS requirements. This section will provide more detail for the other major functional areas of DDMS. Many of these are either newly developed or heavily revised from the POC system. The functions, which are detailed below, include:

- Appearance Management
- Backups
- Board Selection
- Electronic Note taking
- Help Functions
- Reports
- Scheduling and Calendaring

4.1.1 Appearance Management

Appearance management comprises two primary functions: scheduling witnesses for appearances within a hearing, and scheduling documents for discussion on particular days. Appearance management evolved out of the dual DDMS requirements for witness list management and the need for a document queue available for DDMS users for each day of the hearing. PEC has designed the appearance management module to accommodate both of these requirements within a single interface. Users will be able to select either a witness or document to schedule for any particular date in the future. While the functions are substantially similar, business rules governing each process differ greatly, and party interaction with witness scheduling will be much more restricted.

Appearances

An appearance can be either by a witness or a document, both scheduled through the DDMS. Appearances are identified by several criteria: the date/time of the event, the party sponsoring the appearance, the board, issue, and contention for which the appearance is scheduled, and the associated panel of witnesses, if appropriate. Witness appearances will be shown on the community home page in a Gantt chart format. Document appearances will be shown in a daily queue format, with hyperlinked titles, allowing single-click access to the PDF documents. From

the main community page, users will select the Appearance Manager hyperlink, which opens a new browser window with all Appearance Management functions available from a single page.

Appearance Manager

The appearance manager window allows single-click access to all appearance management functions. Figure 4-1 below shows a proposed layout for the window. The left frame shows all management functions, which are described in detail below. This table also shows the access rights associated with each function for the primary DDMS user communities. In general, parties will only be able to create and modify witness information, while the other communities will have the authority to schedule witness appearances. All communities will be able to create and update document appearances. The middle portion of the appearance manager window will display corresponding information when specific functions are selected from the left frame. When witness appearances are selected, the display will include hyperlinks to the video transcript for each initial appearance of the witnesses.

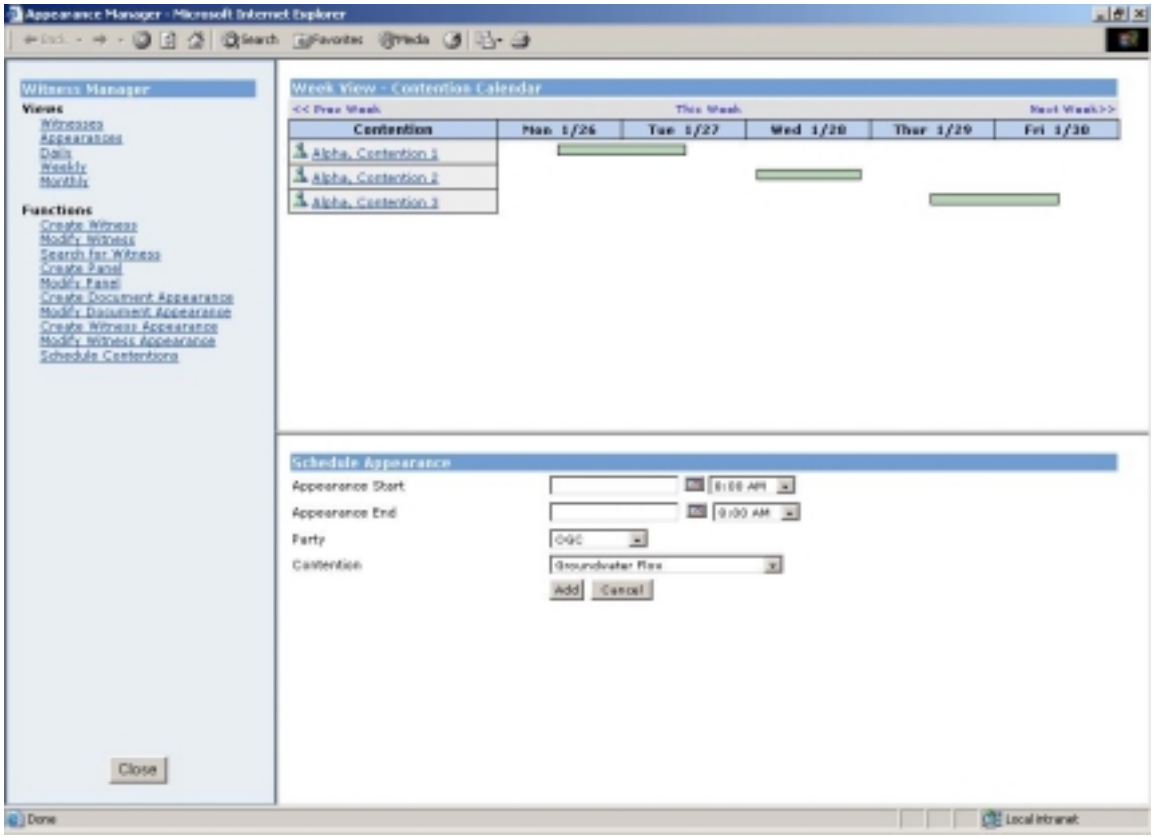

Figure 4-1 - Appearance Manager Screen

The Appearance Manager screen allows the user to perform all related functions from a single window. The displays on the screen's right hand side will change based upon the selection of functions from the left menu bar.

A description of each major function follows:

1. **Create/Modify a Witness**—this includes the initial entering of witness information and any subsequent modification to that information. Basic witness information includes the full name, title, salutation, contact phone number, email, and work address. Witness modification may be restricted to specific users, based upon business rules established by the ASLBP.

2. **Search for Witness**—includes a basic search capability by last name. The search field will provide the capability to narrow a drop-down list of matching results based upon the characters entered into the field. For example, if a user enters "Sm" in the last name field, a drop down list will appear with all last names beginning in "Sm". This function will also be available from the community home page. The search results will show in the appearance management window.

3. **Create/Modify Panels**—in general, all authorized users will be able to create panels consisting of multiple witnesses. Witnesses can be assigned to multiple panels. Panel designators will consist of the last names of each of the panel participants. Once the panels are created, users may be restricted from modifying the panels, based upon business rules as-yet undetermined by ASLBP.

4. **Create/modify document appearances**—All authorized users may create a document appearance. An appearance is created by searching for and selecting the desired document, selecting a date/time, and identifying the related party, board, issue, and contention. Once the appearance is created, the document will enter the queue for the selected day and time. This document will then be displayed on the main community page in the "Today's Document" gadget under the appropriate date. Document appearances may be modified by authorized users up to the day of the hearing. Once an appearance has expired, the appearance record will no longer be modifiable.

5. **Create/modify witness appearances**—Authorized users may create a witness appearance, after the initial approval of the schedule. Authorized users may include judicial staff and the clerk of the court. Once the schedules are approved, users will create the appearance by searching for and selecting the desired witness or panel, selecting the approved date/time, and identifying the related party, board, issue, and contention. Once the witness appearance is created, the appearance will display in the witness schedule gadget on the main community page for each user. Modification to witness appearances will then be restricted.

6. **Selecting calendar views for appearances**—this function is available both on the main community home page, and in the appearance manager window. Users may select the desired calendar view to display all appearances for a particular board. A link from the Common Task gadget will allow users to select the specific board for display.

7. **Scheduling Contentions Link**—this link provides a direct connection to the scheduling and calendaring functions, provided through the Center Court product. This is described more fully below in section 4.7.

Witness Appearances

Hearing procedures will control witness appearances. In general, proposed witness schedules will be assessed and discussed during pre-hearing conferences between the parties and the judges. These schedules will be tentatively approved prior to creating appearance records within DDMS. Each witness appearance will be assigned one of two statuses: Adopted or Actual. When initially created, the witness appearance is assigned the status "Adopted". This will be indicated on the main witness appearance schedule by a green bar on the Gantt chart. On the day of the hearing, the clerk may make any adjustments required in the date/time of the appearance, and change the status to "Actual". A red bar on the Gantt chart will indicate an "Actual" status. The status will then remain "Actual" in the historical records.

4.1.2 Backups

Backing up the DDMS system will be critical to ensure uninterrupted service for the HLW hearings. The backup strategy is described below. The *DDMS Contingency Plan* provides more details on the backup procedures and processes.

4.1.2.1 Backup for Rockville

The DDMS will utilize Veritas® Backup Exec as the enterprise backup solution. The Backup Exec enterprise application will be installed and run on the Database server cluster. The Database server will have a tape backup drive with a seven-tape autoloader. All other servers (Job Server, Web/Portal Server, Video Capture, Video Encoder (live), and the Video Encoder (On-Demand)) will be running the Veritas® Windows 2000 remote agent software. This software works in conjunction with the Backup Exec program and provides full backup and restore capabilities on every server running the remote agent.

Backups will be performed on all data in the enterprise with the exception of the electronic documents received from HLW-EHD. These documents reside in ADAMS as well as HLW-EHD. Because these files are already backed up through the ADAMS and HLW-EHD servers, it has been determined that a backup through DDMS is not necessary.

4.1.2.2 Backup concerns once Las Vegas is Operational

When the Las Vegas hearings begin, the amount of information processed by DDMS is anticipated to increase significantly. The majority of the increase, at the rate of 100MB per hour, will be primarily due to video capture while the hearings are in session. This increase in data can potentially extend the backup times well beyond the window of inactivity and may cause performance degradation in the DDMS performance. Once the Las Vegas system is online, options must be explored to effectively and efficiently back up all operational sites.

4.1.3 Board Selection

The HLW hearings will address several major issues under dispute by the various parties in the hearing. The ASLBP will create specific boards to address each of the major issues. Each board will comprise three judges: a legal judge, and two scientific judges with specific expertise related to the issue assigned to the specific board. This board will then conduct all hearings and findings related to that issue. All pre-filed documents will be filed per a specific board, identified through the **ASLBP Number** in the document metadata. The NRC has defined a requirement that the DDMS allow users to select a particular board while in a hearing, and the ability to select other

boards on the fly, if desired. This function has been identified as Board Selection, and will be implemented in a variety of ways.

Since DDMS is being developed to accommodate multiple cases, users must first select the desired case prior to login. Once the case is selected, users will select the specific board with which to initiate their session. Figure 4-2 shows the potential login path for authorized users (but does not show the case selection). Board selection will allow users to operate within the DDMS as if they were in the hearing room for that board. All ad-hoc exhibits and live video will be specific for the selected board. Once users are logged in, they will have the ability to select other boards on the fly.

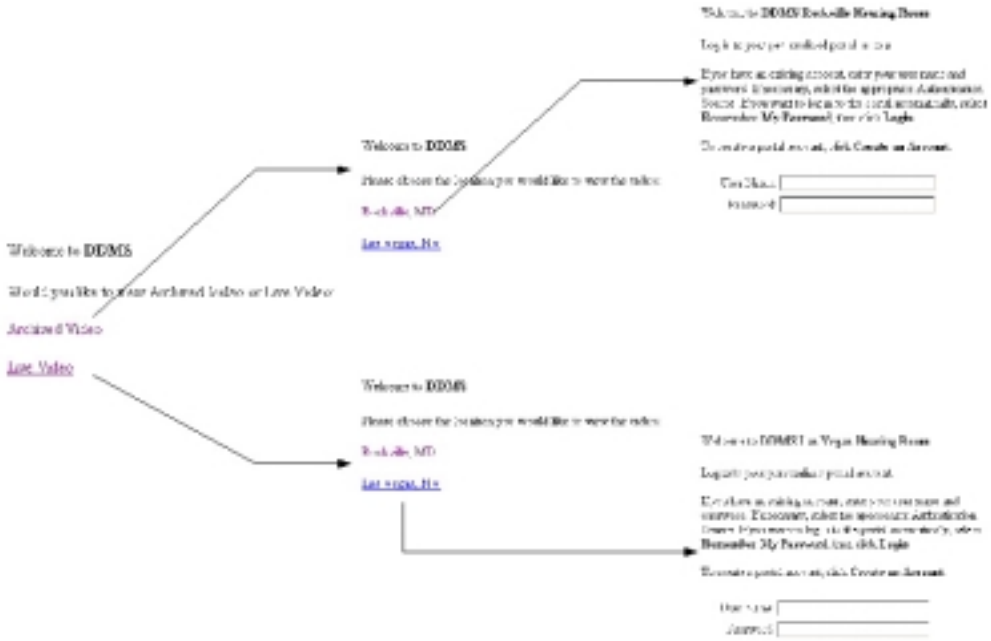

Figure 4-2 - Login Paths for Authorized DDMS Users

This diagram shows the basic Login path for authorized users. The screen on the left is presented first to the user. After selecting either Archived or Live, the user is asked which location they are interested in. This ensures they are routed to the local server in order to view streaming video. Once users have made their selections, the normal DDMS login screen is presented.

4.1.3.1 Change Board Gadget

The Change Board hyperlink is selected from the "Common Tasks" window on the community home page. When the link is selected, a new browser window opens with a listing of all available boards. Users will then select the desired board or group of boards for display. When complete, the user selects "Enter" in the pop-up window to close the window and refresh the community home page with the updated queries.

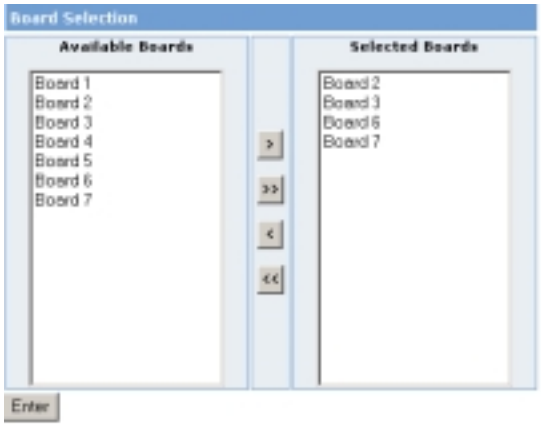

Figure 4-3 - Board Selection Gadget

The Board Selection Gadget allows the user to select one or multiple boards to customize the presentation of information.

4.1.3.2 Change in Displays

Once a board or boards have been selected, the DDMS community pages are altered to display the desired board(s). The gadgets listed in figure 4-4 are modified to show only the board-relevant information. DDMS modifies the SQL statements used to create the views. Users will still have the ability to view information across boards by selecting the "*View all Exhibits*" or "*View all Documents*" gadgets from the community home page and navigating through the filtering options.

List of gadgets affected by the Board Selection modification:

Gadget	Function	Where displayed
Ad-Hoc Exhibits	Allows clerk to add new exhibits submitted during the hearing.	Clerk's Home Page to add an exhibit, all communities to view ad-hoc exhibits.
Community Publications	Allows access to the previous video transcripts for the user's selected board.	All Home pages
Exhibit Search	Provides a search of all exhibits filed per board.	All Home pages
Exhibit Status	Provides views of adhoc and recent exhibits	All Home pages
Exhibit Status TS	Provides views of adhoc and recent exhibits through a Touch screen interface	Judges community
Live Video TS	Provides a link to the live video for the current board.	All Home pages

Gadget	Function	Where displayed
Today's Exhibits	Provides links to recently used exhibits specific to the hearing in progress.	All Home pages
Today's Scheduled Exhibits	Provides links to the exhibit queue for the specific hearing in progress.	All Home pages
Witness/Appearance Manager	Provides capability to schedule and view witnesses for the specific hearing in progress.	A link provided in the Common Tasks gadget for all users.
Witness Schedule	Provides a weekly view of the witness schedule.	All Home pages
View Live Video	Provides a link to the live video to the board currently in session.	All Home pages

Figure 4-4 - List of affected Gadgets

4.1.4 Electronic Note-taking

Electronic note-taking will be provided as a separate gadget, currently available only to the Judge's community. During the POC phase, several judges expressed interest in having a private note taking capability, including a date and time stamp. The date/time stamp will provide the context in which the note was written: judges can return to the corresponding transcript or other information based upon the stamp.

The note-taking gadget is accessed from the Common Tasks gadget within the Judge's community. When selected, a new browser window will open allowing authorized users to create and view notes. Users can scroll through existing notes and edit or delete notes as required. When creating a new note, users select "New Note", which opens a separate editing window. Unlimited comments can be added for any particular note. Users will follow the directions provided on the screens to save, edit, and delete notes.

4.1.5 Help Functions

DDMS incorporates several help features to assist users in learning the interface and using the system over the course of the proceedings. In addition to user training and online user manuals, DDMS will incorporate help features such as pop-up informational windows, icons readily identifying key features, mouse-over information tags, help messages, links to user manuals, and checklists. The help functions will be available throughout the application where needed. These features are described more fully below.

4.1.5.1 Informational windows

PEC will work with ASLBP staff-members to identify areas and functions requiring informational windows. Informational windows will be used to provide detailed information on functions that are not self-explanatory. In most cases, users can select a "Help" icon next to the feature that opens a separate browser window with detailed information on the selected feature.

4.1.5.2 Mouse-over informational tags

Mouse-over informational tags are used throughout DDMS to provide a short description of buttons, links, and other features. Users only need hover their mouse over a link or button, and an informational tag will display with information identifying the feature, or offering additional detail for a link. These informational tags will not be used on every link, only where necessary.

4.1.5.3 Identifying Icons

Where possible, icons have been created that readily identify the underlying function or feature. Icons will be used primarily to identify documents within DDMS. The list of document icons is shown in figure 4-5 below.

Audio	
Video	
GIF	
TIFF	
Text File	
WordPerfect	
Excel	
Physical	

PowerPoint	
Word	
Notes	
PDF	
Class PDF	
Printer	
Folder	

Figure 4-5 - List of Industry Standard Icons

4.1.5.4 Help Messages

In some cases, help messages will be available to assist the user in understanding more complex features and functions. Help messages may aid in explaining more complicated procedures and checklists for particular functions. In many cases, this style of help is incorporated directly into the browser page, by listing procedural steps, for instance, or allowing data entry in only a specific pattern.

4.1.5.5 Online User Manual

The DDMS user manual will be available in PDF format to all DDMS users. The manual can be opened at any time from the community home page. When the online manual link is selected, a separate Adobe window will open displaying the document. The document can then be saved, emailed, or otherwise managed without altering the master document.

4.1.6 Reports

DDMS will utilize Crystal Reports for creating all customized reports. This offers flexibility for users and has already been integrated into Plumtree, reducing potential compatibility problems. Both pre-formatted and ad-hoc reports will be available using Crystal. Each community

homepage will have a link in the Common Tasks Gadget pointing to the Reports Main Page. Figure 4-6 shows a mockup of the Reports Main Page. From the Reports Main Page, authorized users will select the hyperlink of the desired report, which opens an Adobe window with the report. If the user is accessing DDMS from outside the hearing room, the report can be renamed, saved locally, printed, or sent via email. Report formats will be finalized with NRC prior to implementation.

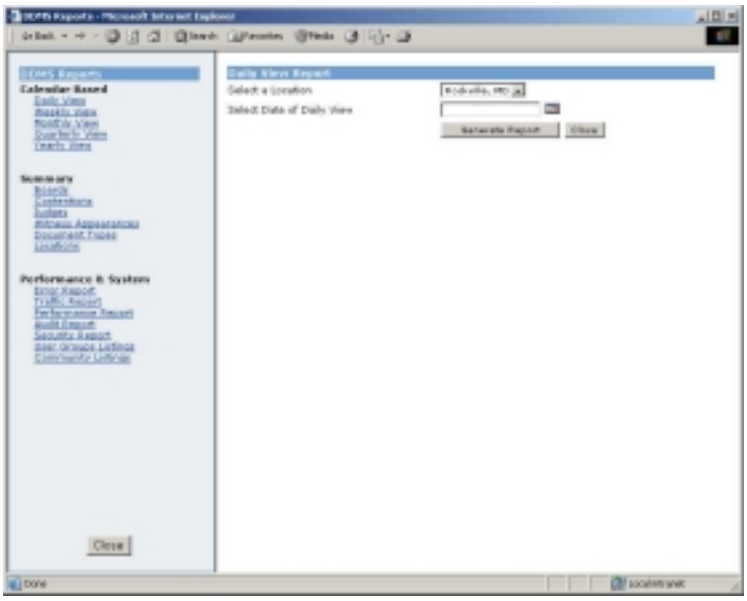

Figure 4-6 - Reports Gadget Main Page

The reports available to the user are shown in the left frame of the page. When a report is selected, the right-side frames of the page will show any parameters associated with the report.

4.1.6.1 Types of reports

Generally, there are three types of reports available through the DDMS interface: calendar-based reports, summary reports, and performance-related reports. Each is further described below:

- **Calendar-based—**these reports are built around the calendar functions of DDMS and provide a daily, weekly, monthly, quarterly, or yearly view of time or date-based information. Each report will show the selected information in the specified date format. Time and date-based information within DDMS includes: boards, contentions, judges, documents, witnesses, locations, and some selected metadata information. In some cases, only limited descriptive information may be shown for the selected information due to screen space constraints.

- **Summary-type—**these reports summarize information at any hierarchical level selected by the user. Organizational levels are used to categorize the information within DDMS into manageable and related blocks of information. Organizational categories include: Case selection (HLW vs. PFS), boards, contentions, judges,

witness appearances, document-types, and locations. Information can be retrieved and grouped at any or multiple levels. Most of these reports will offer parameter selection when the hyperlink is chosen. An interim screen will display, requesting the desired organizational category for the report. This report category also includes standardized reports showing identification lists. These reports would include lists of all contentions related to a single issue, for instance, and a list of Official Exhibit Number codes. Summary reports can also contain numerical summaries containing subtotals and totals; for instance, a report showing the number of exhibits submitted by Party 1 for Board 1.

- **Performance/System Reports—**this category of reports addresses miscellaneous performance and system-related reports. These include error reports displaying status and any errors generated during the running of any routine DDMS jobs or crawlers. Other reports in this category could include traffic and performance statistics, auditing and security reports, and user group and community listings. Most of these reports will be restricted to system administrators and clerks of court.

4.1.6.2 Access to Reports

Reports will be restricted based upon access rights for each user. Reports will only be available to those authorized to view and print the information contained in the reports. When a user is restricted from a report, the hyperlink will not be visible to them on the Reports main page. The security will be similar to other restricted documents within DDMS.

4.1.7 Scheduling and Calendaring

DDMS will incorporate standard scheduling and calendaring functions to allow the ASLBP staff to schedule and manage the complexity of the HLW hearings, incorporating several dozen boards, multiple hearing locations, and several dozen judges, all to be scheduled over a three-year period. A commercial off-the-shelf (COTS) product will be customized to provide the specific scheduling functions for DDMS.

4.1.7.1 Scheduling Description

PEC has evaluated several COTS products, and recommends using the Center Court product, from Levare Software. This product is designed for courtroom use, and can be completely customized for the DDMS implementation. The product will be integrated into the Plumtree environment, and customized to provide seamless access for the users.

The scheduling functions will be accessed through links on the main community page and from the Appearance Manager screen within DDMS. Authorized users selecting the link will be directed to a new browser window, containing the main dashboard of the scheduling package. Scheduling tasks can be performed within this window, and users will close the browser window upon completion, similar to the other DDMS functions.

Specific descriptions of the calendaring product are TBD, as of January 30, 2004. NRC is expected to make a selection of the calendaring product after the delivery of this document.

4.1.7.2 Scheduling Requirements

The original DDMS requirements did not envision creating a full-function scheduling module. However, after several requirements meetings, as noted in Section 3 above, it was apparent that the HLW hearing required a more robust solution. Several basic requirements were established and they define the essential functionality for the DDMS scheduling module. The requirements are:

1. **Resource Conflict Resolution**—resources should not be allowed to overlap. For instance, a judge cannot be scheduled for more than one event at any one time. The system will provide a mechanism to notify the event scheduler when they attempt to schedule a resource for more than one event at the same time. An additional function will allow the event scheduler to search for the next available time slot for the selected resources to prevent scheduling overlaps.

2. **Event Scheduling**—events, or contentions in the DDMS, can be scheduled for a specific time period. It was determined that contentions are the identifying attribute of an event, being the lowest level of activity to be scheduled. Attributes of an event are: the Board hearing the contention, the Contention name or ID, start time/date, end time/date, and location.

3. **Notifications and/or alarms**—the system should contain a mechanism for notifications and/or alarms to notify users of new events and of event changes in the schedule. The actual list of notifications and triggers is TBD.

4. **Day, Week, Month, and Year views/printouts**—the calendaring module should provide views and reports for daily, weekly, monthly, and yearly views of any combination of schedules. A master view should be available for each location. The reports should be available in PDF format.

5. **Scheduling resources to events**—resources can be assigned to any scheduled event. Resources in the DDMS include judges and hearing room locations. These resources also define the level at which conflict resolution is conducted.

6. **Browser-based—**the scheduling module must be browser-based.

7. **Customizable**—because of the HLW hearing's complex requirements and needs, the scheduling should be customizable to the specific needs of NRC.

8. **Self-contained database (SQL or equivalent)**—the scheduling module will utilize a self-contained database, compatible with the DDMS SQL server environment. This will help ensure that any customization and integration is seamless.

9. **Multiple Time-Zone support**—due to the diverse hearing locations in multiple geographic regions, the scheduling package will support multiple time-zones. Each location will have a dedicated time zone.

10. **Authenticate Users through Plumtree**—a key requirement for the scheduling functions, as supplied through a COTS product, is that a single-sign-on is required. When users log into the DDMS portal, the authentication will be automatically passed to the scheduling/calendaring package, eliminating the need for duplicate logins.

4.1.7.3 Scheduling Implementation

The Center Court product will be customized to meet the exact needs of the ASLBP staff. On the date of this document, the final decision on Center Court is still pending. Once the final decision is rendered, PEC anticipates conducting several meetings with critical users to determine the exact customization needed for the product. Once the requirements are established, PEC will produce a functional design document and work closely with Levare in customizing the product. The detailed design of the scheduling functions will be provided in an update to this document.

4.2 Process Flows

4.2.1 Logical Exhibit Flow

Figure 4-7 depicts the logical flow of documents and physical objects to ADAMS, EHD, and DDMS systems. The diagram focuses on documents as they relate to the High Level Waste (HLW) mission and specifically DDMS.

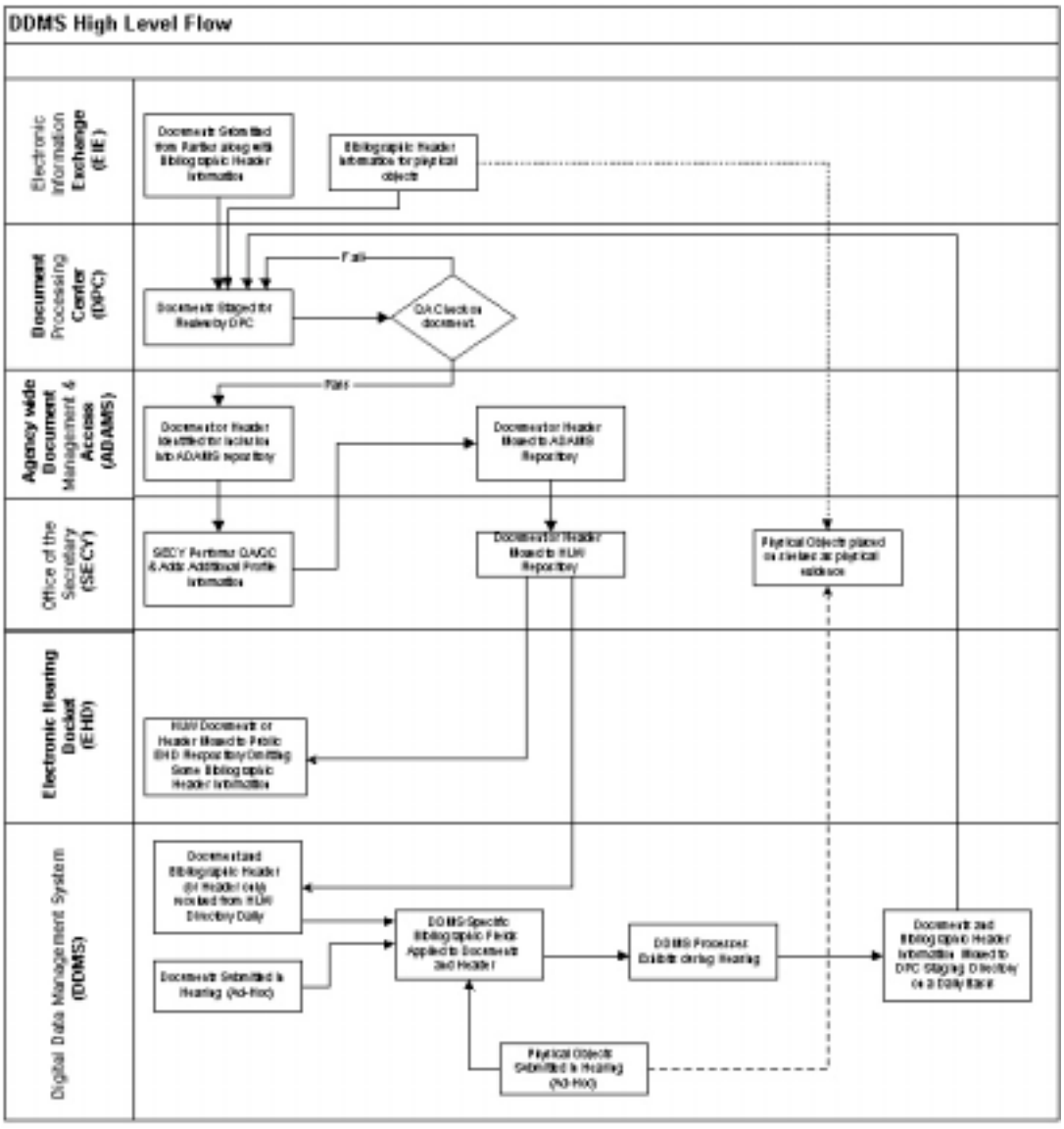

Figure 4-7 - Logical Exhibit Flow

This diagram depicts the entire document flow for the HLW hearings within NRC. This diagram places DDMS in context within the entire NRC environment.

The description of each horizontal swim lane in Figure 4-6 is as follows:

- **Electronic Information Exchange (EIE):** The EIE system is the facility in which the documents are submitted to the NRC.
- **Document Processing Center (DPC):** The documents are then received by the DPC for processing. The DPC verifies the overall quality of the documents, and then enters the documents into ADAMS along with certain profile or header information acquired from the EIE and the documents themselves.
- **Agency Wide Document Management & Access System (ADAMS):** ADAMS is the agency's document repository. All documents that pertain to HLW will be identified and stored within ADAMS.
- **Office of the Secretary (SECY):** SECY will update the document profile with additional data elements specific to HLW. SECY will also provide an additional quality assurance/ quality control and categorize HLW documents as to parties and boards.
- **Electronic Hearing Docket (EHD):** The EHD will serve as the public repository of the subset of ADAMS documents that were identified as HLW documents.
- **Digital Data Management System (DDMS):** DDMS will serve as the private NRC repository of the subset of ADAMS documents that are identified as HLW documents. Any new exhibits introduced into the DDMS during a hearing will be forwarded to ADAMS via the DPC. DDMS will include additional profile information and DDMS specific information that ADAMS stores and passes on to HLW-EHD and EHD.
- **Physical Objects and Evidence:** Physical evidence is handled differently from electronic documents. Physical evidence is first identified with bibliographic header information upon submittal. Once the header is created, it follows the same path as the header information for electronic documents. Regardless of when submitted, either through EIE or through the hearing room and into DDMS, the physical objects themselves are shelved using existing procedures by the SECY staff.

4.2.2 Logical Functional Flows

Based on numerous interviews with authorized NRC staff and personnel, the following subsections describe, using logical flow charts, the major DDMS functions within the production design and implementation.

Processes and document validation occurring outside of DDMS, for instance, any process to address discrepancies in the document hand-off to ADAMS or errors in documents supplied to DDMS via the HLW extraction process, ***are TBD***. These processes will be defined later in development of Task 3.

Non-Pre-filed Exhibit Submissions

The following logical diagram details the DDMS processes for handling, processing, and storing all non-prefiled submissions.

As shown in the diagram, the submitted evidence will either be scanned (e.g., documents) or photographed for conversion to a digital image.

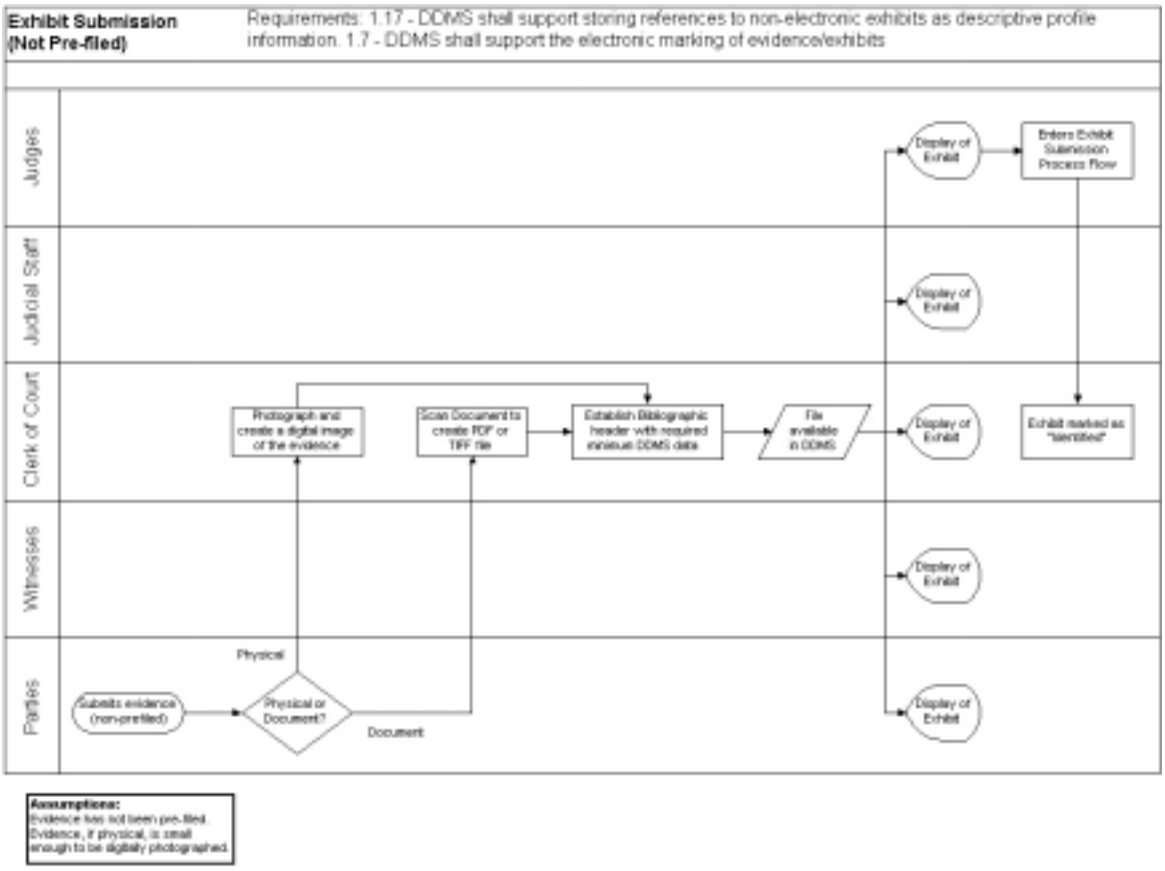

Figure 4-8 - Exhibit Submission (Not Pre-Filed)

This diagram shows the process for all exhibits submitted during the hearing. Parties may bring materials into the hearing room and submit them as exhibits.

Exhibit Submission and Marking Process

The following logical diagram details the processes, within DDMS, for receiving and initial storing of exhibits (in electronic format), and the various defined marking options. Document annotation devices are also available and are shown in a separate diagram.

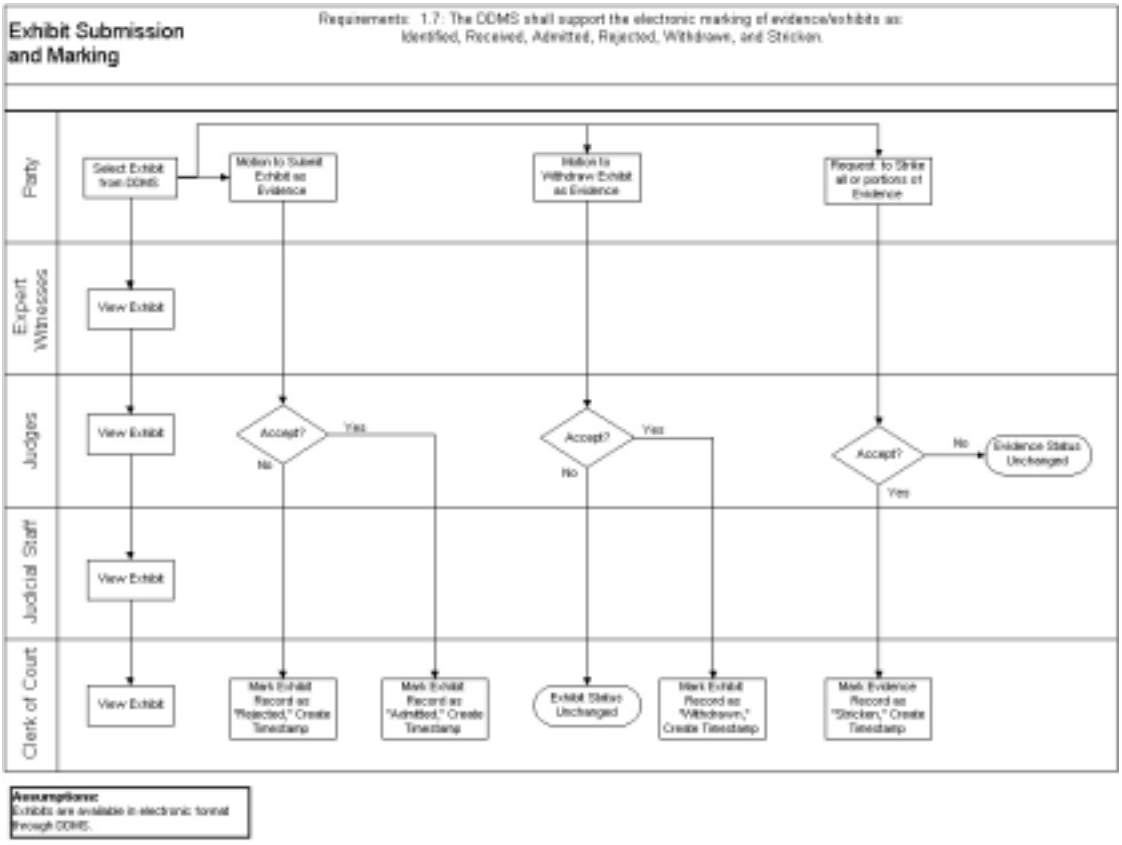

Figure 4-9 - Exhibit Submission and Marking

During the proceedings, documents will be submitted by the parties and ruled upon by the panel. When they are identified, admitted, rejected, or withdrawn, a status is attached to the bibliographic header information for the exhibit.

Orders and Directives Process

The following logical diagram details the process of how orders and directives are entered, stored, and then made available. This process occurs almost entirely outside of DDMS.

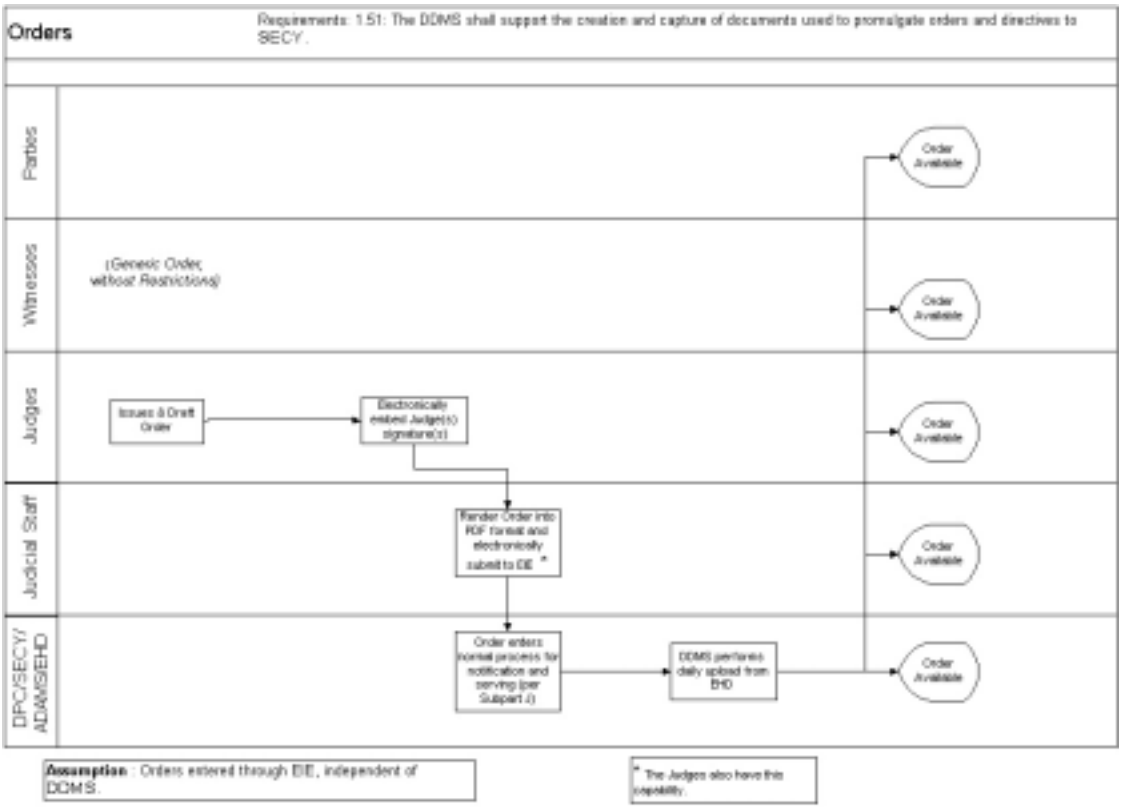

Figure 4-10 - Orders and Directives Process

Orders will be considered simply a separate document type for electronic files within DDMS. The Orders will be submitted through EIE and ingested into DDMS through the normal file input process.

Closed Hearing Process

The following logical diagram details the process, within DDMS, of how portions of the hearings designated as "closed" will be handled.

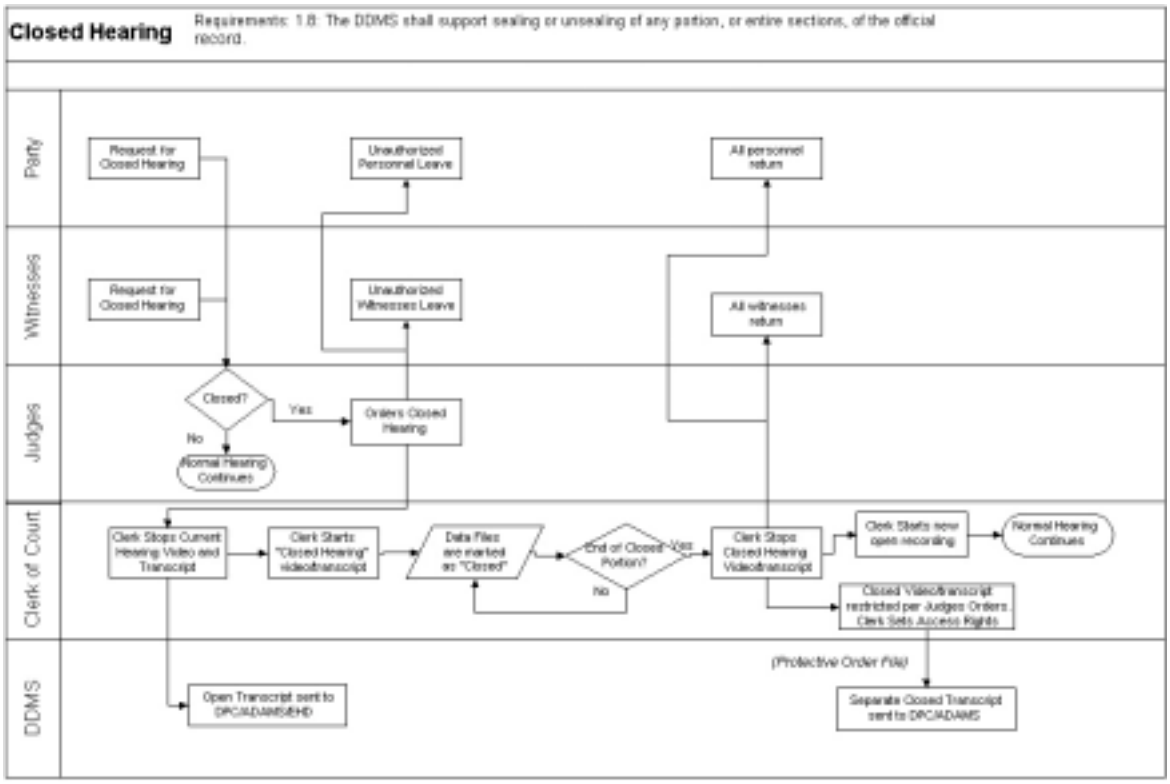

Figure 4-11 - Closed Hearing Process

Closed, or in-camera, hearings may be held to discuss proprietary or other sensitive information. The DDMS will continue to operate, but the video file created will enter protective order status and only be available to authorized users.

Ordered Witness List Creation

The following logical diagram details the process, within DDMS, of the initial storing and converting to PDF format of the hearing's witness list.

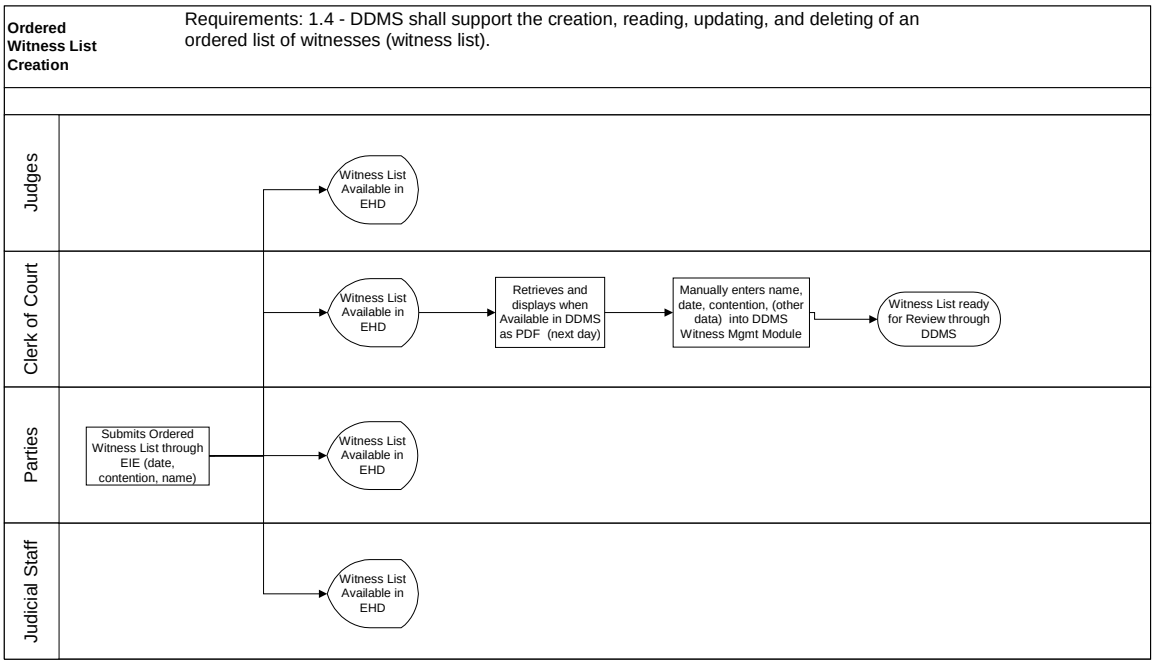

Figure 4-12 - Ordered Witness List Creation

Witness lists are created prior to the hearing in which witnesses are scheduled. This frequently occurs several weeks prior to the actual contention. The list is then available through DDMS for all authorized users.

Pre-filed Testimony Process

The diagram describes the process for pre-filed testimony handled within the hearing environment.

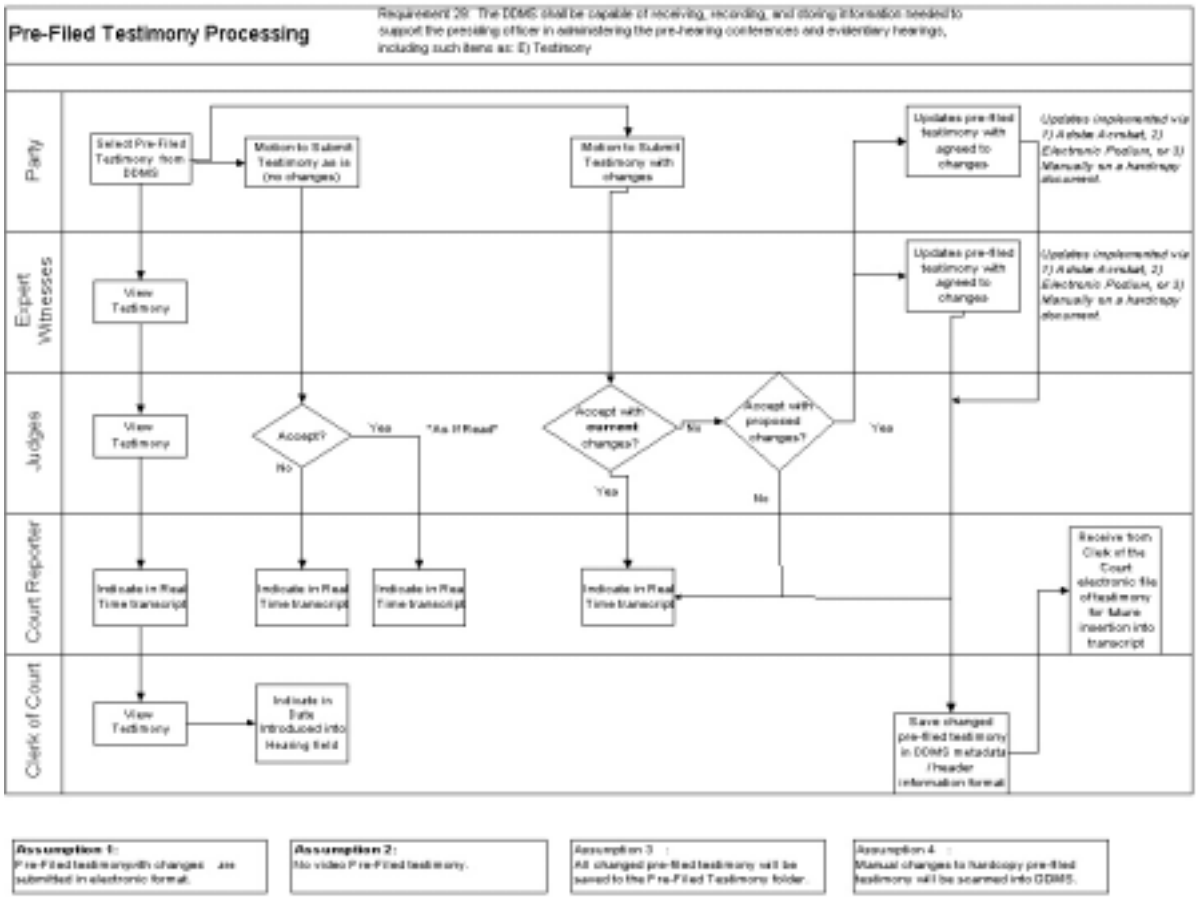

Figure 4-13– Pre-Filed Testimony Process

Parties submit pre-filed testimony through EIE and it is ingested into DDMS through the normal file input process. This testimony is then available to any authorized user.

Cross-Examination Plan Process

Cross-examination plans are strategic plans developed by parties to outline their approach to cross-examining witnesses. These plans are not filed publicly and are only available to the submitting parties and the judicial staff.

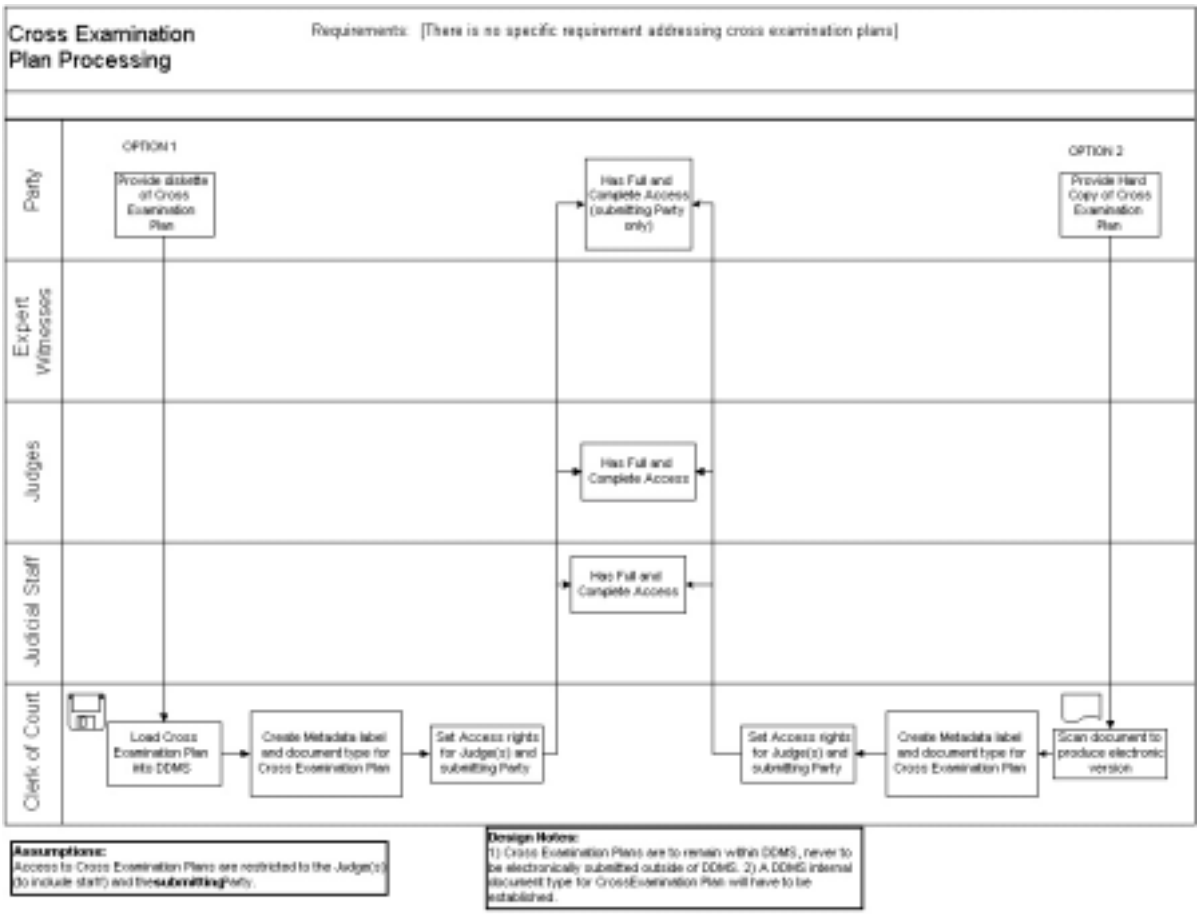

Figure 4-14 – Cross Examination Plan

Cross-examination plans are considered strategic documents and are not shared between parties. Parties will bring the plan into the hearing on the day of intended use. Parties will then use either the intelligent podium or the clerk's workstation to display the intended documents to the hearing room.

5 DDMS Architecture

5.1 Architecture Overview

The DDMS architecture represents a web-based three-tiered approach providing a thin client access to a web portal server. The client interface is supported on standard user workstations through the use of standard Microsoft Internet Explorer Version 6.x browser. The server side of the DDMS architecture will operate in a Microsoft Windows 2000® environment using the Plumtree® Corporate Portal and Collaboration Server software and the Microsoft SQL Server 2000 Database Management System (DBMS) software. User/Administrator screens will be provided through the Plumtree® Portal interface. The DDMS will support off-line batch type interfaces via either secure File Transfer Protocol (FTP) transfer or file copy operations with HLW-EHD and ADAMS.

The high-level DDMS context in the NRC environment is illustrated in Figure 5-1.

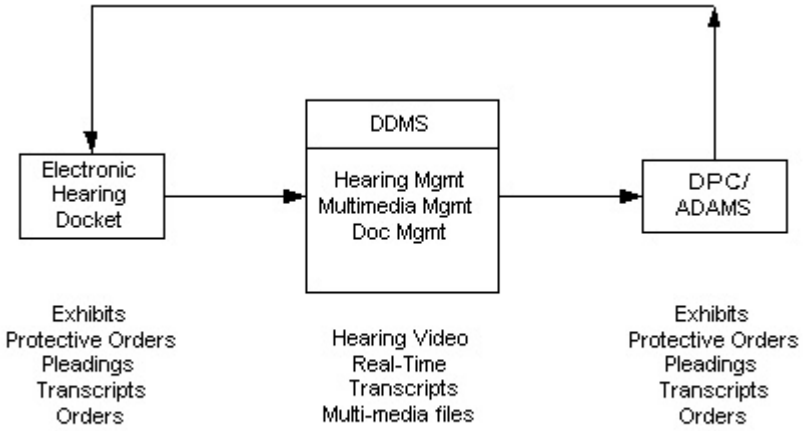

Figure 5-1 - DDMS context Diagram within the NRC environment

5.1.1 System Interfaces

The following subparagraphs discuss the external systems with which the DDMS will be required to interface.

5.1.1.1 High Level Waste--Electronic Hearing Docket (HLW-EHD)

As defined in the *DDMS Interface Control Document*, the HLW-EHD system will provide an extract of new and updated docket information by placing this information in a DDMS-defined data share.

5.1.1.2 Agency Wide Document Access & Management System (ADAMS)

As defined in the DDMS ICD, new information introduced or produced during the course of the hearing proceedings will be placed in a DDMS defined data share used by the NRC Document Processing Center to process data into ADAMS.

5.1.1.3 Court Reporting Services

The Court Reporting Services provide the real-time transcript, which is added to Line 21 of the video feed from the hearing room cameras. Line 21 is the industry-standard track of a video signal used by closed-captioning systems to embed the text onto the video signal. The serial output of the transcription machine is connected to a Line 21 encoder. The Court Reporter/closed captionist will connect their stenographic machine to a DDMS workstation running the Total Eclipse Court Reporting/Closed Caption software. This workstation and software will translate the output from the stenographic machine and provide input to the closed caption encoder providing the text for the real-time transcript as well as the closed caption text displayed on the court room monitors for the hearing impaired.

5.1.2 System Environment

PEC's proposed design is built around a core of products for meeting the diverse set of DDMS functional requirements. At the heart of the solution lie two major software products:

- Plumtree® Corporate Portal. This COTS product from Plumtree® Corporation provides the functionality needed to meet the document management and multi-media management, court case, and hearing management requirements of DDMS. It marries the document and object management features along with searchable video and audio through the use of well-established Web environment technology.
- Plumtree® Collaboration Server. The Plumtree® Collaboration Server allows DDMS users to collaborate on projects: setting schedules, sharing documents, and exchanging ideas. Designed to integrate with the Plumtree® Corporate Portal, the Collaboration Server combines a view of active projects with all the other resources integrated in the portal, including document and object management.

These tools form the cornerstone of DDMS document and multimedia management. PEC will integrate other tools as part of the DDMS design approach, such as the following:

- Adobe® Acrobat. This package, running on all hearing room workstations, will allow all parties to access previously stored documents. Acrobat provides a full range of image display

and manipulation features including resizing, rotation, thumbnails, book marking, and annotation.

- SQL Server DBMS relational database management system. DDMS will be built around Microsoft's SQL Server 2000® relational database management system. SQL Server is a robust, scalable, and cost effective industry standard.
- MediaEdge Video Indexing Software. This software synchronizes the video from the hearing room with the transcript from the court reporter. It also creates "key frames," allowing users to view selected video frames, select a particular scene and then begin streaming the video from that point.
- MediaEdge Video Application Server. The video application server contains the metadata about the video (i.e., time code, key frames, date, hearing, etc), the time synchronized transcript, and synchronized links to all evidence submitted during the hearing. The video application server appears as a gadget (an application) within the Plumtree® portal. This provides a simple interface for users to easily query the multimedia court record.
- Advantage Software's -Total Eclipse®. Total Eclipse® provides an interface enabling users to receive transcript text directly from a court reporter in real-time, whether in the hearing room or remotely via the internet/intranet, mark a line of transcript with an issue, exchange data with other software packages, and tag key words and phrases automatically.
- Levare Software's Center Court®. This package provides the scheduling and calendaring functionality for DDMS. The package will allow customization for the NRC hearing room environment.

A simple graphical user interface construct will organize and prioritize what judges and other users see when they operate DDMS within the hearing room. The interface will provide functions to search, display, and manage exhibits. Documents (including all exhibits) will be full text indexed and will contain metadata fields that will also be searchable. Appearance management functions will provide the ability to schedule witness appearances, display past, present, and future witness appearances, and link a witness to an exhibit. The appearance will also automatically be linked to the video transcript file for the session in which the witness first appears. Security controls will be implemented based on the sensitivity of the data, DDMS Risk Assessment, and NRC security policies, procedures and guidelines as defined in NRC Directive 12.5.

5.2 DDMS Availability Architecture

The following diagram shows the major functional blocks of the DDMS Production system, as described in Section 3 of this document.

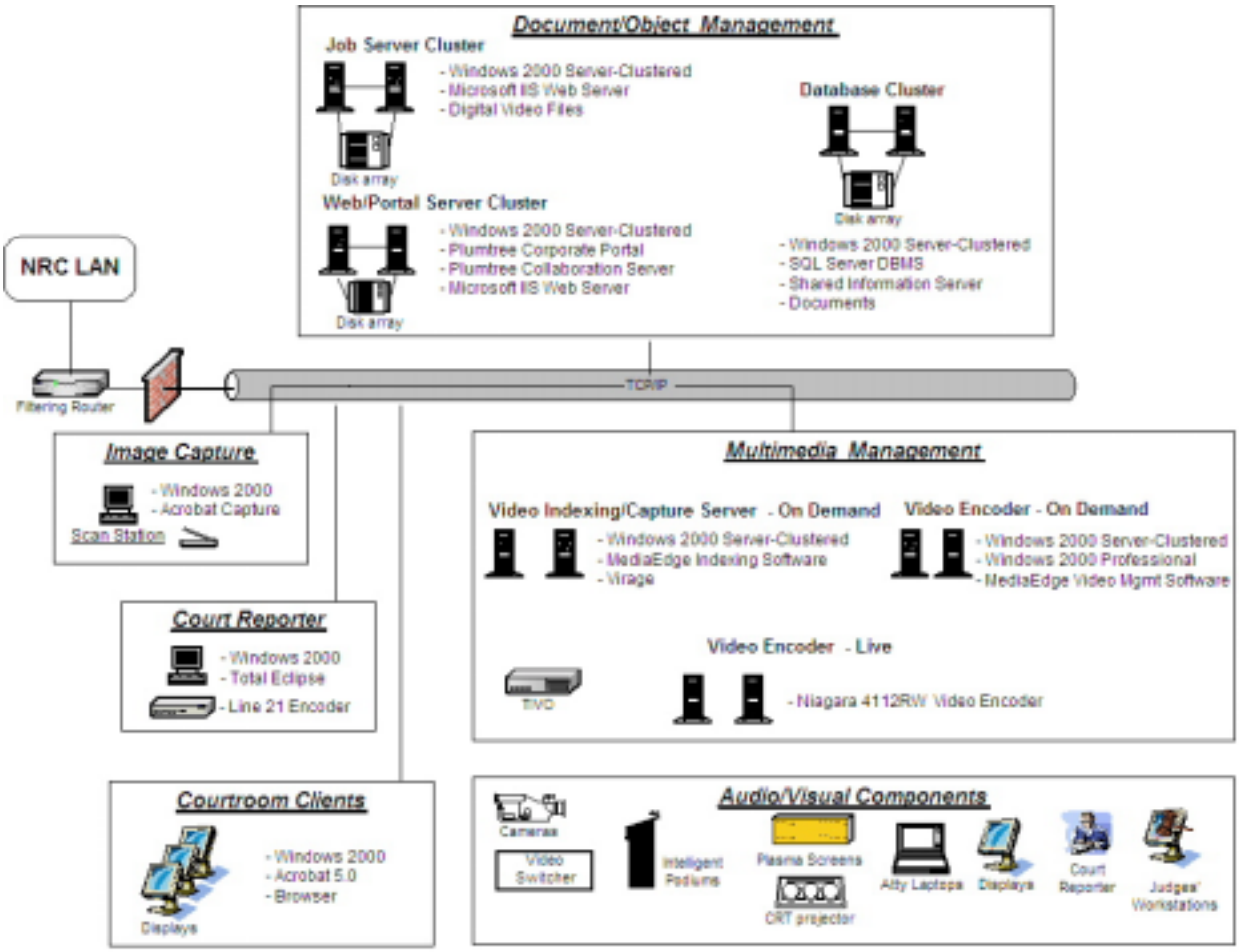

Figure 5-2 - DDMS High Level View

This diagram shows the major components and functional areas of DDMS.

PEC has incorporated the appropriate level of redundancy into the design. Since the DDMS database residing in Rockville may serve as the central DDMS database for the eventual Las Vegas area and remote sites, it will be implemented using two servers in a clustered configuration. In the event that one server fails, the remaining server will continue to support all database management functionality without the need for reconfiguring the system. This will allow for uninterrupted operation. Each of these servers provides redundant power supplies, redundant Local Area Network (LAN) controller cards and a Redundant Array of Independent Disks (RAID) storage configuration that will transparently accommodate the failure of any one disk without the need for operator intervention. This capability will be implemented using a

combination of Windows 2000® Enterprise Server Clustering and MS SQL Server Clustering features. Data remains up-to-date for each server since it is stored on an external RAID array supporting access from both servers simultaneously. Since this storage array will be configured using RAID 5 features, it will continue to operate without operator intervention following the failure of any one of the deployed disk drives.

The remaining servers in the Document/Object Management subsystem, the Plumtree Job, and Web/Portal servers each have a redundant server available for use. Each of these backup servers will be fully configured and ready to run should the primary server fail, through the use of Windows 2000® Enterprise Server Clustering features.

For the Multimedia Management Subsystem, one backup server will be included for each primary server. Each primary/backup server pair will be configured with software identical to that on the secondary server. This will be implemented using Windows 2000® Enterprise Server Clustering features.

5.3 Server Clustering

The DDMS Document and Object Management servers will be configured as Windows 2000 Advanced Server clusters, each containing two nodes. Windows clustering provides for automatic fail-over to a passive server node should the active server node malfunction. The fail-over occurs within a number of minutes and will meet the DDMS requirement of one-hour mean time to repair.

The server clusters will be configured as a Windows 2000 Advanced Server two node cluster with a mirrored Quorum drive. This provides automatic fail-over for the OS and services running within the OS. Applications that are not Windows 2000 cluster aware will restart but not retain session information. The result is that if a user is logged into the Portal Server and node A fails, node B will come on-line, but the user will have to re-login to the Portal Server. Currently, Microsoft SQL Server® 2000 Enterprise and Microsoft IIS Server® are the only cluster aware applications in DDMS.

The following section explains each functional group in detail:

5.3.1 Document/Object Management

The *Web/Portal Server Cluster* powers the primary DDMS user interface and the document and object management software. This cluster ensures that any document or object stored in DDMS – including videos, audio files, and images – can be quickly located and retrieved via the DDMS user interface. The server also acts as the interface between the user's browser and the actual DDMS system, retrieving user requests and formatting responses to the user. The portal server formats the results from the database server and formats each web page based upon the individual user's rights and access control.

The *Database Server Cluster* will store the documents and objects managed by the web/portal server. The servers are implemented using the Microsoft SQL Server® 2000 database management system. The database server cluster also stores the files containing the full-text index of all documents stored in the system.

The *Gadget Server Cluster* contains the set of gadgets accessible to each user. A gadget is a module of code that sends an http(s) request, or secure request, to the application and receives HTML in return. The HTML is presented to the user as interface to the application called by the gadget. It also includes the configuration of each user's pages and communities as well as all access control lists.

5.3.2 Multimedia Management

The *Video Indexing/Capture Server* will index the video and create an XML file representing the video metadata. The XML file will consist of the real-time transcript that has been inserted into line 21 of the video. A separate time code will be generated for each line of the "closed-captioning", scene changes/camera cuts and high-level metadata. The XML file will be stored in a shared directory. This XML file will contain the initial transcript, be synchronized with the digital video and will be crawled and stored in the portal for viewing until the official transcript is available. The official transcript will be converted to XML format. Required metadata will be extracted from the initial transcript and added to the official XML transcript file. This 'official' XML transcript file will be crawled by Plumtree® and replace the initial XML transcript file.

The *Video Encoder Server – On Demand* will be used to house the on-demand courtroom videos. This is controlled by the Video Indexing Server and creates a digitized version of the video in Microsoft Media format for streaming over the network. The video will be encoded at both high and low data rates to accommodate various user connection rates. The encoded video is then stored on a Microsoft Streaming Video Server for delivery to users. A separate content folder for each location will be created to better segment the videos for each. During the production, it may become necessary to further segment the location videos by creating a separate folder for each location.

Video Encoder Server – Live A video signal from the TIVO system will be encoded for streaming live to users. This will consist of a high and a low data rate to accommodate various users. The encoded video will be pushed to a Microsoft Streaming Video Server for live broadcast.

The Video Control Subsystem will provide an interface for the Clerk of the Court to remotely control starting and stopping the Video Indexing as well as the video encoding.

5.3.3 Web Streaming (part of Multimedia management)

The *Microsoft Streaming Video Server* included in Windows 2000® Server will be used to house the on-demand courtroom videos. A separate content folder for each location will be created to better segment each of the videos. During the Production implementation, it may become necessary to further segment the location videos by creating a separate folder for each board and/or issue. Each server is connected in a cluster configuration with a backup server, with fail-over capability should either server fail.

The Microsoft Streaming Video Server provides access to the live and on-demand video from the courtroom. The on-demand videos are stored in the content directory of the streaming server. The live video from the hearing is streamed directly from the Microsoft Video encoder and is available as 'live.wmv'.

For streaming outside the hearing room, a Microsoft Video Caching Server will be located at a remote site to handle external access. When an outside user makes a video request of the caching video server, a request is sent to the originating video server where one copy is streamed to the caching server where it is stored in the server's cache. Future user requests then view the cached version of the video file, thus minimizing bandwidth and user load on the originating server.

For web streaming over the Internet, a copy of the video feed from the live courtroom video will be connected to a stand-alone encoding computer that will be separate from the DDMS network and on its own network for security purposes. Each courtroom/hearing room will need a partial, dedicated T-1 (minimum of 500kbs) that will connect the stand-alone network to the web hosting facility selected by the NRC. This will be repeated for each of the hearing rooms that will be broadcasting live.

The web hosting facility will require a Microsoft Streaming Video Server with sufficient bandwidth to support the number of potential Internet users. The encoded live video stream from output of the Microsoft Encoder on the stand-alone network will be streamed to the web hosting facility where it will be forwarded to the Microsoft Streaming Server. It will then be streamed live over the Internet. A hyperlink will be placed on the NRC website to provide public access to the live video by board.

The live video will be encoded at two rates (high and low) to accommodate various user connection streams.

5.3.4 Audio/Visual Components

The audio/visual components of the DDMS include most of the input and output hardware devices for the system. These include, but are not limited to: cameras, intelligent podiums, plasma screens, monitors, touch screen panels, and laptops. These are the primary devices used to interact with DDMS and will be located throughout the hearing room. The cameras, intelligent podiums, and touch screen panels all provide both analog and digital input information for DDMS. The monitors, plasma screens, and laptops are output devices for DDMS users. The exact equipment, location, and quantities were determined during the activities performed under Task 2. The Task 2 *Hearing Room Audio/Video System Design Document*, provided under separate cover, includes detailed design information.

5.3.5 Image Capture

Image capture will be accomplished using a Windows 2000®® workstation, with an attached scanner, running the Adobe Capture® software. Text documents will be scanned utilizing the Adobe Capture® software and saved as PDF files with full text.

5.3.6 Hearing Room Clients

The hearing room clients will utilize Windows 2000® workstations or laptops for access to the DDMS LAN. The client workstation will run Internet Explorer® 6.x, Microsoft Media Player® 9, Flash Player® 6, and Adobe Reader® 6.x.

5.3.7 Closed-Captionist

DDMS will provide a configured workstation for the court reporter station. The court reporter will interface to the workstation through a standard communication (COM) port. By providing a pre-configured workstation, DDMS can maintain configuration control of both the system and critical software. Each court reporter will have a custom user account at the workstation, allowing each to customize settings and dictionaries as appropriate. The court reporter workstation will utilize Windows 2000® and the Advantage Software® suite including Eclipse®, Accucap®, and Teleview®. The Court Reporter/Closed Captionist will be responsible for launching the Eclipse®, Accucap®, and Teleview® applications.

5.4 Video Signal Flow Through DDMS

Figure 5-3 depicts the flow of the video thru the DDMS system. This approach provides for the digital encoding and indexing of incoming video, stripping out the Line 21 text provided by the Court Reporter, and synchronization of the text with the encoded video. The design also provides for a live feed with real-time playback capabilities.

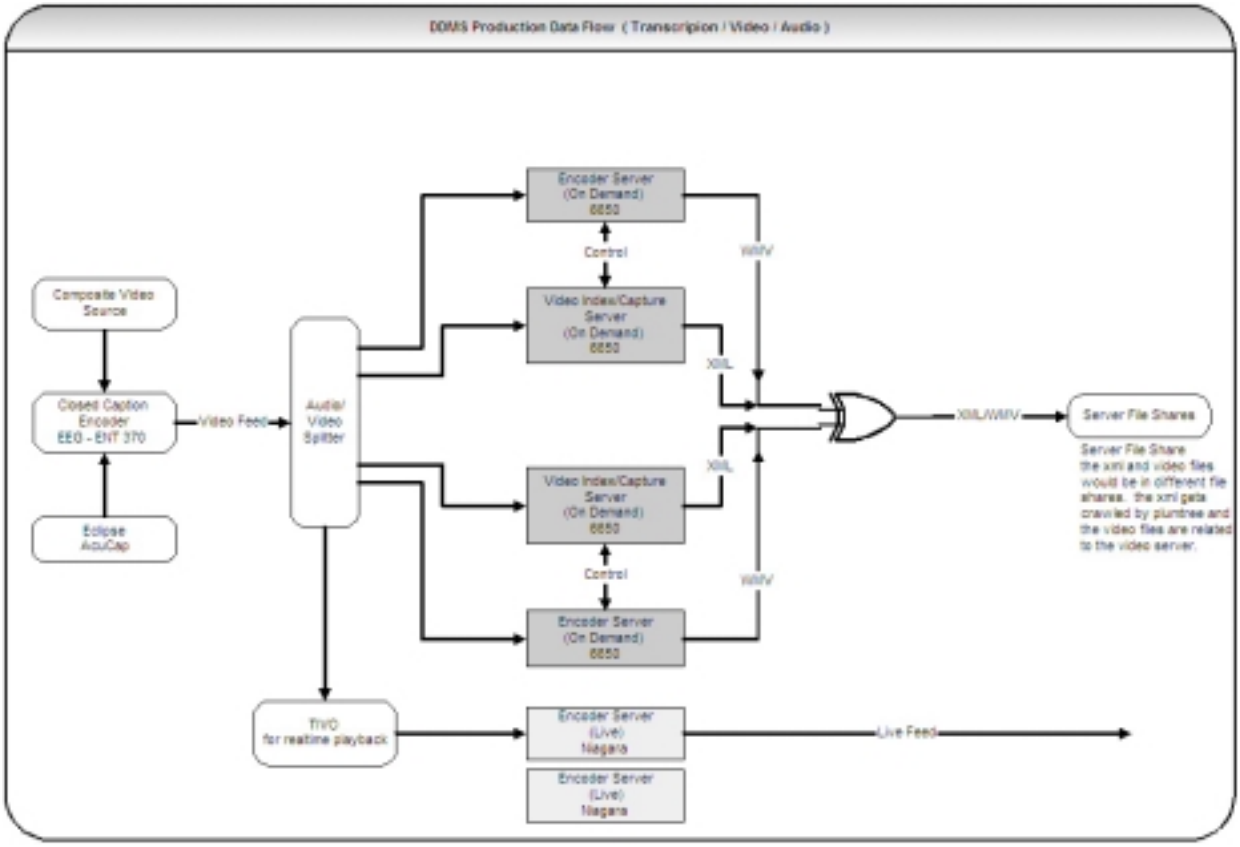

Figure 5-3 - DDMS Video Signal Flow

Diagram shows the video flow from the camera sources through the video processing equipment and into the ultimate server file share for distribution to users.

The following steps describe the process in the diagram above:

1. The composite video is supplied by the A/V system and fed into the closed caption encoder along with the live transcript text (Line 21 Text) from the Court Reporters workstation.
2. The combined feed is routed into the audio and video splitter. This provides multiple feeds while retaining the quality of the original signal.
3. The splitter supplies feeds to the following devices:
    a. The TIVO real-time playback device. The TIVO unit acts as a digital video buffer and can store up to 35 hours of digitized video. This feed proceeds to the live video encoder server and is available for display through a browser.
    b. Two identical server sets consisting of a video indexing server and a video encoder server. One set will act as the primary and the other as backup. Each set will perform the audio/video indexing and encoding simultaneously. At the conclusion of a hearing, the Clerk of the Court will process the video from the primary server set and shutdown the video processing from the backup server set. If a failure exists on the primary server set, the Clerk of the Court will have the ability to process the video from the backup server set. In the event that both server sets experience system failures, the Clerk of the Court will have the option of processing the video stored in the TIVO device once either one of the video server sets becomes operational.
4. The processed video files and transcript XML files are stored on the Job Server Cluster storage array.

5.5 Logical Security Architecture

The DDMS logical security architecture employs a defense-in-depth strategy approach. The specific detailed system design implements an approach based on the broad criteria identified below:

- **Protection from defacement (Integrity).** All documents on the system should be unalterable by un-trusted sources. File integrity should be maintained and examined on a regular basis. Content should never be altered (but it can be replaced from a trusted source) once it is published.
- **Protection from replacement (Integrity).** The number of trusted sources with the ability to publish content will be limited to the fewest possible (i.e., clerk of court, judges of proceedings (as needed)). The publishing mechanism should be separate from the delivery mechanism.

- **Protection from Denial of Service (Availability).** The system should contain no single points for failure to reduce risk of accidental or malicious Denial of Service (DoS) attack. Appropriate filtering should be in place to prevent spoofing and other DoS techniques. Incident response mechanisms should specifically address DoS attacks.
- **Protection from Distributed Denial of Service (Availability).** IP spoofing should be prevented. Traffic patterns indicative of Distributed Denial of Service (DDoS) attacks should be captured early. Available capacity for all system components (HTTPS, HTTP, DNS, Secure FTP, FTP, etc.) should be great enough to reduce the immediate impact of a DDoS attack, even at peak workloads.
- **Early warning of potential threats (Integrity, Availability).** Intrusion detection mechanisms could be used, but are not required at this time, in quickly detecting serious probing or threat activities. The use of an intrusion detection system, the development of response plans, and the monitoring of these threats, should be documented prior to a threat occurrence. This would be used if DDMS supports a direct connection to an Internet Service Provider.
- **Restriction of Access (Integrity).** Access should follow a least privilege model. Any public access should be restricted to parties of the proceedings based only on authorized access and via HTTPS or Secure FTP. This access will be enforced at multiple layers. Administrative access should be limited to individual machines and root access held by only two individuals (primary and backup). NRC administrative network access should be through a separate infrastructure.
- **Adverse event auditing/logging (Confidentiality, Integrity).** Any adverse activity detected should be logged and stored for later review and assessment. Logs should be restricted, robust enough to support investigation and prosecution, and unalterable after initial creation. Regular, secure offsite storage of logs for multiple years after generation should be practiced. NRC auditing policy should balance system performance with security concerns.
- **Separation of administration (Confidentiality, Integrity, Availability).** All administrative functions should be performed through a separate administration network, including backup, system monitoring and reporting, and updating. Alerting should be available, as well as administrative access to the primary severs, even when there are network issues with the primary access network.

These criteria determine the DDMS logical architecture. The DDMS logical architecture will then be translated into an actual physical design for DDMS during the Task 3 Production System implementation.

Logical protection mechanisms will be put in place to address the DDMS security design goals stated above. The logical protection mechanisms are defined as follows:

- **Router Access Control.** Any broad anti-spoofing rules (standard reserved addresses) will be implemented at the router: specific IP's will be blocked at the DDMS firewall level. Additionally, the DDMS router will be expandable to support an OC192 bandwidth on its incoming trunk line, allowing for protection against bandwidth flood attacks.

- **Firewall Access Control.** The DDMS firewall will block Granular IP addresses (i.e., specific internal IP addresses, individual IP's of known scanning machines, class C's of violating networks). Inbound ports 21, 80, and 443 and outbound port 25 will be the only ports allowed to pass though the firewall.
- **Intrusion Detection Systems.** Both network-based and host-based intrusion detection capabilities will be covered under this logical component. Network-based intrusion detection uses a signature-based, heuristic, and statistical approach to monitoring network traffic. Host intrusion detection focuses on changes to file structures and auditing/alert generation based on anomalous events. Network-based intrusion detection capabilities will be implemented at the NRC firewall outside of the DDMS configuration. Host based intrusion detection will be implemented within the DDMS firewall configuration.
- **OS/Data Protection Mechanisms.** OS and disk subsystem controls will protect data from modification. OS hardening, minimization of the OS footprint and application hardening (specifically on the web servers) will be implemented on the DDMS. This includes the utilization of virus protection software on all DDMS servers and workstations and the application of OS and virus protection software patches and update releases at appropriate intervals.
- **Human Monitoring and Analysis.** A specific security manager will be assigned solely to oversee security on the Production DDMS implementation in accordance with NRC's FISMA/GISRA process. After the initial system certification, the system will be re-certified every 3 years after the initial accreditation. This individual will be the single point of accountability for all security issues. **The specific individual is TBD.**
- **Assessment, Audit, and System Forensics.** Important activities will be audited to a secure logging server. These logs will be used with pre-defined processes to perform system review, as necessary. A pro-active assessment process will be put in place to conduct full, quarterly vulnerability assessments of the entire DDMS infrastructure by an independent security team. **The specific process is TBD.**

The logical protection mechanisms defined above will be translated into actual protection mechanisms, products, processes, and procedures in the DDMS Production implementation. These choices were selected and reviewed by the DDMS architecture team to meet all of the security implementation requirements.

5.6 System Platform Components

5.6.1 Servers

The production DDMS will run on a series of Intel based servers: Dell PowerEdge 2650 and 6650 servers. These systems contain either single or dual 1.9GHz to 2.4GHz P4 processors with 256 KB Cache. The systems include up to 4GB of RAM, and up to 73GB disk drives. *See section 6, table 5 for a complete listing of servers and hardware.*

The DDMS platform software configuration is based on a Microsoft Windows 2000® Enterprise Server operating system environment. In addition, the database server will support Microsoft SQL Server 2000® Database Management System (DBMS).

For the production, the application software will be configured as follows (The Portal and Database Servers will have replicated backup servers with identical configurations):

- **Portal Server**:
  - Plumtree® Corporate Portal
  - Plumtree® Collaboration Server software
  - Microsoft IIS® (part of Windows Server 2000®)
  - BEA Application Server® software (Included within Plumtree®)
  - DDMS specific portlets
- **Database Server**
  - Microsoft SQL Server 2000®
- **Video Indexing/Capture Server**
  - MediaEdge Video Transcript Synchronization Software
  - Microsoft Streaming Video Server (part of Windows Server 2000®)
  - MediaEdge Video Indexing and Retrieval Software
  - Microsoft IIS® –not needed
  - Osprey® Card (VIDCAP)
- **Video Encoding Platform (for the official court record)**
  - Microsoft Video Encoder
  - 1 Osprey® Card (VIDCAP)
  - TIVO Box with its software
- **Video Encoding Platform (to stream live video to the hearing room)**
  - Microsoft Video Encoder
  - 1 Osprey® Card (VIDCAP)
- **Transcription Platform**
  - Total Eclipse® Real-Time transcription software
  - Line 21 Encoder (EEG Model EN370 DT)

5.6.2 Client

The client workstations will consist of a 2 GHz Pentium, with 256 MB of RAM, a 30GB hard drive, and a 17-inch flat screen monitor. Users will employ MS Internet Explorer® Version 6.0 browsers, Adobe® Version 6.x, Microsoft Media Player® Version 9 and Flash Player® Version 6,

as minimums, to access DDMS. The judges will utilize the same client configuration with the addition of a touch sensitive flat-panel monitor in lieu of the standard monitor.

5.6.3 Network

DDMS will utilize the NRC LAN, through the use of Internet Explorer® Version 6.0, to connect authorized users to the server. For the Production System, no non-remote user based DDMS traffic will travel outside of the NRC LAN in Rockville. Only information requests to the legal research services on the Internet will be routed outside of the NRC LAN. For remote user logins to DDMS, traffic will enter the NRC network complex via the Internet. A more complete description of the network architecture is included in Section 5.9.

5.7 DDMS Audio-Visual Subsystem Architecture

The audio-visual subsystem design for the DDMS is part of Task 2 of the contract. As of the date of this document, integration and testing of the subsystem is under way for the components. Installation in the Rockville hearing room is scheduled to begin in February 2004. For the detailed installation diagrams, consult the Hearing Room Audio-Video System Design Document Version 1.0 (dated November 14, 2003), under separate cover. The Audio-Visual design document provides detailed functional specifications, design diagrams, and installation instructions for the Rockville hearing room.

5.8 Remote Site Architecture

5.8.1 Remote DDMS

The DDMS has been designed to incorporate a remote-site operations capability, as described in requirement # 125 (which states that DDMS "shall support...a remote location"). Remote site operations will encompass any hearing conducted outside the existing hearing rooms in Rockville and Las Vegas. The remote site equipment is self-contained and all encompassing: it can completely simulate the hearing environments in the permanent locations. The remote site kit includes all servers, interconnect cabling, networking hubs, laptops, audio-visual components, and software to operate in the same manner as the full DDMS located in Rockville, MD and Las Vegas, NV.

5.8.2 Remote Kit Design

The remote kit will include the components listed in figure 5-4 below. These will be mounted and stored in a containerized rack-mount unit, allowing the field team to quickly and efficiently set up and operate the remote kit. All internal cabling will be static, and quick-disconnect ports will be provided for all external connections to the laptops, microphones, and cameras.

Component	Qty.	Function
Rack-mount servers	3	Running the video capture, portal, and database servers
Laptops	12	User and Sys Admin interfaces

Component	Qty.	Function
Network Hub	1	For network interconnections
30” flat monitors	2	For gallery and hearing room displays.
Pan/zoom camera	1	To capture the video of the proceedings
Microphone	3	To capture audio of the proceedings
A/V mixer panel	1	To combine all audio and video signals into a single feed.
Laptop	1	Court transcription laptop, configured for real-time processing.
Closed Caption Encoder	1	Provides Line 21 text from Court Reporter/Captionist
Tivo Unit	1	Provide real-time playback during hearing

Figure 5-4 - Remote Site Component List

This table shows the list of projected components for a “courtroom in a box”. It is anticipated that this configuration would be self-contained and designed for rapid setup and ease of operations.

5.8.3 Remote DDMS Operations

This section provides an overview of the procedures for remote site operation. The ASLBP can operate remote hearings for anywhere from a few days up to several weeks. It is important that the information gathered and modified during the session be recorded and available for other users as soon as possible after the completion of the hearing. The following diagram depicts the flow of data between the Remote Site and the Rockville Site.

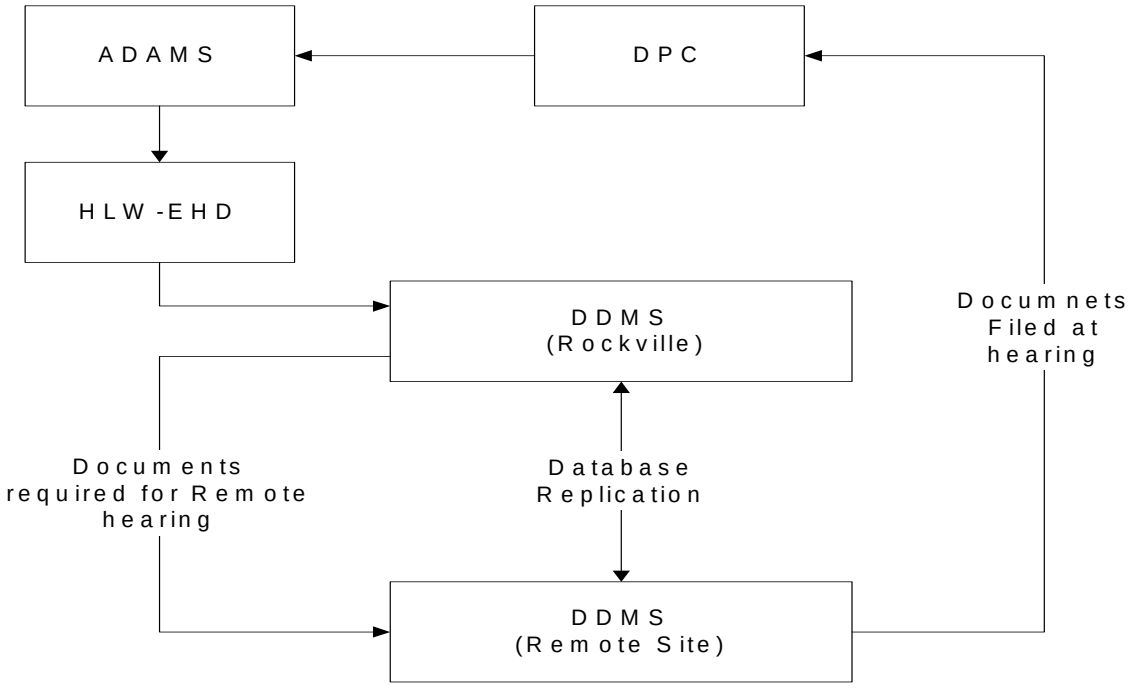

Figure 5-5 - Remote Site Information Flow

The general concept for remote operations will be to pre-load the servers with all board-related information for the remotely constituted board. Prior to deploying the remote "Kit" the following steps need to be executed to prepare the remote system for proper operation:

- Documents required for the remote hearing will be copied to the remote server from the Rockville repository.
- A subscriber database will be created on the remote SQL Server from the Rockville DDMS Publisher database.

If possible, a data link will be established between the remote kit and Rockville for database replication. If available, the data link can be established daily for synchronization. If no link is available, or the connection is of poor quality, the remote site information can be replicated to the Rockville servers upon completion of the remote hearing.

DDMS will be designed to accommodate both of these update scenarios. They are more fully described below.

- **Best-Case scenario**—this describes the case where a reliable, high-speed connection exists between the remote site and Rockville.
    - **Database** - The remote subscriber database will communicate with the Rockville publisher database, and replicate all metadata entered/updated at the remote site to the Rockville site, and be available throughout the DDMS environment on a daily basis.

- **Documents** – Documents filed at the remote site will be sent to the DPC via a secure FTP connection. The new documents will be placed in the HLW_DDMS_Updated_Content share on the DDMS database server in Rockville and the DPC personnel will retrieve documents from this location. When these "new" documents are returned to DDMS via the HLW-EHD download, they will be copied via secure FTP to the remote site database server into the appropriate board folder.

- **Worst Case scenario**—this describes the case where only an unreliable and inconsistent dial-up connection is available between the remote DDMS and Rockville. When this is present, the remote kit will operate independently for the duration of the hearing. When the hearing is complete, the Operations and Maintenance contractor will ensure that the databases are synchronized and that the documents filed at the hearing are moved to the HLW_DDMS_Updated_Content share on the Rockville database server.

5.9 DDMS LAN Architecture

The current DDMS design calls for the system to reside on a self-contained dedicated physical subnet. The DDMS LAN will utilize a Gigabit network switch and all DDMS servers will utilize Gigabit network interface cards. This will provide optimum transfer rates required for streaming video at the parties desktops. All workstations located within the hearing room will connect to the Gigabit network via Gigabit Ethernet network interface cards. Workstations provided by parties and located outside the hearing room environment should have a minimum of a 10/100 Ethernet interface cards. Please refer to section 7.3 for in-depth discussions of the proposed network and security architecture.

6 Logical Design

6.1 System Architecture

The DDMS will integrate with the current NRC document/data management environment by providing interfaces to both ADAMS and HLW-EHD. As depicted in Figure 6-1, documents will be delivered to NRC via the Electronic Information Exchange (EIE). Once processed by the Document Processing Center (DPC) the documents are entered in ADAMS. Documents relating to the HLW hearing on the Yucca Mountain project are extracted from ADAMS and entered into HLW-EHD. The DDMS will receive documents from the HLW-EHD system and will position documents for export to the ADAMS system that were modified, entered, and accepted during a hearing. Figure 6-1 illustrates the contextual layout of the DDMS processing environment.

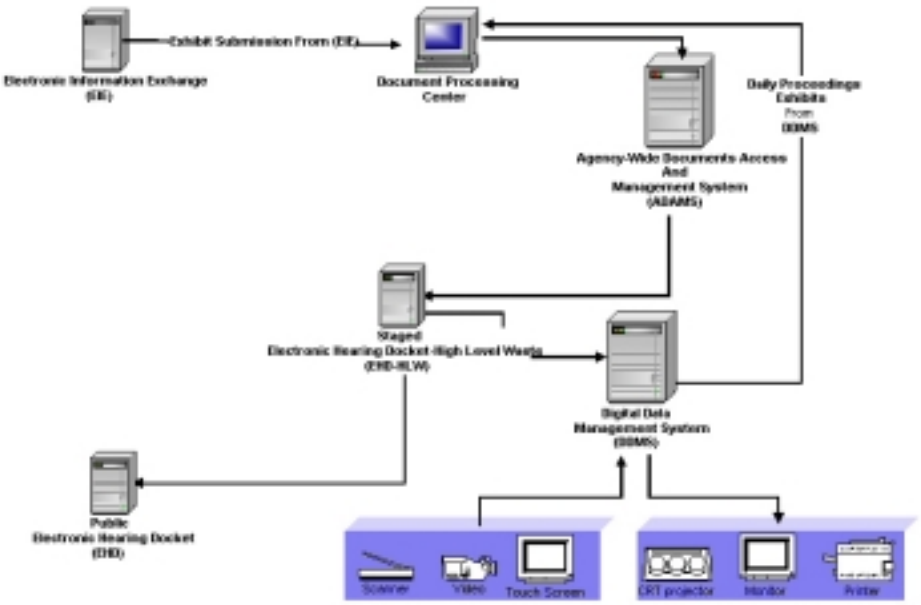

Figure 6-1 - High Level DDMS Integration Into HLW Environment

6.2 System Design

6.2.1 Logical Data Model

The Logical data model depicted in Figure 6-2 represents the inherent relationships within the DDMS metadata. The data model has integrated the ADAMS and EHD profile data with DDMS specific data elements.

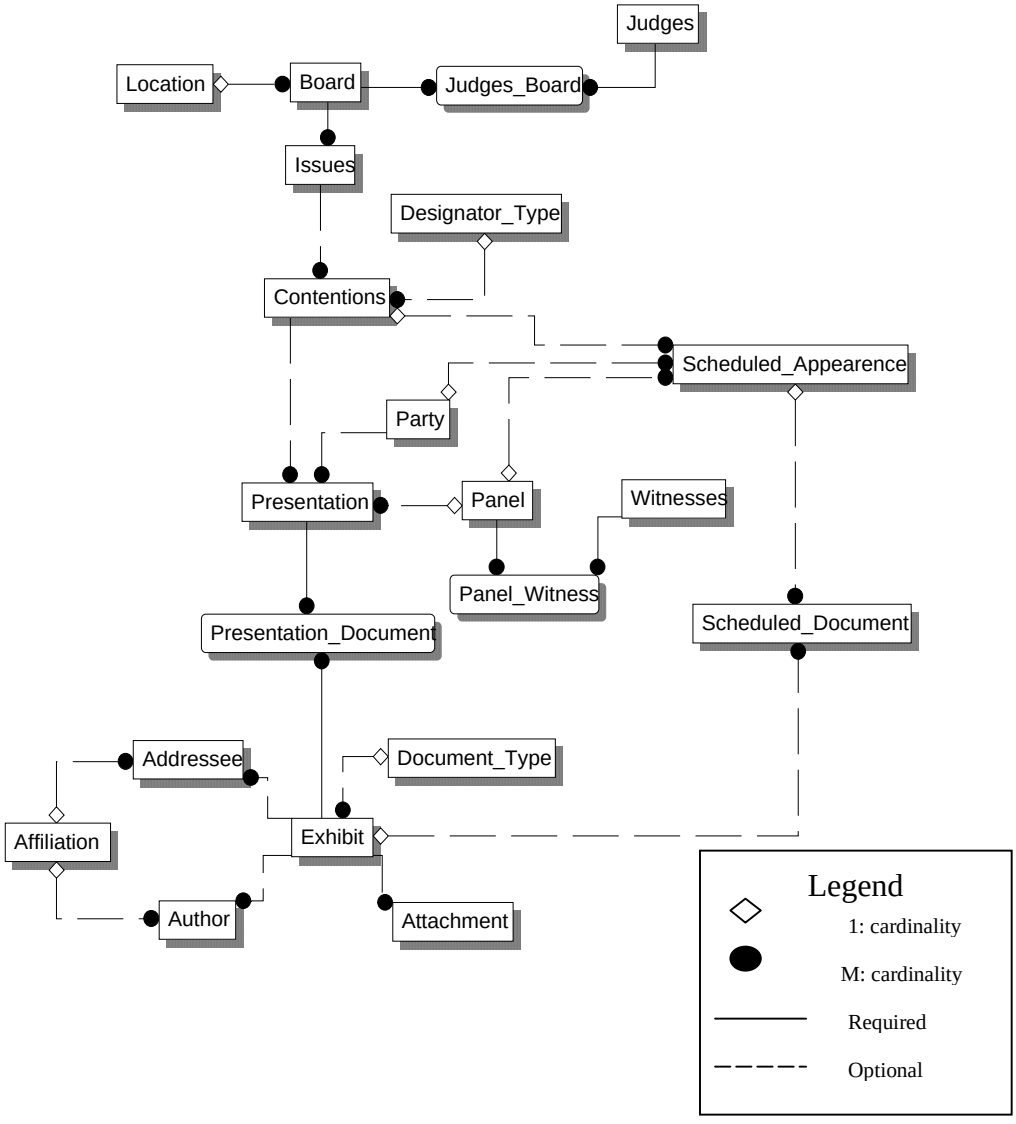

Figure 6-2 - DDMS Logical Data Model

Showing the primary relational table structure within the DDMS database.

6.2.2 Logical Security Design

The DDMS security approach is a four-layered security perimeter defense, ensuring the DDMS resources are less exposed to external attacks and the security of the DDMS is not limited or adversely impacted by the weakest link of the security layer. Complete security details, including audit functions, are included in the *DDMS Security Plan*. Figure 6-4 summarizes the logical security architecture of the DDMS in conjunction with the associated components of the NRC infrastructure. This architecture is subject to change based upon the selected approach of Internet connectivity, i.e. use of an independent Internet Service Provider (ISP) dedicated to DDMS, versus the use of the standard NRC Internet architecture. The four-layered approach comprises the following levels:

Layer-1: Perimeter Defense

- OCIO
- DDMS

Layer-2: Operating Systems and Servers Protection

Layer-3: Host Protection

Layer-4: Information Protection

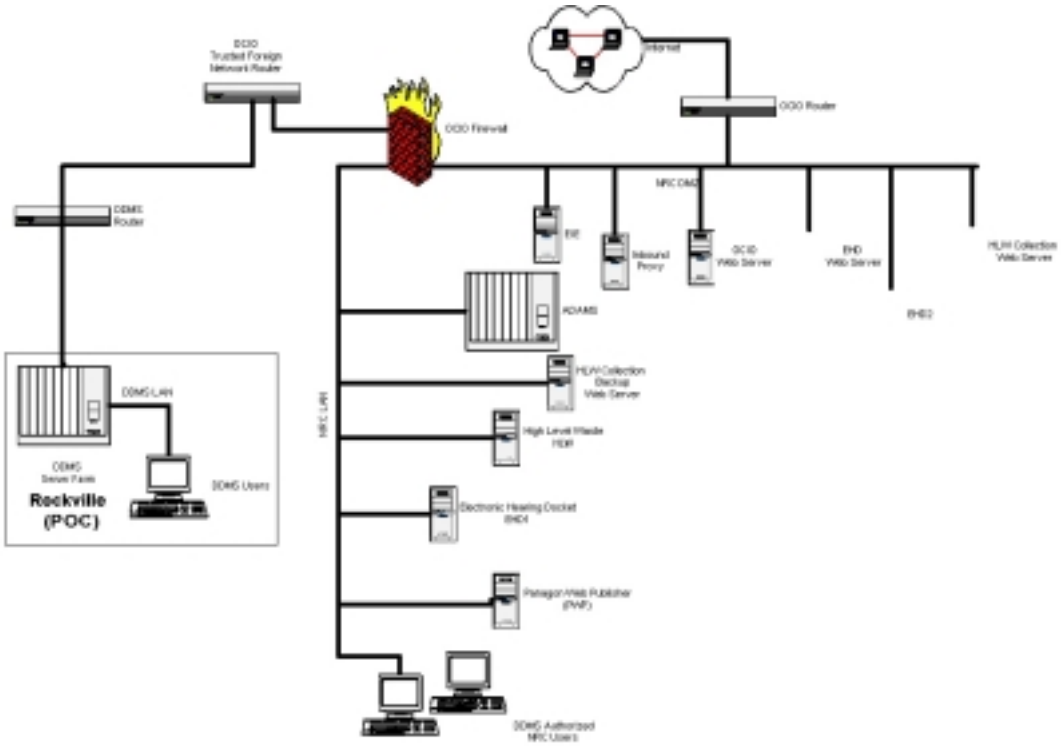

Figure 6-3 - Security Architecture

Note that the document transfer between the DDMS server and HLW-EHD and ADAMS will be accomplished via either secure FTP transfer or Window 2000 file copies to or from specified shares. This issue will be revisited during design work in Task 3.

The following paragraphs discuss the four layers in detail. As this document describes a baseline preliminary design of the production system, the logical security design description includes a combination of specific design aspects along with planned processes and procedures and implementation techniques. During the execution of Task 3, the security design will be refined further to include more specific details of how all security aspects will be implemented.

6.2.2.1 Security Layer-1: DDMS Perimeter Defense Security Systems

This defense layer will include two firewalls, an NRC foreign network router and an NRC proxy server. One firewall is located on the NRC Demilitarized Zone (DMZ); and one is within the NRC environment. The DDMS perimeter security architecture comprises a router/firewall configured to block incoming and outgoing traffic, with a specific list of known exceptions. Further, the proxy server, supplied by NRC, will be implemented with a list of content filters and web addresses blocking incoming and outgoing traffic not specifically mentioned in passing through the NRC infrastructure and accessing the DDMS.

OCIO will be responsible for the NRC network infrastructure and administration up to the DDMS firewall. The DDMS firewall and all associated subnets will be the responsibility of ASLBP.

PEC will implement and configure the DDMS router in accordance with vendor recommendations while complying with NRC, National Institute for Standards and Technology (NIST), and National Security Agency (NSA) security guidelines. One method that will be implemented in the DDMS router will be to filter (disallow) packets with 'spoofed' IP source addresses by adding a command: *"[no] IP verify unicast reverse-path.*" Another method, used within the router configuration, will be to add the command: "*no IP directed-broadcast*." These methods will protect against any potential use of DDMS as the middleman in any attempted attack and will protect the OSI layer 3 broadcast into OSI layer 2 broadcast.

DDMS will be implemented within the NRC DMZ through the use of a proxy server. During the Task 3 production DDMS design, PEC will confirm the following filters between the NRC internal network and DMZ are configured properly:

- The DMZ is setup as an external network to the NRC network (production network); and,
- The DMZ is setup as an internal network for requests from the Internet to the DMZ.

Security for DDMS will incorporate the following minimum precautions:

- Installation of the appropriate filters:
    - o "*access-list number deny ICMP redirect*." This disallows Internet Control Message Protocol (ICMP) packets.
    - o "*Anti-spoofing*." This will control access through the router and prevent the input of packets with internal IP source addresses.

- o "*no IP directed-broadcast.*" This will stop packet broadcasts.

- Control and monitor filter configurations in terms of privileges and their use, to include: 1) Who can modify; 2) Who modified; 3) When modified; 4) Why modified.
- Update filters:
  - o As and when required to implement network changes
  - o Install new software releases
  - o Prevent future attacks that may exploit existing or newly discovered vulnerabilities
- Periodically test filters to ensure the security rules are still working and conduct break testing.
- Configure anti-virus software for real time scanning at the gateway and at the administrator workstation.
- Implement 'intelligent' logging at a level comprehensive enough to trace attacks.
- Trace Host intrusions, if any, and analyze them in detail to take corrective measures to harden/improve the security infrastructure.
- Maintain detailed documentation of the filter (router and proxy) configurations and follow NRC change management procedures.

6.2.2.2 Security Layer-2: Operating Systems and Application Servers Security Systems

This layer of the DDMS security architecture will protect the operating system, the application servers, web servers, and workstations. While traffic is regulated at the perimeter, the DDMS will execute on various application servers. However, because the servers operate through the operating systems resident on the computers, an abuse of operating system privileges can compromise the security of the network. Users with access to the underlying operating system can jeopardize the availability and integrity of the firewall and expose critical network resources to both internal and external security threats. Hardening this layer will protect the DDMS from a number of internal threats.

DDMS will utilize multiple copies of a single brand of operating systems in its network and will interface with systems using that same operating system. Although this offers some security, the user organization (ASLBP) has the responsibility to apply all appropriate security features as they become available through the vendor. The DDMS administrator will ensure that all operating system patches and upgrade releases are applied to all servers at the appropriate times.

Some of the General Practices that ASLBP will use to Secure DDMS operations:

- Place the servers, workstations, and communication equipment in a secure room/facility. Servers will be mounted in locked racks accessible only to authorized system administrative personnel.
- Enforce restricted access to server/communication room;

- Avoid using server consoles as much as possible;
- Match hardware compatibility while buying/installing the server;
- Disable booting from CD-ROM or floppy disk devices;
- Avoid using cookies in the DDMS application.

Windows 2000™

The following steps will be implemented to make Windows 2000® a more secure operating system, and allow the NRC to establish the required security for DDMS operations:

- Install minimum Service Pack 6a. It provides the feature of the "Authenticated Users" group to help eliminate anonymous connections. Installation of service packs newer than SP3 (i.e., SP6a) is required to protect the server(s) from attacks like GetAdmin and RedButton.
- Install Norton Antivirus software on all servers and workstations.
- Enable auditing (not enabled by the basic install procedure) to record both successful and failed login attempts.
- Enable 'change periodic password' policy (not enabled by the basic install procedure). An important aspect of Windows 2000® passwords is that the OS stores hashed versions of the password rather than encrypted passwords. These hashes are one-way encryption algorithms resulting in passwords that cannot be decrypted outside of the OS.
- Disable network access to the administrator name by changing the registry key to "HKLM/SYSTEM/CurrentControlSet/Control/LSA: RestrictAnonymous." This will eliminate an inherent vulnerability within Windows 2000®.
- Change the default user rights in "user manager menu". Restrict user to login locally on Primary Domain Controller.
- Make proper backups. DDMS will not rely solely on Windows NTBACKUP. It will use the third party backup product named Backup Exec since multiple servers/workstations are to be backed up. Periodic backups will be transported and stored at an off-site storage location. Refer to the *DDMS Contingency Plan* for further details.
- DDMS will have Windows 2000® registry backed up using the NT-resource kit utility Regback.exe.
- DDMS Windows 2000® will enable encryption of information stored on drives, in folders, and in files, as needed. This will prevent hackers from accessing DDMS information by physically mounting the hard drive on another PC and taking ownership of files.
- In Windows 2000®, only Administrators and Backup Operators have default network access to the registry. Even tighter control of registry access can be implemented by implementing the steps listed in TechNet Article Q153183.

- The Page file is the temporary swap file Windows NT/2000 uses to manage memory and improve performance. To avoid any possibility of saving passwords or other sensitive data in memory or data cache, DDMS will clear the page file at shutdown by editing the Registry Key entry "*HKLM\SYSTEM\CurrentControlSet\Control\SessionManager\Memory Management"* and setting ClearPageFileAtShutdown value to "1" as defined in TechNet Article Q182086.

- Should a DDMS user press Ctrl-Alt-Del, Windows NT/2000 will display the login dialog box with the name of the last user who logged in to the computer. This could make it easier to discover a user name that can later be used in a password-guessing attack. DDMS will disable this feature by editing the Registry Key entry "*HKLM\Software\Microsoft\WindowsNT\CurrentVersion\Winlogon\DontDisplayLastUserName"* and changing the REG_SZ value to "1."

6.2.2.3 Security Layer-3: Host Protection

DDMS's third layer of defense addresses threats from workstations connected to the DDMS and NRC networks. DDMS will employ workstation security to protect:

- Against users trying to attack from within and outside of the NRC and DDMS network connections;
- The data stored on workstation(s) and servers from users coming in through the firewall; and,
- Against a possible virus on media brought into the DDMS environment.

Some of the key DDMS workstation security activities to be implemented:

- User access control meeting the NRC Security Directive 12.5 User Access Policy requirements;
- A user ID and password policy meeting the NRC Security Directive 12.5 requirements. Passwords will be distributed solely by NRC ASLBP to authorized DDMS users only;
- Establish a limit to the Network Resources Access rights from workstations. NRC should only assign what is a "MUST REQUIRED";
- Install Anti-virus software and update it regularly on all the DDMS user workstations; and
- Provide the capability to enable/disable various types of workstation logging features.

6.2.2.4 Security Layer-4: Data/Information Protection

The fourth layer of the DDMS security defense will focus on storing and, whenever possible, encrypting DDMS data. This will assure that should DDMS data be accessed, viewed, and possibly printed and stored from any location, the data can be encrypted. In order to properly accommodate the sensitive nature of DDMS data, the use of Windows 2000® is needed to address the following:

- Properly implemented security layers on the NRC network help secure all PCs in the NRC network. However, DDMS will have users outside of the NRC network either

through use at home, on the road, or at another third party location. These remote connections increase the security risk of the DDMS data being compromised and therefore require security controls on both sides of the connection.

- Sensitive data may be retrieved from DDMS databases from user remote desktops. This requires DDMS data storage to be protected not only on the servers but also on the desktop/laptop.

Precautionary steps will also be taken that will:

- Disable any option that "remembers" your password in order to eliminate the need to reenter it at the next login opportunity;
- Enable encryption during the installation of Windows 2000® on all laptops;
- Enforce the use of different passwords for different accounts.

The DDMS four-layered security defense provides fail-safe security system controls such that even if one barrier is breached, the other three can provide effective security. This approach raises the bar for potential attackers, and significantly increases the security and risk management of the system.

7 DDMS Physical Design

7.1 Physical Data Model

The Data Entity-Relationship model for the DDMS depicted in Figure 18 shows a definition of the baseline database design including not only the tables to be defined and created in the DDMS database but also the details of the actual field names in each record of each table and the indication of the primary keys for each table.

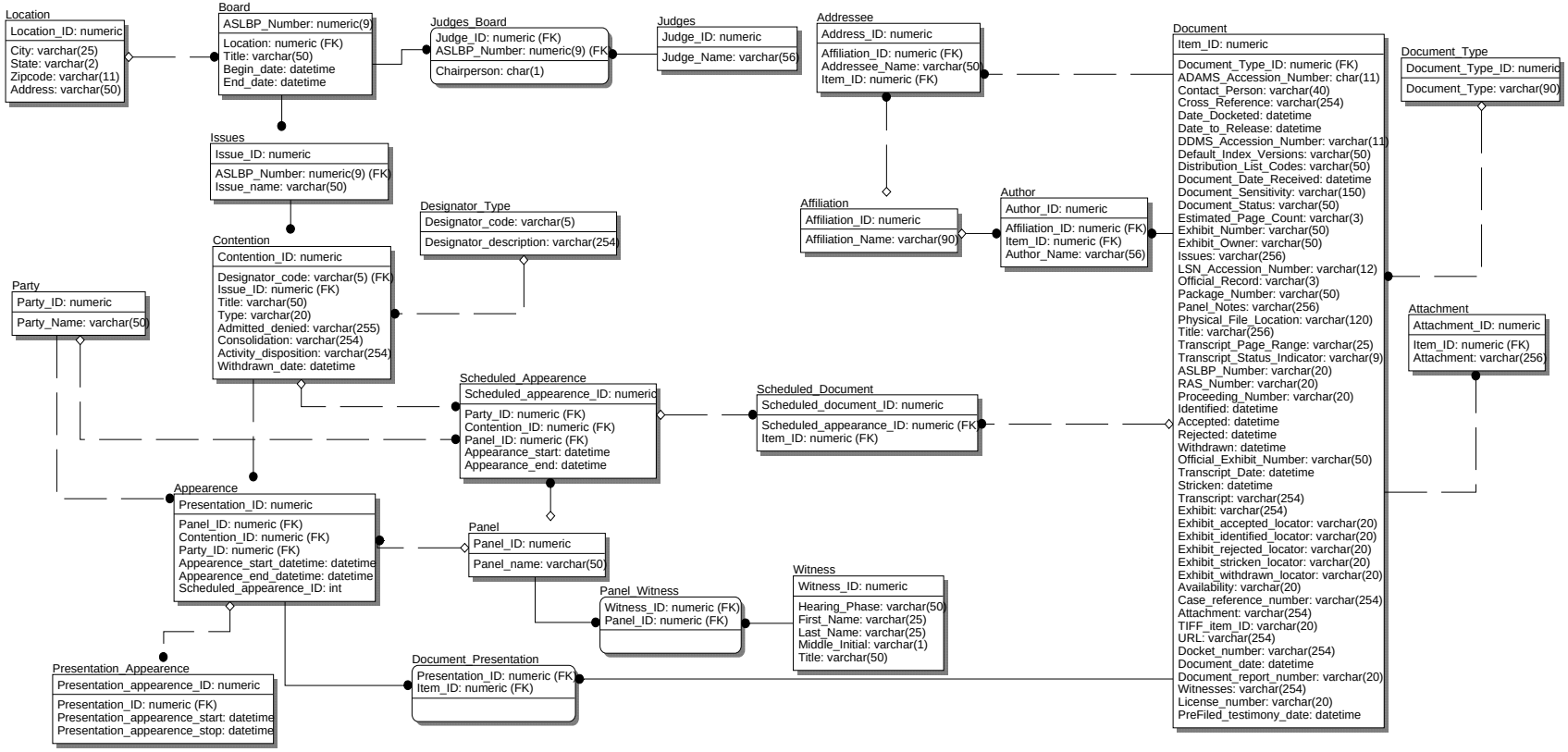

Figure 7-1 - DDMS Physical Data Model

This model shows the physical design of the DDMS database with all tables and all attributes.

7.2 DDMS Physical IT Security Design

The DDMS Physical IT security design is based on:

- The logical areas discussed earlier;
- The network constraints of the NRC infrastructure and associated applications; and
- The business requirements identified in the DDMS analysis phases.

The key IT security product choice of a router/firewall as follows:

DDMS Firewall – The firewall portion of the DDMS router/firewall, a Checkpoint Firewall 1, will be based on stateful inspection and allow for centralized management of all devices initially at one location with expansion to two locations. It will be deployed with consistent policy enforcement from a common repository. The firewall will be configured to only allow outbound traffic to the Lexis-Nexis, Westlaw, and NRC domains. All other traffic will be restricted.

7.2.1 Virtual Private Networks

Corporations and Government agencies use Virtual Private Networks (VPNs) to establish secure, end-to-end private network connections over a public networking infrastructure. VPNs are a logical solution for remote access connectivity. Deploying a remote access VPN reduces communications expenses by using the local dialup infrastructures of Internet Service Providers. Figure 7-2 shows a typical VPN installation

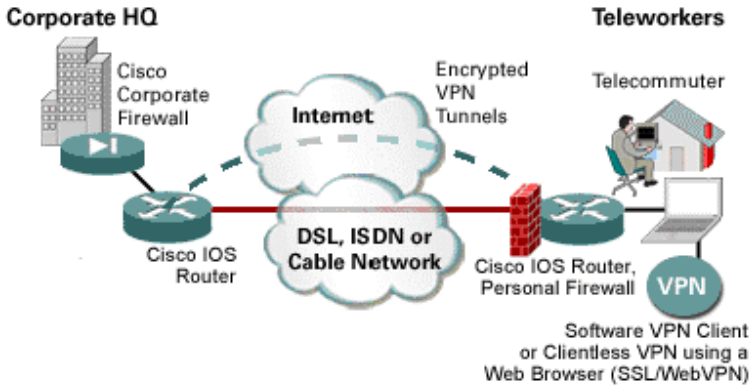

Figure 7-2 - VPN Architecture Overview

This diagram shows a typical VPN installation. This reflects the DDMS architecture proposed for the VPN.

DDSM will utilize Secure Sockets Layer (SSL)-based VPN. Secure Sockets Layer (SSL)-based VPN is a technology that provides remote access connectivity from almost any Internet-enabled

location using a Web browser and its native SSL encryption. Although application accessibility is constrained relative to IPSec VPNs, SSL-based VPNs allow for access to a growing set of common software applications, including Web page access, Web-enabled services such as file access, e-mail, and TCP-based applications (by way of a downloadable thin-client applet). Using Web technology for connectivity allows accessibility from almost any Internet-connected system without needing to install additional desktop software. Because SSL-based VPN can provide network access to users from almost any Internet-connected system, it is an option for extending remote access to users who require access to specific applications.

7.2.2 Virtual LANs

The initial physical architecture of the DDMS site is shown in Figure 7-3 below. The DDMS networks are segmented into Virtual LAN's (VLAN's) based on their relative security zones, defined as follows:

VLAN 1 – This is the primary VLAN. An Intrusion Detection System monitors all raw requests coming through the firewall before being passed through any load balancing devices.

VLAN 2 – The second VLAN is the primary network segment for the DDMS information. Web/portal, search, FTP services within DDMS, and the image-indexing server all have similar levels of security from the standpoint of access from the Internet, and are grouped together into one security zone. The application server is proxied through the NRC proxy/web server, with requests passing through the DDMS router/firewall on a separate port (not 80 or 443).

VLAN 3 – The third, or storage, VLAN is configured for access to the temporary storage of files prior to posting onto the DDMS database servers. This VLAN is setup exclusively as a conduit for reading from and writing to the production database servers and for supporting secure FTP to other NRC data repositories from which DDMS requires information. All access to the mass storage is filtered by an additional firewall in controlling access.

VLAN 4 – The fourth VLAN protects the application and databases. Application and Database servers are configured as read-only from the web segment, and read/write from the application server depending on the defined user access privileges.

VLAN 5 – The backup, content management, and publication systems are placed in a fifth and final VLAN (a separate LAN with physically separate switches). This VLAN has read/write access to the storage VLAN (VLAN 3), which acts as a gap technology to prevent direct access to backend systems from the web.

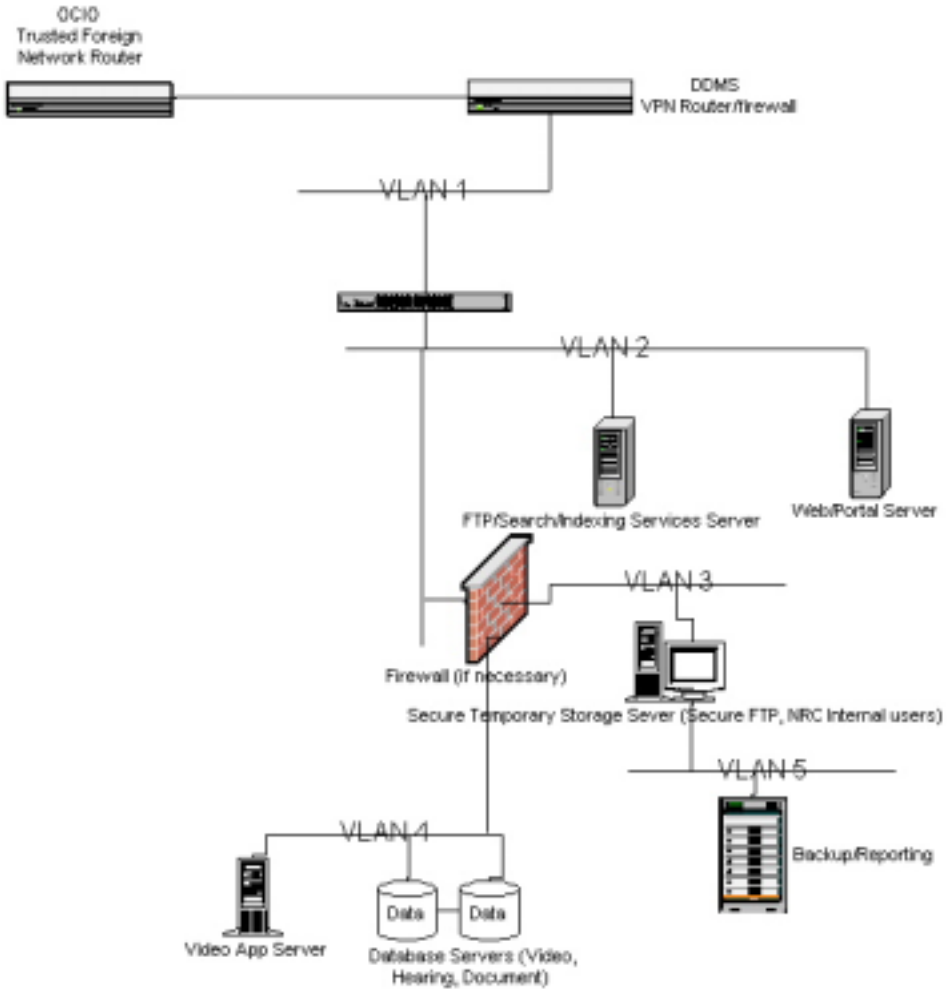

Figure 7-3 - Physical Security Design

This diagram shows the physical layout of the VLAN security structure created for DDMS.

7.3 DDMS Security Design Implementation Features

There are several features implemented in the design to enhance the security of the DDMS infrastructure. These are not individual security components, but rather techniques and configurations that will be used to assist in creating a secure DDMS environment. These include:

- **Network Address Translation (NAT)**. Internal use of NAT with different address bands for the different component layers. The externally visible IP addresses are translated at the load balancer layer to reduce the amount of information provided by the DDMS site to the public.
- **System Minimization.** The design minimizes the footprint to include only the necessary services. All additional local and network services will be turned off, and the local firewall will be enabled with a tool similar to IPChains for further lockdown.

Also, unnecessary accounts will be disabled, and existing accounts provided only the minimal privileges necessary for operation.

- **Post-implementation.** ASLBP will perform a detailed vulnerability assessment of the DDMS infrastructure. This could include automated scans, a manual penetration test of the environment, and architecture reviews with a separate security team. After the assessments, all findings will be immediately remediated and reassessed for compliance.

In addition to the internal assessment, additional assessments will be performed by external entities. The recommendations from these assessments would be incorporated into future enhancement plans for the DDMS environment.

Further, as security is a moving target, assessments on a quarterly basis will be conducted to uncover new vulnerabilities or problems since the previous attempts. The systems administrators will be held responsible for ensuring patches are applied in a timely manner and held accountable for timely patch installation.

Physical security will be enforced by locating the DDMS server equipment in access-controlled locations. In addition, if people outside of the DDMS team have access to the controlled locations, the servers will be mounted in locking racks to ensure nobody outside the authorized DDMS administration team can gain access to the servers. The DDMS administration team will perform regular system backups and will remove copies of the backup set to off-site location in compliance with DDMS disaster recovery plans.

7.4 Plumtree® Portal Overview

The Plumtree® Portal provides the integrated environment for managing the hearing room, managing exhibits, controlling the capture of the hearing room video and for providing an integrated search environment.

The Portal provides the judge, clerk of the court, and party's customized views of the hearing room and controls access at every level of the hearing room.

Plumtree® Software, in conjunction with specialists in Web accessibility, has developed an extension to its end-user interface designed especially for persons with disabilities. This enhanced interface offers the same content and interactivity as the standard user interface, but has navigational aids designed for people with disabilities and reduces problems associated with interfere with assistive browsing technologies.

The Plumtree® portal software is Section 508 compliant and has been tested and verified to be compliant with JAWS (The most popular screen reader worldwide). The portal has a user selectable mode of operation that converts the user interface (Web Pages) into a Section 508 compliant interface.

The Plumtree® Portal also offers the following features:

- **Round-robin load balancing** in the Automation Server, so multiple servers can automatically pick up the load during heavy periods of use.
- **User information settings** that can query any database on log-in and pass the arbitrary user information to any gadget, providing context-sensitivity for Gadget Web Services.
- **Caching architecture** based on standard HTTP headers, so programming Gadget Web Services to be cached is as simple as setting up any other Web content for caching.
- **Unicode** throughout the product, including the search collection, for true multi-lingual deployments.
- **Integration with NT performance monitor and Simple Network Management Protocol (SNMP) on UNIX** for granular read-outs of components' performance characteristics.
- **Integration of HTTP basic authentication** for easy-to-configure security between the portal and remote servers.
- **Low bandwidth and 508-compliant modes** for users with slow connections or physical disabilities.
- **Access control lists** (ACLs) for every object in the Plumtree® system—including links, folders, Gadget Web Services, publications, and all administrative objects.
- **100% Web-based administration console**, a feature enabling distributed administration.

- **A user profile system** that can assign default profiles to new portal users, conveniently determining the Gadget Web Services and personalization settings that users see when they first log in to the portal.
- **Back-up and recovery tools** for increasing system fault-tolerance and reducing the impact of catastrophic failure.
- **Customizable search collection backup** procedures for location and frequency.
- **A comprehensive tracking system** for auditing user logins, modifications of portal objects, and access control changes.
- **Image Server:** The option of configuring additional servers to store heavy graphics at locations separate from the portal server. This is especially useful for global deployments to bandwidth-deprived regions, where installing local image servers can reduce the amount of data that must arrive through thin regional pipes by up to 40 percent.
- **Extensive on-line help files** let users and administrators learn about and troubleshoot all portal functionality.
- **Content syndication architecture** delivers content from the portal to other Web sites or portals sites as HTML or as XML that can be dynamically rendered as HTML.
- **Drag and drop layout** of Gadget Web Services.
- **An invitation feature** to allow content managers to send e-mail that enrolls new users in the portal and assigns these users appropriate security privileges, supporting the viral marketing for both internal and external portals and portal features.
- **No client-side controls**, ensuring that the Plumtree® Corporate Portal remains device- and location-independent.

The following paragraphs provide additional detail of the portal design and component integration for the DDMS Hearing and Document Management functionality. Figure 20 illustrates this integration environment.

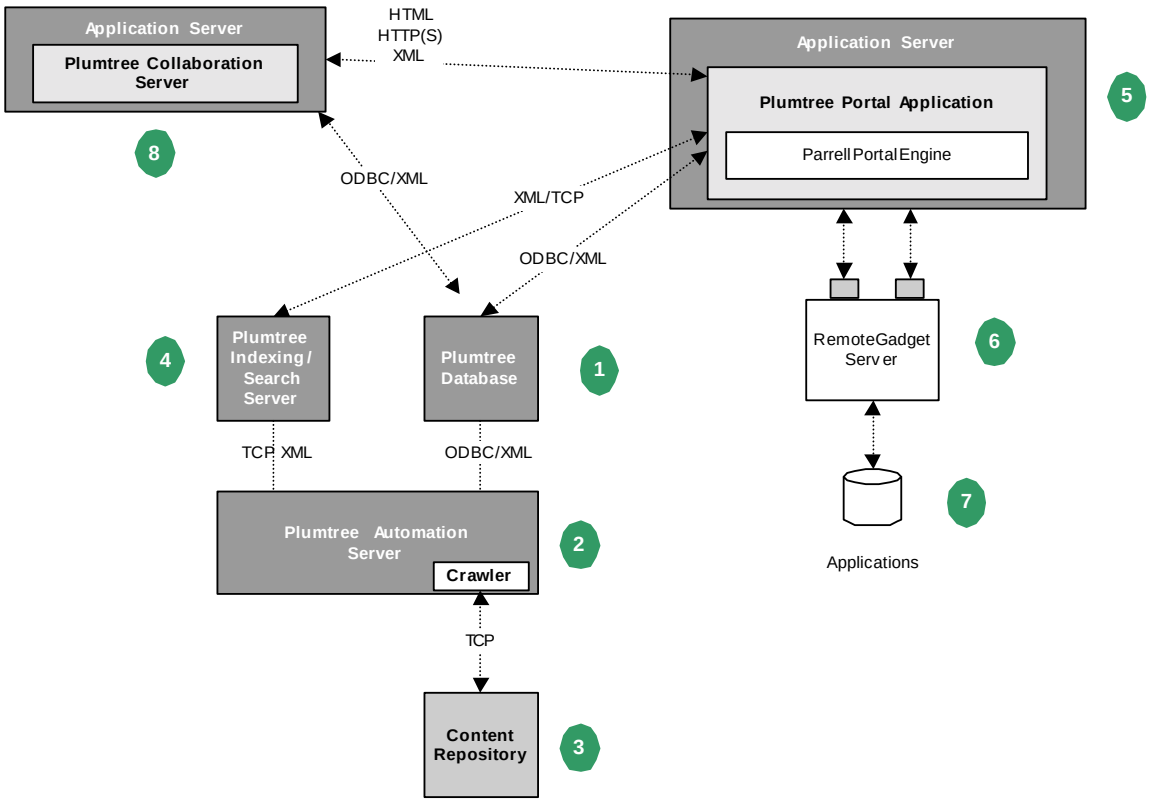

Figure 7-4 - Summary of Plumtree® Component Integration

Refer to Figure 7-4 for the following descriptions:

(1) ***Plumtree® Database***. The Plumtree® database contains all the metadata (bibliographic headers) for each exhibit, all user preferences, and all the access control lists for each object contained within the system. Each user request is compared to the database to verify access control. The database also contains all the information utilized by the crawlers.

(2) ***Plumtree® Automation Server***. The Automation Server controls, monitors, and reports on each of the crawlers and jobs, ensuring all run on time. For example there is a crawler that runs at night to process the new exhibits forwarded by HLW-EHD for indexing. There are also maintenance jobs to check the status of the system and publication jobs that display the newest exhibits and their status.

(3) ***Content Repository***. This directory contains the keyword indexes for all of the exhibits.

(4) ***Plumtree® Indexing/Search Server***. The Indexing/Search Server performs two key ***functions***. The first is to full-text index all the exhibits that are crawled and processed, the initial and official transcripts which are represented as XML files, transcripts delivered as PDFs and any other official court documents. The second function is to format and perform either the keyword search or a metadata search. This Server formats the search requests and forwards them to the appropriate subsystem.

(5) ***Plumtree® Portal Application***. This is the presentation level for the DDMS, ***formatting*** all https requests and delivers all html pages to the users. It also generates the https requests to display the gadgets on each page in each community based upon user access rights.

(6) ***Remote Gadget Server***. The Gadget Remote Server contains all the gadget code (i.e. web services) for all the functionality of the DDMS. The Server receives https requests and returns html and/or XML.

(7) ***Applications***. This is the interface to the various external applications. For example ***the*** video indexing, search and streaming are all external applications accessed via the Remote Gadget Server.

(8) ***Plumtree® Collaboration Server***. The Collaboration Server provides several functions: a) versioning control for exhibits; b) an integrated workflow engine for routing, reviewing and approving documents; and c) a calendaring function for tracking the court calendar as well as some basic collaboration capabilities.

7.4.1 Plumtree® Folder Structure

The folder structure will mirror the input folders as specified in the *DDMS Interface Control Document*. Permissions based upon the User Groups defined within Plumtree® will be applied to each of the folders. After the folders are created initially, the portal administrator will assign groups to each folder.

7.4.2 Plumtree ® Crawlers

Plumtree® utilizes a mechanism known as a "crawler" to establish scheduled indexing of a known data source. One crawler will be developed to periodically search and index the shared folder where HLW-EHD will place documents. Documents to be crawled will consist of 'PDF', 'TIFF', and 'XML' files. The files will be indexed and 'cards' created in the Plumtree® folder structure that mirrors the shared file structure. The documents will be left in their original folders with the metadata being stored in Plumtree®.

The crawler will be configured to run daily at an NRC specified time. The crawler will update its index for all new documents.

7.4.3 Bibliographic Header Information Capture

After the crawler has successfully completed indexing the documents (new and old), a utility will read each of the XML files in the shared input folder (populated by HLW-EHD). This utility will read each XML tag and update the Document Cards within Plumtree®. This is described in more detail in the *DDMS Interface Control Document*, provided under separate cover.

7.4.4 Plumtree® User Groups

The Plumtree® User Groups are created via the web administration of the portal. Each of the folders created will have its permissions set based upon the groups created below. The User Groups are divided into DDMS specific and Plumtree® specific and are as shown in Table 4 below:

DDMS
System Security Administrator
Database Administrator
System Administrator
Parties
Clerk of the Court
Judges
Law Clerks
Plumtree® Specific
Portal Administrators

Figure 7-5 - DDMS User Groups

The following table documents specific system privileges and system functions that will be available to each user group by default. The User access privileges table was the genesis of the gadget development, as shown in section 7.6.6.2.

Attribute	*Parties*	*Clerk of Court*	*Judge*	*Law Clerks*
View latest version of Pre-Filed documents and exhibits	X	X	X	X
Submit Exhibits, including physical evidence (within the hearing room)	X	X	X	
Perform Searches for Exhibits, pre-filed documents	X	X	X	X
Grant and revoke access privileges to hearing documents, exhibits, video, transcripts, and legal research services. (To include Protective Orders)		X	X	
Retrieve hearing documentation	X	X	X	X
Create and Store hearing documentation	X	X	X	X
Collaboration			X	
Create Store, and Retrieve Private Notes		X	X	X
Review Proceedings (video and transcript of hearing)	X	X	X	X
Marked Exhibits as Accepted, Rejected, Withdrawn, and Stricken		X	X	
Access to legal research using Lexis Westlaw,	X		X	X
View Sensitive, Copyright, Proprietary, Client/Attorney Privilege, or Privacy Act information (directed authorization)	X	X	X	X
Seal Records		X	X	
Witness List management			X	X
Start and Stop all or portions of DDMS		X	X	
Scheduling		X	X	X

Figure 7-6 - DDMS User Privileges

7.5 Plumtree® Jobs

Jobs within Plumtree® execute routines at specified times to help automate information management as well as portal administration. There are two classes of jobs created within Plumtree®. The first are Plumtree® specific maintenance jobs, audit logs and weekly housekeeping. These jobs are created automatically and are stored in the 'General' jobs folder. The second class comprises DDMS-specific jobs, such as the crawler.

A DDMS folder has been created to store the DDMS specific jobs. The crawler will be scheduled to run daily and will process any new material received from HLW-EHD.

7.5.1 Document/Exhibit Import from HLW-EHD & Export to ADAMS

HLW-EHD will place documents 'PDF', 'TIFF' and 'XML' in the folder structure specified in the *DDMS ICD (see Appendix A).* This folder structure will mirror the folder structure/taxonomy stored within Plumtree®. The process flow is as follows:

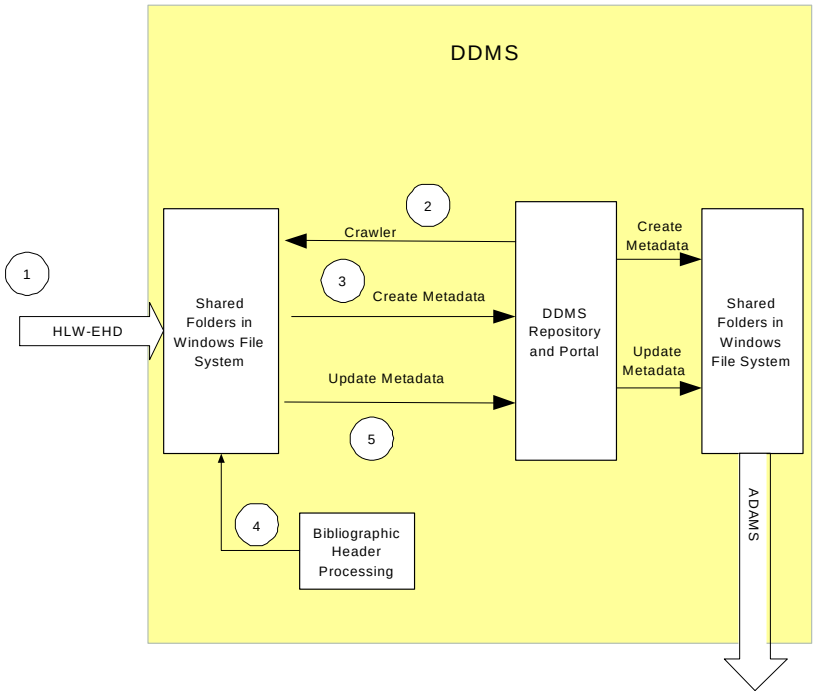

Figure 7-7 - ADAMS & HLW-EHD Import/Export Data Flow

1. HLW-EHD places documents and profile information to be processed in shared folders residing on the DDMS server.
2. The Plumtree® Crawler, at a scheduled time, indexes all new PDF files.
3. The crawler creates cards (metadata) for each document and stores the metadata in the identical folder within the DDMS repository.

4. After the crawler job is completed, the bibliographic header processing routine is started which processes each of the XML files containing the bibliographic header information.

5. The contents of the tags are read and the metadata in DDMS is updated using the file name as the key field.

Within the DDMS portal, the documents are automatically indexed and inherit the security ACL based upon the folder they are stored in.

The interface between DDMS and the ADAMS will be implemented using a mechanism that copies files extracted from DDMS into a specific folder structure by a DDMS program. This program will extract all files entered during the HLW hearings since the last HLW-EHD download. It will place the extracted files in a folder structure required to meet DPC submission requirements. ADAMS will then pull this information from the DDMS server.

7.6 Multimedia Subsystem

7.6.1 Hearing Room Video Capture

The overall logical architecture for the video subsystem is shown in figure 7-8.

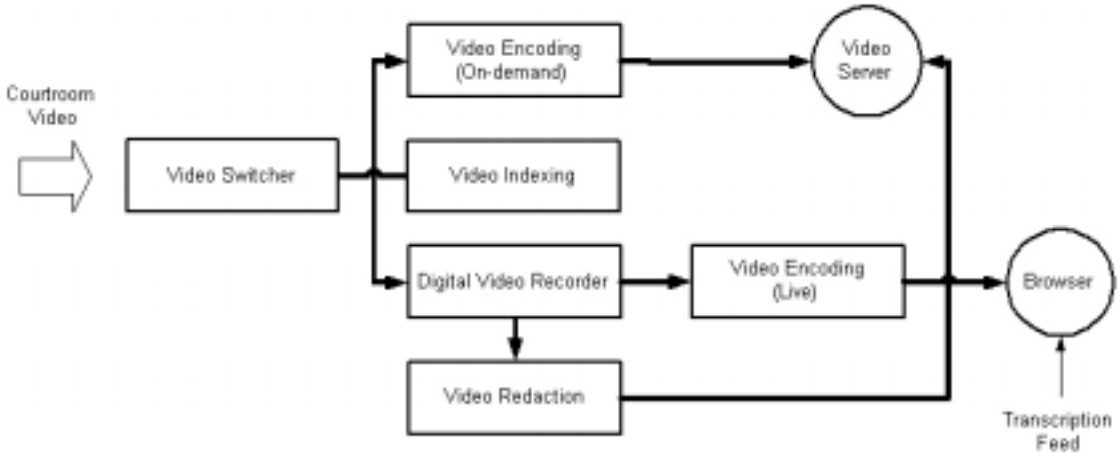

Figure 7-8 - Video Capture Flow

A total of six cameras will be used to capture video in the hearing room. These six inputs will be fed to a voice-activated video switcher. The switched video output of the video switcher will be input to a video splitter, which will then feed the video encoding system, as well as the TIVO digital recording system.

The Video switcher has a single output that is fed into a video splitter. The video splitter provides multiple copies of the video stream to feed the encoding subsystem for on-demand/archived encoding as well as the Digital Video Recording subsystem, which, in turn, feeds the live encoding subsystem.

On-demand Encoding Subsystem - The on-demand encoding subsystem will convert the composite video feed to Microsoft video (wmv format at 384 Kbps at 400x300 pixels as well as

56kbs). The output of the video encoder will be stored on the Microsoft Streaming Video Server.

The encoded video will use the following naming convention:

[unique session id]

Digital Video Recording Subsystem - A Tivo or Replay TV will provide 40 hours (approximately five days of hearings) of high quality video storage. The output of the Digital Video Recording Subsystem will feed the live encoding subsystem as well be available for the Redaction system. When asked to replay a part of a testimony, the Clerk of the Court will have the capability to rewind the digital video recorder and replay the appropriate part of the video.

Live Encoding Subsystem. The Live Encoding Subsystem will encode the hearing video in the same format as the On-demand Encoding Subsystem. The live video will then be broadcast throughout the hearing room and will appear in conjunction with the real-time transcript. The live video and the transcript will appear in the same browser.

Video Redaction Subsystem: The Video Redaction Subsystem will be used to edit audio on the video if proprietary or classified information is inadvertently disclosed. The video for the session will be identified in the Digital Video Recording Subsystem and captured in the Video Redaction Subsystem as Moving Picture Experts Group-2 (MPEG2). The Video Editor will edit the audio in question and then encode the video as specified for the On-demand Encoding Subsystem. The transcript for that particular session will also be edited to remove the transcript portion that corresponds to the redacted video segment, using a word processing application. The video and the transcript will then be resynchronized. The video is then moved to the streaming video server and replaces the suspect video file.

Note: This feature is reserved for special use under judge's direction.

Video Indexing Subsystem: The *Video Indexing/Capture Server* indexes the video and creates an XML file representing the video metadata. The XML file consists of the real-time transcript inserted into line 21 of the video. A separate time code is generated for each line of the "closed-captioning", scene changes/camera cuts and high-level metadata. The XML file is stored in a shared directory. This XML file contains the initial transcript, is synchronized with the digital video and will be crawled and stored in the portal for viewing until the official transcript is available. The official transcript will be converted to XML format. Required metadata will be extracted from the initial transcript and added to the official XML transcript file. This 'official' XML transcript file will be crawled by Plumtree® and will replace the initial XML transcript file.

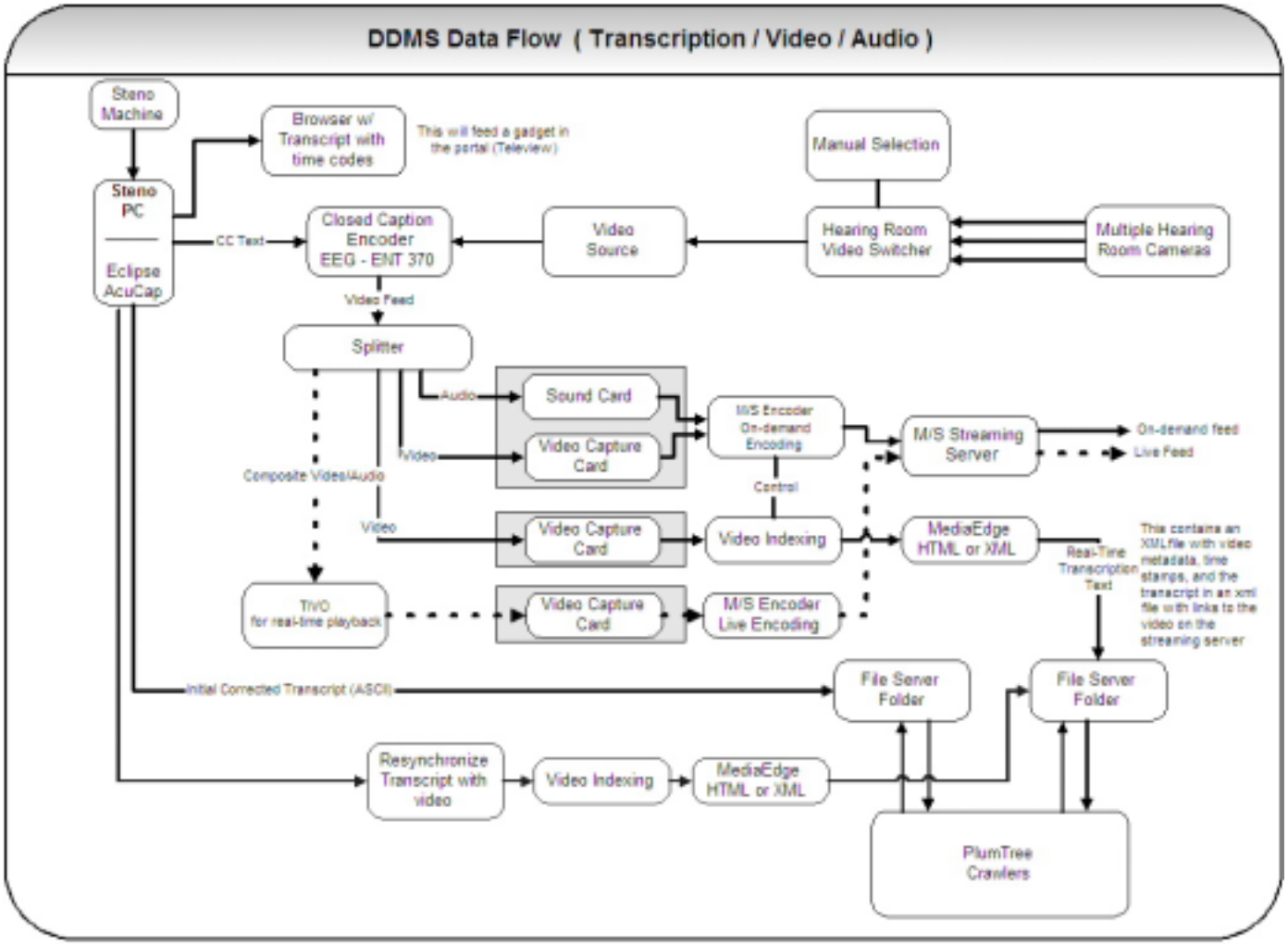

Figure 7-9 – DDMS Data Flow Model

Video Server and Storage Subsystem – The Microsoft Streaming Video Server included in Windows 2000®/2003 Server will be used to house the on-demand hearing videos. A separate content folder for each hearing room will be created to better segment the videos for each. During the Production System implementation, it may become necessary to further segment the hearing room videos by creating a separate folder for each board/issue.

7.6.2 Transcript Capture & Video Merge

The Transcript Capture subsystem will perform the function of real-time translation of the output from the court reporters steno machine. The real-time transcript will be fed to web services running on the court reporter's workstation supporting web-access to real-time transcription stream. A block diagram along with a sample screen snapshot is shown below.

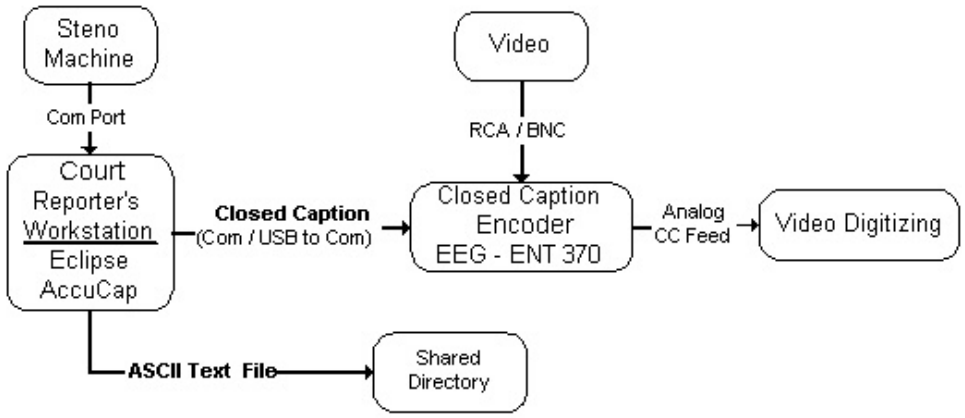

Figure 7-10 - Transcript Capture & Video Merge

The Steno machine will be used by the court reporter and will produce output to the court reporter's workstation. The steno machine connects to the court reporter's workstation via a standard communications (COM) port and the court reporter's workstation will receive electronic steno machine output via the workstations COM port.

The shorthand transcript is then translated by the Total Eclipse™ software, encoded by the AccuCap™ software, and sent to the referenced URL for transmission.

Transcript Synchronizing. During the session, the live transcript will be added to line 21 of the video and fed to the video indexing subsystem. During the hearing the video indexing subsystem will extract the line 21 'transcript' at the end of the court session, and an XML file will be created that contains the initial, or live transcript. This will contain the initial transcript as well as keyframes, which represent scene changes in the hearing room. This XML file will be integrated with the video for that session and stored in a shared directory. A Plumtree® Job will be run automatically (at a scheduled time) to ingest this XML file, index it and make it available in the transcripts folder for viewing. Once the official transcript has been delivered to the DDMS systems as a PDF and stored in the appropriate folder, the Clerk of the Court will use the sync transcript gadget in the portal. The Clerk will identify the XML version of the transcript (the official PDF is converted to XML during the resynchronization process), the XML metadata file generated via the Video Indexing Subsystem (the initial transcript file), and the appropriate

video file stored in the streaming video server. The transcript will then be resynchronized with the video, indexed and made available for searching and viewing using a process similar to the initial transcript process. The initial transcript will then be deleted to minimize confusion (two transcripts for the same court session).

With respect to pre-filed testimony, the DDMS will automatically insert the pre-filed testimony text directly into the synchronized transcript at the date/time the pre-filed testimony was accepted into the record. However, there will be no corresponding video for this text, and the video will remain synchronized to the original hearing video. Users may stop and start the video independently and scroll through the text as required.

Transcript as an Exhibit: The DDMS will receive the official transcript as a PDF file in a manner similar to that of other exhibits. The transcript will then follow the same process as other exhibits.

7.6.3 Integrated Multimedia Search and Playback

A court record (transcript/video) gadget will be available for searching and viewing the transcript. A user will select the hearings/boards to search and then enter the words or text string to search on. The query will be passed to the index and a query results set will be returned. This returned set will include the hearing room, board, day and session (i.e. AM/PM) along with a link to play that part of the court record. An example is shown below based on a keyword search.

For example, a query on the location of "Rockville," for a date range of 11/18/2002 - 12/25/2002, may produce the following type of output:

Location	Board	Date	Session
Rockville	1	20021219	AM
Rockville	4	20021118	PM

Clicking one of the links will return the appropriate XML file and a style sheet will be applied at the browser. Three windows will be provided:

- The first will contain the streaming video;
- The second will include the transcript and,
- The third window will include multiple embedded windows that contain: key frames to allow a user to visually review the video; links to exhibits referenced in the official transcript; and a search function to search for individual words within the transcript.

Selecting a line of a transcript will provide the capability to play corresponding video segment(s) indexed on the date and timestamp.

7.6.4 Capture Ad Hoc Multimedia Exhibit

This section discusses adding an exhibit submitted during the hearing. The type of submitted exhibit divides the sections. A shared directory will be used to store exhibits added during the hearing.

7.6.4.1 Common Process for entering exhibits submitted during the hearing

Entering the Exhibit in the Portal. The Clerk of the Court will select the link to enter a new exhibit, presented as a gadget in the portal. The Clerk will then select the type of exhibit to be created and fill-out the corresponding form. A help screen will be available to identify the tasks to be performed to add an ad hoc exhibit during the hearing. For example, the steps required to import a video submitted as an exhibit will be displayed. The Clerk will also copy or store the exhibit, as applicable, in the shared folder designated for exhibits entered during the hearing. The Clerk can then select the "SAVE" feature, and the metadata will be saved to the appropriate repository.

Processing the New Exhibits. A crawler will be created to crawl the folder where the exhibits created during the hearing are stored. This crawler will index the documents but will not automatically approve them for storage in the portal. The Clerk of the Court will then review each exhibit at the end of the day, finish completing the metadata and then approve the exhibit to go into the portal. The updated metadata will be stored in the repository.

7.6.4.2 Document as an Exhibit

Using Adobe Capture, the document will be scanned and converted to PDF format. The PDF document will then be stored in a shared directory for that hearing. An initial set of metadata will be created consisting of the Exhibit Number, filename, and date time stamp corresponding to the document status (i.e. identified, accepted, rejected, withdrawn, stricken). This will be stored as an XML document in the same-shared folder.

7.6.4.3 Video as an Exhibit

If a video (VHS/DVD) is submitted as an exhibit, it will be processed in a similar manner to the hearing video. At the time of identification during the hearing, a minimal amount of metadata will be entered via a gadget. This will be stored as an XML document in the same-shared folder. An "asx" file will also be created that will contain a link to where the video cartridge is stored.

The video will also need to be processed or encoded. The video will be placed in a VCR/DVD player. The hearing room cameras will capture the output of the VCR/DVD Player during the proceedings.

7.6.4.4 Computer Model/Simulation/Presentation as an Exhibit

If a model, simulation or presentation is submitted during the hearing, the computer will use a video-out connector (s-video or composite video) to feed the corresponding video inputs to the hearing room monitors. If the computer running the presentation does not have a video-out connector, a scan converter will be required to convert the VGA video output of the computer (i.e., connector that typically goes to a projector or external monitor). The output of the scan converter will then be fed into the hearing monitor for presentation.

At the time of identification during the hearing, a minimal set of metadata will be entered to reflect the simulation model as an exhibit.

7.6.4.5 Evidence Image Capture

The image is captured from the Evidence Image Capture device and saved as a TIFF file, saved in the shared directory. At the time of identification during the hearing, a minimal set of metadata will be entered into an XML document in the same, shared folder.

7.6.5 Touch Screen Interface

The gadgets that are unique to the Clerk of the Court will require the use of a mouse to operate due to the complexity of the functions to be performed. All other gadgets will be operated via mouse or touch screen. These gadgets will have a style sheet applied that will provide a large enough font to be accessed via the touch screen.

7.6.6 DDMS Portal Communities, Gadgets and the User Interface

Gadgets are a code segment, which provides a set of functionality for a user. For example, there will be a gadget allowing users to select a particular exhibit and view it. Each gadget has a set of permissions that determine which user(s) or groups of users will have access to a particular gadget. The layout of the gadgets on a page can be configured via a wizard to best benefit the users.

The portal will provide exhibit management as well as customized access to all information related to the hearing.

The following sections describe each of the communities and gadgets to be provided as well as the assignment of gadgets to user groups and thus communities.

7.6.6.1 Communities.

A Community will be created for each of the groups of users. DDMS shall be designed to allow authorized users the ability to restrict access to DDMS data and functional areas based upon user group assignment. For example, there will be a community for judges restricted solely to the judges (and approved judicial staff).

PEC will provide communities for the following user groups. A separate community will be created for each of the Parties. An All Boards Community will be created providing the overall status of all the boards and locations. There will be a separate area within the community for each Board.

Current DDMS Communities

- Judges
- Party Attorneys
- Clerk of the Court

7.6.6.2 Gadgets

Figure 7-10 summarizes the gadgets and their Community/Group availability:

Gadget	Parties	Clerks	Judges	Law Clerks
Ad-Hoc Exhibits		X	X	X
Beginning of the Session		X		
Chat		X	X	X
Common Tasks	X	X	X	X
Community Publications (Video Files)	X	X	X	X
DDMS Search TS			X	
End of Day		X	X	
End of the Session		X	X	
Exhibit Search	X	X	X	X
Exhibit Status	X	X	X	X
Exhibit Status TS			X	
Job History		X	X	
Judge's Common Tasks		X	X	
Legal Research	X	X	X	X
Live Video TS		X	X	
Process XML files		X	X	
Set Current Exhibits		X	X	
Today's Exhibit		X		
Today's Scheduled Exhibits		X	X	
Video Synchronization		X	X	
Appearance Manager	X	X	X	X
Witness Schedule	X	X	X	X
BIC Manager		X	X	X

Figure 7-11 - DDMS Gadgets

7.6.6.2.1 Ad-Hoc Exhibits

This gadget provides the ability to add a new exhibit and append information into the bibliographic header file, allowing the clerk to manage exhibits submitted during the hearing. This is wizard-driven to enable the Clerk of the Court to enter the minimal information for capturing the information about an exhibit.

7.6.6.2.2 BIC (Board, Issue, Contention) Manger

This gadget will provide the functions available for managing the boards, contentions, and issues list. The Clerk of the Court will be updating the DDMS database to reflect the most current naming conventions for each list. Functions throughout DDMS will populate their board, issues, and contention lists by querying the updated tables.

- Add Board – allows user to add a board and update the database
- Modify Board - allows user to modify or delete an existing board and update the database
- Add Issue - allows user to add an Issue and update the database
- Modify Issue - allows user to modify or delete an Issue and update the database
- Add Contention - allows user to add a Contention and update the database
- Modify Contention - allows user to modify or delete a Contention and update the database

7.6.6.2.3 Beginning of the Session

This gadget provides a list of the tasks to be accomplished at the beginning of the day by the Clerk of the Court. These tasks include the following:

- Check the status of the document import job;
- Start live video; and
- Verify live video is functioning.
- Process bibliographic header information

7.6.6.2.4 Chat

This gadget will provide authorized users the ability to electronically communicate in an open environment or to select a ‘room’ to chat in. The chat will not be saved nor will it be searchable.

7.6.6.2.5 Common Tasks

This gadget contains a list of seven links depending on the user's access level. This list will contain the most commonly used functions within the DDMS system, including the following:

- **My Briefcase** - allow users to store personal documents and manage personal folders
- **View All Documents** – performs a search on all documents in the DDMS system using certain filter criteria
- **View Live Video** – provides access to live hearing video and the real-time transcripts
- **Current Exhibit** – displays the current exhibit set by the Clerk of the court
- **Add New Exhibit** – allows users to add and configure the properties of a new exhibit
- **Add Note** – allows judges to enter a note
- **View Notes** – displays all notes entered by judge
- **Reports** – Link to display the available DDMS reports
- **Board Selection** – Allows the user to select one or more boards for viewing information through the portal.

7.6.6.2.6 Community Publications

This gadget contains links to the trial video synchronized with the updated court transcripts. Clicking the link will launch a browser window, containing the video along with the transcript. Exhibits will be hyperlinked to launch them in a separate window when clicked. This gadget and display are shown in figure 7-11.

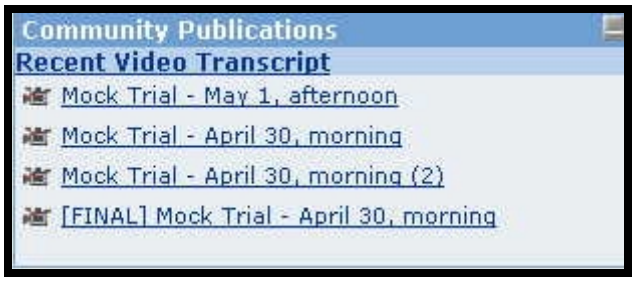

Figure 7-12 - Community Publications

7.6.6.2.7 DDMS Search TS

This gadget provides the judge with a touch screen keyboard display. The touch screen keyboard display allows for easy searching for documents and exhibits.

7.6.6.2.8 End of the Day

This gadget provides a list of the tasks to be accomplished at the end of the day by the Clerk of the Court. These tasks include the following:

- Stop the Live Video
- Verify Live video stream has stopped
- Complete the metadata for new exhibits
- Complete the metadata for pre-filed exhibits that have changed
- Send the metadata files to DPC
- Verify the video files are linked with the transcript files

7.6.6.2.9 End of Session

The End of Session gadget provides a listing of all tasks to be completed at the end of each session by the Clerk of Court. As the Clerk completes each task, the checkbox can be marked next to the task. The steps are:

- Stop live video
- Verify live video stream has stopped
- Completing the metadata for new exhibits
- Completing the metadata for pre-filed exhibits
- Verify the wmv files are linked with the transcript files.

7.6.6.2.10 Exhibit Search

This gadget provides the ability to search an exhibit by the exhibit number and display the exhibit. The user must enter a valid exhibit number for the exhibit to be displayed.

An example of this gadget is shown in figure 7-12

.

Figure 7-13 - Exhibit Search

7.6.6.2.11 Exhibit Status

This gadget will display the status of exhibits (identified, accepted, rejected, withdrawn, stricken) for each hearing room. A user will be able to click on an icon and launch the exhibit for viewing as well as clicking another icon and displaying the video where that exhibit is discussed. An example of this gadget is shown in figure 7-13.

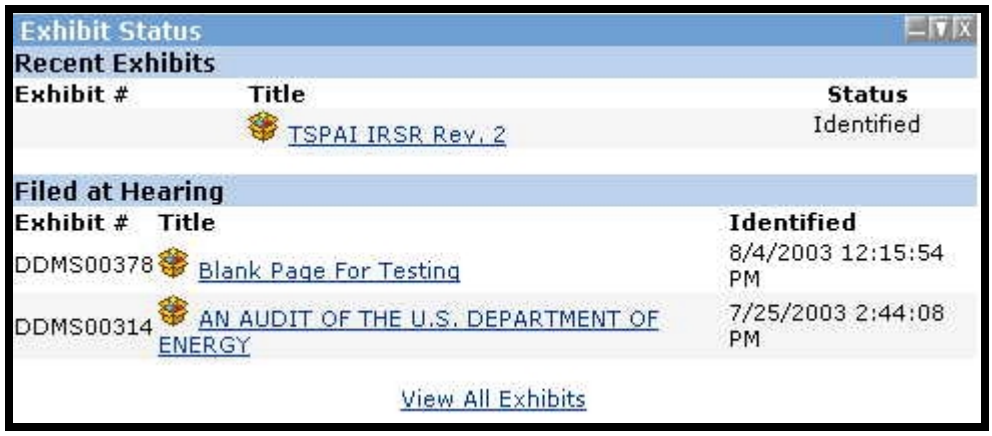

Figure 7-14 - Exhibit Status

7.6.6.2.12 Exhibit Status TS

This gadget will provide a touch screen function that will display the exhibit search screen. The user will have the ability to view the exhibit and launch the video where the exhibit was discussed. An example of this gadget is shown in figure 7-14.

Figure 7-15 - Exhibit Status TS

7.6.6.2.13 DDMS Job History

This gadget will display the Date, Job, Status, and Last Message of any job that was run within the DDMS system. The gadget is shown in figure 7-15.

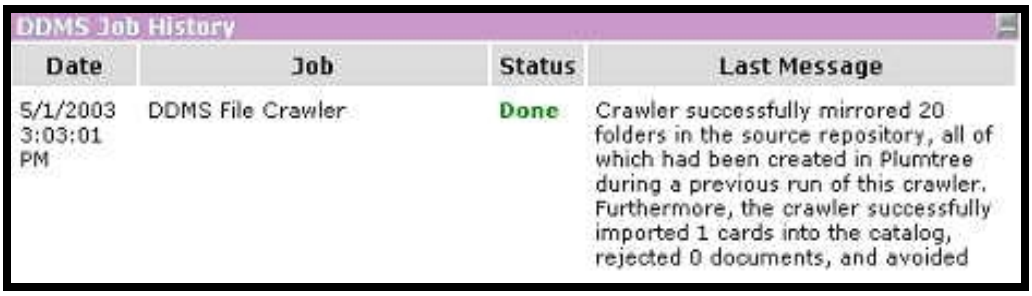

Figure 7-16 - DDMS Job History

7.6.6.2.14 Judge's Common Tasks

This gadget has the same functionality as the Common Tasks gadget. All the links and icons are displayed in a larger font for touch screen use.

7.6.6.2.15 Legal Research

This gadget will provide a link to Lexis™, Westlaw™, and NRC. Westlaw™ contains a complete collection of NRC Rules, Policies and Procedures. NRC will not provide user accounts to Westlaw™ or Lexis™. Each user will be responsible for entering their account information. Each user will be responsible for entering their account information. This gadget is shown in figure 7-16.

Figure 7-17 - Legal Research

7.6.6.2.16 Live Video TS

This gadget provides touch screen access to the live hearing video and the real-time transcript for the Judges community. There will be two frames within the browser window. The video frame on the left will show the live feed from the hearing room. The right frame will display the real-time transcript.

7.6.6.2.17 Process XML Files

This gadget will retrieve all the metadata from the XML files and display a list of all the processed XML files.

7.6.6.2.18 Set Current Exhibits

This gadget allows the current exhibit to be set on a daily basis. Once the exhibit is set, users will be allowed to view the exhibit by clicking the link "Current Exhibit" located in the Common Tasks gadget. The gadget is in figure 7-17 below.

Figure 7-18 - Set Current Exhibit

7.6.6.2.19 Today's Exhibit

This gadget displays a list of all the exhibits that have been identified during the current day. The list will display the Exhibit number, Title, and Status of the exhibit. The exhibit number will be hyperlinked to enable users to change or edit exhibit statuses. The gadget is shown in figure 7-18 below.

Figure 7-19 - Today's Exhibit

7.6.6.2.20 Today's Scheduled Appearances

This gadget will display a quick view list of Panels or Witnesses scheduled to appear that day in court. The list will have the Name and Party of the Panel or Witness. The gadget is shown in figure 7-24 below.

Figure 7-20 - Today's Scheduled Appearances

7.6.6.2.21 Video Synchronization

This gadget will allow the user to re-synchronize the hearing video with the updated PDF transcript files. The gadget is shown in figure 7-20 below.

Figure 7-21 - Video Sync

7.6.6.2.22 Appearance Manager

This gadget will allow authorized users the ability to add/modify/delete witnesses, create/modify panels, create/modify appearances for documents, create/modify appearances for witnesses/panels, select calendar views for exhibits, and provide a link for scheduling contentions handled by Center Court. There will be a daily, weekly, monthly, and yearly view of scheduled contentions available to aid in scheduling document and witness appearances.

7.6.6.2.23 Witness Schedule

This gadget displays a list of witnesses scheduled to appear in court. The user has the ability to navigate to past, present, and future lists of scheduled witnesses. The Witness name is linked to page where the user can see a list of all the scheduled appearances for that witness and schedule future appearances for that witness. The gadget is shown in figure 7-21 below.

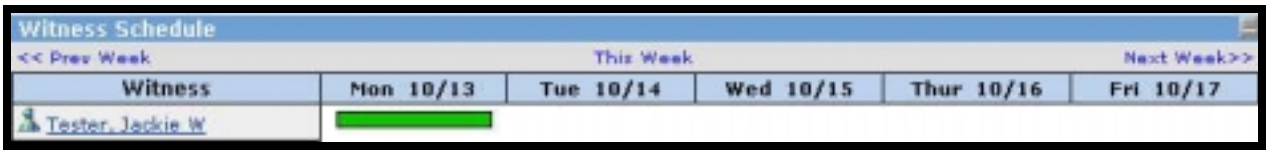

Figure 7-22 - Witness Schedule

7.7 System Software

7.7.1 Server Platform

The server platform for the DDMS will be Microsoft Windows 2000® Server.

7.7.2 Application Software

7.7.2.1 Portal/Collaboration Server Software

This will be implemented using Plumtree® 4.5WS along with the Plumtree® Collaboration Server 2.0 which contain custom versions of Documentum®, Verity®, and BEA Application Server®.

7.7.2.2 Video Indexing Software

The Video Indexing software is implemented using MediaEdge's Video Indexing Solution.

7.7.2.3 Search & Retrieval Software

Search and Retrieval is implemented using Plumtree® 4.5WS along with custom SQL Server code.

7.7.2.4 Database Management Software

Microsoft's SQL Server 2000® is used for the underlying database application.

7.7.2.5 Video Encoding Software

Video encoding is accomplished using Microsoft's Media Encoder.

7.7.2.6 Video Streaming Software

This is accomplished using Microsoft's Streaming Video Software.

7.7.2.7 Real-time Transcription Software

Real-time transcription is accomplished using Total Eclipse from Advantage Software. In addition, the closed-captioning text stream is created using AccuCapNT™. TeleView™ allows access to the Closed Caption text via a web browser.

7.7.2.8 Levare Center Court

Center Court will provide the scheduling and calendaring functions within DDMS. The Center Court product will be customized for the DDMS environment.

7.8 System Hardware

Figure 7-22 details the proposed server hardware required for the Production System.

Machine	Description
Job Server	Dell PowerEdge 2650, 2.4 GHz, 2.0 GB Ram, (5) 36GB HD, Raid 5, Dual Gigabit NIC, Redundant Power Supply
Disk Array	Dell PowerVault 220S External SCSI disk array, (2) 36GB HD; (5) 146GB HD
Portal Server	Dell PowerEdge 2650, 2.4 GHz, 2.0 GB Ram, (5) 36GB HD, Raid 5, Dual Gigabit NIC, Redundant Power Supply
Disk Array	Dell PowerVault 220S External SCSI disk array, (2) 36GB HD
Database Server	Dell PowerEdge 6650, Dual 2.0 GHz, 4.0 GB Ram, 73GB HD, Dual Gigabit NIC
Disk Array	Dell PowerVault 220S External SCSI disk array, (7) 36GB HD
Video Encoder Server (On-Demand)	Niagara 4112RW P IV 2.4 GHz, 512 Mb Ram, 80 GB HD, Osprey Card
Video Encoder Server (Live)	Dell PowerEdge 6650, Dual 1.9 GHz, 4.0 GB Ram, (5) 36GB HD, Raid 5, Dual Gigabit NIC
Video Indexing/ Capture Server	Dell PowerEdge 6650, Dual 1.9 GHz, 4.0 GB Ram, (5) 36GB HD, Raid 5, Dual Gigabit NIC
Image Workstation	Dell Optiplex GX260, 2.2 GHz, 256MB Ram, 40GB HD, 17” Monitor
Court Reporters Workstation	Dell Optiplex GX260, 2.2 GHz, 256MB Ram, 40GB HD, 17” Monitor
UPS	Dell 3000RM Rack Mount UPS
Tape Backup	Dell PowerVault 122T 40/80 GB Rack Mount Tape Drive
KVM Switch	Dell 180ES Console Switch, Rack Mount
Rack Console	Dell 1U Flat Panel Monitor Console, Rack Mount
Server Rack	Dell PowerEdge Rack 4210, Server Rack

Figure 7-23 - Server Requirements

7.9 System Sizing

Based on the requirements defined for the DDMS Production environment, PEC has developed a **preliminary** sizing projection for the amount of storage and wide-area network bandwidth required for the DDMS in Rockville. Based on the recommended architecture from the Aspen Study, this analysis assumes that Rockville hosts the centralized DDMS database and both the facilities in Rockville and the Las Vegas area have their own dedicated portal/document management and video subsystem servers.

7.9.1 Storage Sizing Analysis

The major objects addressed by our storage analysis are: DBMS (SQL Server Database and Plumtree Database), documents, document indexes and video files.

7.9.1.1 DBMS Storage

General DDMS Assumptions

- DDMS will store 50 thousand document records

SQL Server Database Assumptions

Based on an assessment of the database created for the POC system:

- An average record has 25 fields
- An average field has 60 characters
- The DBMS requires 100MB storage for itself
- The average SQL Server record is approximately 1.5KB (25 X60)

The resulting estimated SQL database size is **175Mb.**

Plumtree Database Assumptions

- The Plumtree database will store approximately 100,000 records
- Average record will consist of 10 fields at 60 characters per field

Based on these assumptions, an average record will consist of approximately 0.6KB resulting in an estimated Plumtree database size of 60MB.

Thus, the storage required for the database portion of the system is approximately **235MB**.

7.9.1.2 Document Storage

- DDMS will store 50 thousand documents
- The average document will consist of 20 PDF pages
- An average PDF page will require 20KB of storage

Based on these assumptions, the document storage required will be approximately **20GB**.

7.9.1.3 Full Text Index Storage

Storage for indexing of the documents crawled by Plumtree requires approximately 30% of the original document content size. Thus full text indexing data represents approximately **6 GB** (30% of the 20GB shown above).

7.9.1.4 Video Storage

- A typical video file will represent one session of 4 hours
- DDMS will store 150 days of video or 300 sessions video files
- An average hour of video requires 100MB of storage, or 400MB for a four hour session

Based on these assumptions, the video file storage required will be approximately **120GB.** *Once the Las Vegas location is operational, this requirement will expand to approximately 240GB.*

Figure 7-23 summarizes the overall storage requirements calculated in the previous paragraphs.

Storage Component	Storage Requirement
Databases	
SQL Server	175MB
Plumtree	60MB
Documents	20GB
Full Text Indexes	6GB
Video	120GB

Figure 7-24 - Storage Requirements

7.9.2 Wide-Area Network Bandwidth for Rockville

Refer to Figure 7-28 to help clarify the network bandwidth sizing analysis for the DDMS high-level architecture. Note that for the initial system implementation the database server storing the DDMS metadata resides in Rockville only. For this analysis, “Inbound” refers to traffic arriving at the Rockville site from Las Vegas area system and from all remote users of the DDMS. “Outbound” traffic refers to traffic sent out from the DDMS system in Rockville to the Las Vegas area system and to remote users of the DDMS.

In the course of supporting DDMS operations, users logged into the Las Vegas area DDMS will generate inbound traffic from the Web/portal server in the Las Vegas area over the network to the database server in Rockville. The equivalent user generated requests in Rockville will not generate wide-area network traffic since this traffic will pass only over the local LAN. Requests from remote users logged into the Web/portal server in Rockville will also generate inbound traffic. Similarly, DDMS responses to these remote users and the Las Vegas area system requests will generate outbound traffic.

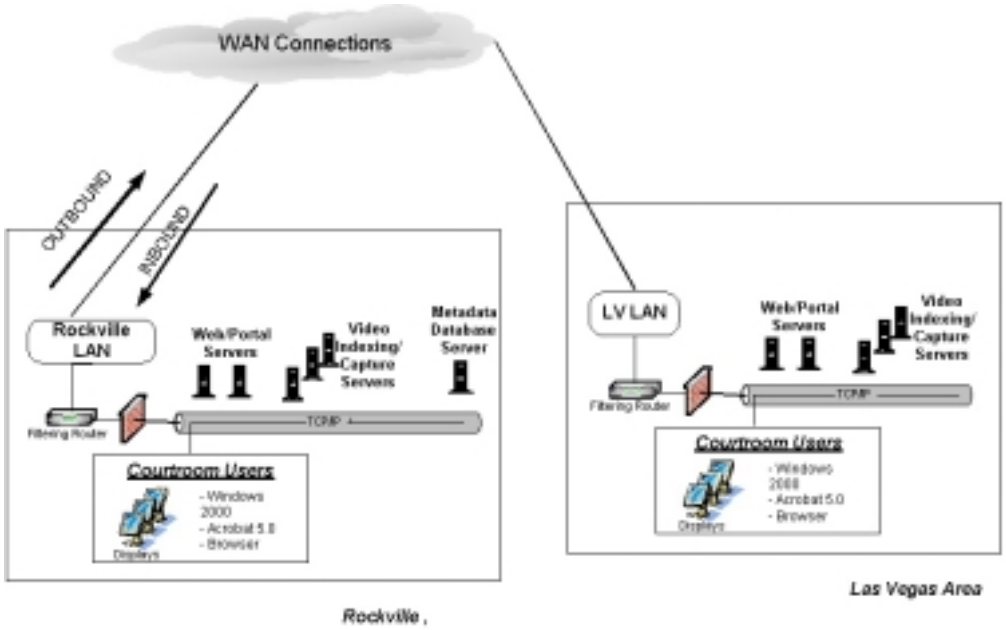

Figure 7-25 - Wide Area Network

The major wide area network traffic into (**inbound**) the Rockville DDMS consist of:

- Database transactions to the Rockville DDMS from users accessing metadata for material based on either the Rockville or Las Vegas area proceedings;
- Live Video stream from Las Vegas area hearing room to supply the caching video server in Rockville

The major wide area network traffic out (**outbound**) from the Rockville DDMS consist of:

- Any database transaction responses from the DDMS with metadata for material based on both the Rockville and Las Vegas area proceedings;
- The resulting transfer of documents and video clips to those remote users viewing Rockville-based proceedings material;
- Live Video stream from Rockville hearing room to supply the caching video server in Las Vegas area system.

7.9.2.1 Inbound Traffic

Database Traffic (Users accessing Rockville or Las Vegas area Proceedings information)

Queries

All user requests, whether from local Rockville users, remote Rockville users, local Las Vegas area users or remote Las Vegas area users, result in a query transaction to the metadata database in Rockville. Thus the request traffic is the sum of all these requests for metadata. Assuming a worst case scenario that both locations are actively supporting a hearing concurrently:

- Assume requests from 20 active users at each site or 40 concurrently active users. Each user submits a query transaction once every 40 seconds. This results in a cumulative transaction rate of 1 per second.
- Assume each inbound transaction results in a 1000 character request to the DBMS server.

The total inbound wide-area network request traffic from concurrent board hearings in Rockville and Las Vegas is **10Kps**.

Inserts

- Assume inserts occur for each hearing once every 15 minutes during a hearing; concurrent hearings would result in one DB insert every 450 seconds
- For inserts, a more worst-case scenario is the overnight download and processing of documents from HLW-EHD. Assume 40 documents/hour overnight or one insert every 9 seconds
- Assume a document insert size is the sum of document size (90KB) plus average metadata record size (1.5KB)

The resulting bandwidth required to support inbound inserts during peak time (overnight imports to DDMS) is approximately **101 Kbps**.

Updates

- Assume that during the course of a hearing ten updates occur every hour for each concurrently run hearing. This results in 20 updates per hour to the DDMS database or one update every 180 seconds.
- Assume each update includes 6 fields of data at 100 characters per field

The resulting bandwidth required to support inbound updates is well below **1 Kbps**.

In summary, the sum of all inbound traffic for database operations is approximately 10Kbps plus 101 Kbps plus <1Kbps or **111Kbps**. The worst-case time period is during the overnight processing period where documents are processed from the HLW-EHD download.

Real-time Video Input Stream

- Assume that one Live Video stream from Las Vegas area hearing room is being sent to Rockville to supply the Rockville caching video server. The stream is assumed to be a high quality video output at 384Kpbs.

7.9.2.2 Outbound Traffic

All remote users accessing Rockville Proceedings information from DB Query Results

- From above assume requests from 20 active users at each site or 40 concurrently active users. Each user submits a query transaction once every 40 seconds. This results in a cumulative transaction rate of 1 per second
- Assume each query results in the return of 20 fields at 100 characters per field

The resulting bandwidth required to support this outbound remote user query load is approximately **20 kilobit per second**.

7.9.2.3 Document Traffic

- Assume 40 users generate one document related query every 2 minutes but only 1 out of every 5 requests results in an outbound document transfer. This represents one document transfer every 15 seconds.
- Assume an average of 20 pages/document (from the SOW numbers) and an average of 20KB per page (empirical observation from POC testing)

The resulting bandwidth required to support this outbound remote user document download stream is approximately **267 kilobits per second**.

7.9.2.4 Video Streaming

For video streaming, the data rate is affected by the type of service available to the end user's workstation. If a remote user is connected via high-speed service, such as T1, then the optimal streaming rate is approximately 384Kbps. If the end user is connected to their ISP via a dial-up modem, then the streaming rate is approximately 52Kbs. The analysis assumes that the major party's users are connected via high-speed connection to their offices. The remainder of the users will be connected via dial-up service to their ISP. As each site, (Rockville and Las Vegas area) has its own video server, the assumptions and calculations apply to

each site separately for video streaming outputs. The following assumptions were used:

- The highest bandwidth timeframe will be outside of the hearing times
- 6 users will be connected via high-speed service and will require video streaming at 384 Kbps.
- 6 users will be connected via dial-up service to their ISP and will require video streaming at 52Kbps.

During the conduct of hearings, there is the possibility of the need to stream Live Video from Rockville hearing room to supply the caching video server in Las Vegas area system. However, it is important to note that it is unlikely that this stream will coincide with the 12 video streaming sessions assumed to occur outside of hearing times. Therefore, it is projected that the resulting bandwidth required to support video streaming under the stated assumptions during the worst-case time is approximately **2.7 Mbps**.

This will require at least two T1 lines or fractional T3 service.

Figure 7-25 summarizes the transaction types and the calculated bandwidth requirements.

Transaction Type	Traffic (Kbps)
Inbound traffic	
User Inbound Query Traffic for Rockville and Las Vegas requests	111Kbps
Live Video stream from Las Vegas area hearing room to supply the caching video server in Rockville	384Kbps
Outbound Traffic	
Return of query results to users viewing Rockville or Las Vegas based proceedings material	20Kbps
Transfer of requested documents to remote users viewing Rockville based proceedings material	267Kbps
Transfer of requested video clips to remote users viewing Rockville based proceedings material	2700Kbps
Live Video stream from Rockville hearing room to supply the caching video server in Las Vegas area system.	384Kbps

Figure 7-26 - Traffic Estimates

7.9.3 Summary of WAN Bandwidth Requirements

Based on the analysis described above, it is apparent the dominating factor driving the required outbound wide-area network connection bandwidth is the video streaming activities. Based on this, NRC will need to acquire the equivalent bandwidth of two T1 lines to the Hearing Room in order to support the HLW proceedings. For inbound support, NRC will require a bandwidth of approximately 495 Kbps.

Normal workload and communications bandwidth analysis usually address peaking factors that represent how a large number of users interact with an automated system. The basis for this is that most of the workforce utilizing a system will request support concurrently during 2 two-hour periods during the day (referred to as a bi-modal distribution). In the case of DDMS, this peaking effect will not apply in the same manner. The system is used most heavily during hearings. The proposed design accounted for the challenging situation where there are two concurrently active hearings. However, the actual operational peak time for network bandwidth appears to be outside of the hearing hours. The inbound traffic peak will most likely be during off-hours when documents are downloaded and processed. For outbound traffic, the most likely peak times will also be outside of the hearing times. A peaking factor should be applied to the number of concurrent video streaming users. However, this factor is unknown at this time. Once it has been determined, the resulting effect of this peaking may have a major effect on the outbound traffic bandwidth requirements.

7.10 Hearing Management

Hearing Management will be accomplished through a set of gadgets within the portal to provide the required functionality. Each gadget will have an accompanying access control list to determine user access.

7.10.1 Rules, Policies and Procedures

A gadget will be provided that provides access to Westlaw™ and Lexis™. Individual users will be required to login to these services using their own password and id.

7.10.2 Witness List Management

A gadget will be provided to display the list of witnesses for a given day. An administrative gadget will be provided to allow selected users to add/delete/modify the witness list.

7.10.3 Record Sealing/Unsealing

The Clerk of the Court will have the capability to restrict access to any exhibit by modifying the access control list via the administration interface of the portal.

7.10.4 Hearing Scheduling

The DDMS will be capable of scheduling witnesses, exhibits, boards, judges, issues, or any combination of these elements. The scheduling function will allow users to coordinate and manage the complexity of the hearing.

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Appendix A – DDMS Detailed Production Requirements

The following addresses the requirements' numbering. The original requirements were numbered through 148. Requirements 149 - 153 address the DDMS security, and are incorporated into the Production System. Requirements 154 - 162 expanded the original 148 requirements, but were eventually incorporated into the original requirements, and therefore are no longer needed. Requirements 163 – 173 are new requirements.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 29	The DDMS shall accommodate input information needed to support the presiding officer in administering the pre-hearing conferences and evidentiary hearings, including such items as:	The DDMS shall be capable of receiving, recording, and storing information needed to support the presiding officer in administering the pre-hearing conferences and evidentiary hearings, including such items as:	Note for Requirement 29 D: LSN reference is to be kept (note when appropriate). 29H - this refers to the physical evidence input into the system, with bibliographic header / metadata. 29J - Contentions are a subset of Issues (Every Issue can have multiple Contentions). April 2003 update for 29 J - Contentions are a document type of 'Legal-Pleading' and 'Legal-Intervention Petition, Responses, and Contentions.' 03/26/2003 meeting: pre-hearing conferences and 'regular' hearing conferences are the same. (Users will know the difference based on the date.)

Sub-Requirement

29 A	Motions
29 B	Briefs
29 C	Petitions
29 D	Electronic Records (e.g., LSN, EHD)
29 E	Testimony
29 F	Witness Lists
29 G	Exhibits
29 H	References to models, video, and other information
29 I	Responses
29 J	Contentions

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 30	The DDMS shall accommodate output information needed to support the presiding officer in administering the pre-hearing conferences and evidentiary hearings, including such items as:	The DDMS shall be capable of displaying information needed to support the presiding officer in administering the pre-hearing conferences (non hearing room) and evidentiary hearings, including such items as:	30 A ("Computer generated reports") - refers to DDMS reporting tool (Crystal Reports) - ad-hoc reporting capabilities; 30B ("Acknowledgements") - WAIVED (3/20/03).

Sub-Requirement

30	A	Computer generated reports
30	B	Acknowledgments
30	C	Issuances

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 115	The DDMS record forwarded to SECY shall be retrievable from remote locations including:	The DDMS database record(s) forwarded to SECY shall be retrievable from remote locations including:	The requirement is in reference to SECY, and to sub-requirements of Litigant Offices and Sites with Web access (web accessible). Current DDMS (POC) fulfills this requirement: DDMS POC is web accessible.

Sub-Requirement

115	A	Litigant Offices
115	B	Sites with Web access

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 116	The DDMS shall accommodate input information needed to support the transmission of all record information to SECY, including such items as:	The DDMS shall be capable of receiving, recording, and storing information needed to support the transmission of the DDMS database record information to SECY, including such items as:	Current DDMS POC design addresses the transmission of DDMS database record information (minus the video and DDMS specific datafiles).

Sub-Requirement

116	A	Record
116	B	Index
116	C	Proceeding Information

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 134	The DDMS shall provide a basic entry level manual as a training and reference tool.	The DDMS shall provide a basic entry level manual as a training and reference tool.	An SOW Task 3 objective. The DDMS online Help will address the requirement's training and reference tool objectives (3/20/2003 meeting decision).

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 146	The DDMS shall restrict all users, except the System Administrator, from deleting information stored in the DDMS.	The DDMS shall restrict all users, except the System Administrator, from deleting information stored in the DDMS.	Reference Security Access Table

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 166		DDMS shall provide the capability to indicate system performance and isolate failures.	NEW REQUIREMENT. 3/20/2003 meeting Action Item: PEC to check SOW to verify whether or not this is a requirement originally intended for the DDMS design. April 2003 status: PEC checked SOW / RFP: there is NO reference within these documents for the proposed DDMS to isolate system failures and monitor performance. PEC development staff will provide an estimated cost for implementing this within DDMS.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 167		DDMS shall provide for authorized users the ability to certify the official transcript.	NEW REQUIREMENT. NOTE: certification of the official transcript occurs outside of DDMS. 3/20/2003 meeting decision to WAIVE this requirement.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 99	The DDMS shall support retrieval of the DDMS record from:	The DDMS shall support retrieval of the DDMS database record(s) from:	This is defined by terminal locations. Each location should be specifically identified in the DDMS deployment / rollout plan. Once NRC has provided all the DDMS hardware, this requirement can be verified (3/20/2003 meeting decision; this requirement applies to Rockville, MD location). Production Design Document addresses (verification by analysis).

Sub-Requirement

99 A	Judge's bench
99 B	Litigant desk locations
99 C	Clerk of Court
99 D	Court Reporter
99 E	Judge's chambers
99 F	Judge's conference room(s)
99 G	Litigant support conference rooms at the hearing

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 122	The DDMS shall utilize an open architecture that will accommodate integration with legacy systems (ADAMS).	The DDMS shall utilize an open architecture that will accommodate integration with legacy systems (ADAMS).	A folder structure (of daily information) will be available to ADAM, for DPC staff input. Reference the DDMS POC ICD.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 123	The DDMS shall support the migration to newer information and A/V technologies.	The DDMS shall support the migration to newer information and A/V technologies.	03/20/2003 meeting: intent of requirement for ensuring DDMS, in the future, is capable of being upgraded with the most current technologies, both hardware and software. Applies to DDMS maintenance contract provisions. Verification via analysis.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 124	The DDMS shall use product components that are based on industry accepted standards. This shall include but not be limited to hardware interfaces, Application Programming Interface (API), Relational Database technology, Communications Protocol, and Operating Systems technology.	The DDMS shall use industry accepted standard components.	This shall include but is not be limited to hardware interfaces, Application Programming Interface (API), Relational Database technology, Communications Protocol, and Operating Systems technology. (DRAFT Technical Reference Model/ ECCB approvals]

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 125	The DDMS shall support the hearing room environments for Rockville, a remote location in the Las Vegas area, as well as other sites in remote locations.	The DDMS shall support the hearing room environments for Rockville, a remote location in the Las Vegas area, as well as other sites in remote locations.	03/20/2003 meeting: this requirement addresses a remote site DDMS configuration. NRC envisions a DDMS setup at a remote site to include PCs or laptops with a digital line, with A/V equipment available, to include cameras and video recording and audio capabilities, possible scanning and overhead projection capabilities. (DDMS to demonstrate the 'functional capability to handle' remote sites including ability to accept previously recorded video in the system for post synchronization with the transcript.) This requirement can be addressed at a later design phase. NOTE: the DDMS setup at PEC can serve as an example of a remote location configuration setup and operations. Production Design Document addresses (verification by analysis).

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 126	The DDMS shall use tailored user interfaces that are consistent with industry standards for information presentation.	The DDMS shall use tailored user interfaces consistent with industry standards for information presentation.	As per NRC Technical Reference Model (Draft/ECCB approvals), Microsoft Windows standards as specified in The Windows Interface Guidelines for Software Design. Production system will be in compliance to ADA 508. POC will demonstrate some (limited) 508 ADA compliance.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 132	The DDMS shall use touch sensitive or equivalent data entry devices to assist in the control and manipulation of the DDMS systems by the Judge and Clerk of Court.	The DDMS shall support touch sensitive or equivalent data entry devices.	Reserved for Judges (and possibly the Judicial Staff) and Clerk of the Court. Judge Bollwerk commented that parties/attorneys would also have touch screens, along with the intelligent podium. (NOTE: providing touch screens to parties / attorneys will be a cost impact to NRC.) 03/20/2003 meeting - NRC to determine number of touch screens for the production system.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 133	The DDMS shall use accepted industry icons to represent the format of the information being reviewed, i.e., audio, video, image, Word, etc.	The DDMS shall use accepted industry icons to represent the format of the information being reviewed.	As per NRC Technical Reference Model (Draft), Microsoft Windows standards as specified in The Windows Interface Guidelines for Software Design. Reference W3 Consortium standards. Production system will be in compliance to ADA 508. POC will demonstrate some (limited) 508 ADA compliance.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 135	The DDMS shall integrate with the existing NRC enterprise infrastructure.	The DDMS shall integrate with the existing NRC enterprise infrastructure.	Refer to the DDMS ICD. NRC needs to clarify all potential interfaces, if different from DDMS POC. Reference NRC Technical Reference Model (Draft).

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 136	The DDMS shall make optimal use of existing communications infrastructure including but not limited to the LANs, WAN and telecommunications.	The DDMS shall make optimal use of existing communications infrastructure including but not limited to the LANs, WAN and telecommunications.	03/20/2003 meeting decision: requirement to be WAIVED.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 137	The DDMS shall use existing client desktop computers, enhancing the technology to meet requirements not currently supported.	The DDMS shall use existing client desktop computers, enhancing the technology to meet requirements not currently supported.	03/20/2003 meeting: the intent of the requirement was to ensure the development contractor would be responsible for providing any enhancements that are not part of the NRC standard desktop configurations. Any proposed enhancements to the standard NRC desktop configuration are to be noted (production design documentation).

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 138	The DDMS shall use, as far as possible, server technology that is consistent with NRC procurement standards for similar technology including but not limited to hardware vendor, machine type, and operating systems.	The DDMS shall use server technology that is consistent with NRC procurement standards for similar technology including but not limited to hardware vendor, machine type, and operating systems.	03/20/2003 meeting decision: requirement to be WAIVED; server technology addressed already in the contract negotiations (for example, the use of Dell computers).

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 140	The DDMS shall be capable of supporting multiple concurrent hearings conducted at multiple locations and in multiple time zones.	The DDMS shall be capable of supporting multiple concurrent hearings conducted at multiple locations and in multiple time zones.	DDMS production will support both Rockville and Las Vegas concurrently, for HLW hearings. This implementation will fulfill this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 141	The DDMS shall support intercommunications with the EHD in Rockville, Maryland to obtain EHD updates and to transfer hearing record updates to the SECY organization. This interface shall be available 5 days per week, for a minimum of 1 hour each day.	The DDMS shall be capable of interfacing to designated HLW subsystems. This interface shall be capable of being available 7 days per week, for a minimum of 1 hour each day.	3/20/2003 meeting: recommended rewording of the requirement to current clarified requirement wording. It is conceivable (per Judge Farrar) to hold hearings on weekends. Therefore, access to EHD should be 7 days a week. Push capability shall be used for the interfaces to EHD.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 45	The DDMS shall accommodate input information needed to support evidence and argument presentation at pre-hearing conferences and hearings, including such items as:	The DDMS shall be capable of receiving, recording, and storing evidence and argument presentation at pre-hearing conferences and hearings, including such items as:	03/20/2003 meeting: this requirement is envisioned as a Clerk of the Court function.45 A - 'paper' refers to input via a scanner. 45 B - input would be the running of a PowerPoint presentation off of a laptop computer. 45 D - recording of a presentation projected while running a model simulation off of a laptop computer. 45 G - refers to pre-filed testimony. 45 H - refers to recording of a video conference presentation. 45 K - refers to recording of a projector (or VCR) presentation. 3/26/03 meeting: pre-hearing conferences and 'regular' hearing conferences are the same (users will know the difference based on the date). 4/9/03 meeting; pre-file applies to exhibits and testimony only.

Sub-Requirement

45 A	Documents (images, text, paper, etc.)
45 B	Video Clips
45 C	Laptops/computer inputs
45 D	Computer Models
45 E	Physical Evidence
45 F	Oral presentation/report/testimony
45 G	Depositions
45 H	Video Conference
45 I	CD/DVD
45 J	Reference to Pre-filed court information
45 K	Projectors

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 46	The DDMS shall accommodate output information needed to support evidence and argument presentation at pre-hearing conferences and hearings, including such items as:	The DDMS shall be capable of displaying information needed to support evidence and argument presentation at pre-hearing conferences and hearings, including such items as:	03/20/2003 meeting: 46 C "Reports" - the NRC-supplied (Michelle Mendelson) Exhibit Status report matrix can serve as a report type. 3/26/03 meeting: pre-hearing conferences and 'regular' hearing conferences are the same (users will know the difference based on the date).

Sub-Requirement

46 A	Screens or display units
46 B	Printers
46 C	Reports
46 D	Hearing record
46 E	Remote hearing site - video conference

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 47	The DDMS shall support the capability to update information previously stored in the record.	The DDMS shall support the capability to read, update, and delete information stored in the courtroom record.	Restricted to authorized users per DDMS Users' Privileges Table. This requirement is both for standard data mgmt, and for hearing mgmt of the record. This may include the 'revision' or striking of the record of a document previously entered. For POC this requirement does not apply to video. NOTE: deletion of information stored in the courtroom record is restricted to the System Administrator role(s).

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 49	The DDMS shall support the deletion of electronic information or references to exhibits from the record.	Same as 1.47	The DDMS shall support the deletion of electronic information or references to exhibits from the record.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 50	The DDMS shall support modifying existing portions of the record as directed by the judge(s).	Same as 1.47	Same as 1.47

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 59	The DDMS shall provide access to the record from the judges' chambers.	The DDMS shall provide access to the record from the judges' chambers.	This requirement is similar to Production Requirement 99: The DDMS shall support retrieval of the DDMS record from: c) Judge's chambers.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 62	The DDMS shall support the creation of customized or ad hoc reports to assist the judges in reviewing the record captured during the hearing.	The DDMS shall support the creation of customized or ad hoc reports to assist the judges in reviewing the record captured during the hearing.	03/20/2003 meeting: the proposed DDMS Production system's reporting tool (Crystal Reports) will fulfill this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 88	The DDMS shall provide a capability to correlate types of multimedia information, to facilitate an easy retrieval process.	The DDMS shall provide a capability to match types of multimedia information (image, text, video), to provide a retrieval process that does not require entering of IT type search parameters	03/20/2003 meeting: current DDMS POC design for the use of touch screens can fulfill this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 90	The DDMS shall accommodate input information needed to assist with the creation of the hearing record, including such items as:	The DDMS shall be capable of receiving, recording, and storing information needed to assist with the creation of the hearing record, including such items as:	Requirements 90 A - E impacts the DDMS production system organizational file folder: the production system's file folder structure will have to account for each of these input and storage area types. Verification by analysis (interface / design documentation).

Sub-Requirement

90 A	Evidence electronic and physical)
90 B	Decision
90 C	Pre-filed Testimony
90 D	Pleadings
90 E	Transcription

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 91	The DDMS shall accommodate output information needed to assist with the creation of the hearing record, including such items as:	The DDMS shall be capable of displaying information needed to assist with the creation of the hearing record, including such items as:	91 A - refers to the DDMS ASCII files. 91 D - links to electronic image of the physical evidence, with header information providing location. 91 E - output to CD / DVD: 03/20/2003 meeting: the intent is to be able to burn information onto CDs / DVDs (DDMS to provide CD / DVD burners).

Sub-Requirement

91 A	Metadata
91 B	Electronic Information
91 C	Links or references
91 D	Physical Evidence
91 E	CD/DVD

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 92	The DDMS shall support searching of the DDMS record using one or more metadata fields.	The DDMS shall support searching of the DDMS database record(s) using one or more metadata fields.	An example of fulfilling this requirement would be the generated output based on the metadata fields of all exhibits associated to a particular witness.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 93	The DDMS shall support the searching of the DDMS record using a full-text index.	The DDMS shall support the searching of the DDMS database record(s) using a full-text index.	Currently met in POC Requirement 24: DDMS shall support the capability for a full-text search.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 94	The DDMS shall support the searching of the DDMS record using a combination of metadata and full-text searches.	The DDMS shall support the searching of the DDMS database record(s) using a combination of metadata and full-text searches.	An example of fulfilling this requirement would be a) searching for and retrieving of a document that is a transcript, and within this transcript, conducing a keyword search, or b) searching on a combination of metadata and full text simultaneously (e.g. find all exhibits with status of rejected that contain the phrase 'helium').

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 95	The DDMS shall support the retrieval of the DDMS record from an internet based user using a web browser.	The DDMS shall support the retrieval of the DDMS database record(s) from an internet based user using a web browser.	Web connection and interface, such as a search of DDMS information being conducted from a litigant's office via the proposed web browser.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 96	The DDMS shall support the display of metadata or a profile for each entity stored in the DDMS record.	The DDMS shall support the display of metadata or a profile for each entity stored in the DDMS database record(s).	Current DDMS POC design supports and fulfills this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 97	The DDMS shall support the display of each type of electronic information stored in the record, including documents, video files, images, etc.	The DDMS shall support the display of all stored information.	

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 98	The DDMS shall support the production of a result list for information matching the specified search criteria.	The DDMS shall support the production of a result list for information matching the specified search criteria.	The requirement’s intent is, upon executing a query, to provide a list ('result list') identifying those objects ('search criteria') requested and used within the search.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 100	The DDMS shall support local and remote access to DDMS data for a scheduled 21 hours per day, 7 days per week.	The DDMS shall support local and remote access to DDMS data for a scheduled 21 hours per day, 7 days per week.	

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 102	The DDMS shall accommodate output information needed to assist with interactive search and retrieval of record information, including such items as:	The DDMS shall support the searching on and retrieval of DDMS database record(s) information.	03/26/2003 meeting: agreed to rewriting of requirement to indicate search and retrieval of data. 102 A - 102 D - WAIVED.

Sub-Requirement

102	A	Results from Judges
102	B	Results from Parties
102	C	Results from Court Reporter
102	D	Removable media

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 104	The DDMS shall support a real-time transcription of pre-hearing conferences and hearings.	The DDMS shall support a real-time transcription of pre-hearing conferences and hearings.	03/26/2003 meeting: pre-hearing conferences and 'regular' hearing conferences are the same. (Users will know the difference based on the date.)

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 107	The DDMS shall support the indexing of the transcribed record with metadata and a full-text index.	The DDMS shall support the indexing of the transcribed record with metadata and a full-text index.	Currently met in POC Requirement 24: DDMS shall support the capability for a full-text search of each pre-filed document. 4/9/03 meeting: pre-file applies to exhibits and testimony only.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 118	The DDMS shall provide capacity to store 10% of the high-end estimates for HLW repository document storage in the LSN:	The DDMS shall provide capacity to store 10% of the high-end estimates for HLW repository document storage in the LSN:	03/26/2003: the high-end estimates are noted in 118 A: 15,766,000 pages.

Sub-Requirement

118	A	The LSN is estimated to store a total of 15,766,000 pages by 2004, the expected time frame for the HLW repository proceeding.
118	B	At 50 KB/page, this results in approximately 79 GB to store electronic images in the DDMS at its inception.
118	C	Full text of the images (at 5 KB/page) requires an additional 8 GB of storage.
118	D	Metadata storage is estimated to require an additional 4 GB of storage based on an average of 10 pages/document and 2.5 KB of metadata information/document.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 121	The DDMS shall display a result list within 10 seconds of the search request to find the information, for 90% of all requests.	The DDMS shall, within the electronic hearing room environment, display a result list within 10 seconds of the search request to find the information, for 90% of all requests.	Same as Production Requirement 120: The DDMS shall provide a capability, within the electronic hearing room environment, to display evidence on each monitor or display in the hearing room, within 10 seconds of the request to display the document, for 90% of all requests.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 129	The DDMS shall provide pre-defined search methods; tailored for the DDMS user to mitigate the need to enter many keystrokes when searching for information.	The DDMS shall provide pre-defined search methods.	This functionality is covered in POC Requirement 19: The DDMS shall support the searching for electronic and non-electronic information using the metadata and/or full-text index information as authorized. The 3/27/2003 POC demo confirmed this capability to NRC.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 130	The DDMS shall support the casual, infrequent user that needs to search and retrieve information from the DDMS.	The DDMS shall support the casual, infrequent user that needs to search and retrieve information from the DDMS.	Current DDMS POC design for the use of touch screens will address the needs of the "casual, infrequent user."

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 131	The DDMS shall support the technically proficient user that needs to use advanced tools to find and manipulate information in the DDMS.	The DDMS shall support the technically proficient user that needs to use advanced tools to find and manipulate information in the DDMS.	The current DDMS POC design for full-text and advanced searches will fulfill the needs of a "technically proficient user."

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 139	The DDMS shall be scheduled to be available to support conducting the HLW repository hearing 21 hours per day, 7 days per week.	The DDMS shall be scheduled to be available to support conducting the HLW repository hearing 21 hours per day, 7 days per week.	Exact operating hours are defined with the SOW. Production Design Document addresses (verification by analysis).

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 142	The DDMS shall be available 7 days per week, a minimum of 1 hour each day, to support ongoing or required maintenance activities.	The DDMS shall be available 7 days per week, at a minimum of 1 hour each day, to support ongoing or required maintenance activities.	This is the requirement for 'maintenance' and backups, presumably.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 143	The Mean Time to Repair (MTTR) the DDMS shall be no more than 1 hour, during the 7 day/week operating time frame.	The Mean Time to Repair (MTTR) the DDMS shall be no more than 1 hour, during the 7 day/week operating time frame.	Due to the requirement's short timeframe, PEC envisions on-site maintenance, to include staffing and replacement parts. PEC is to provide 'suggested' written provisions and guidelines to be included in the maintenance contract to fulfill this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 144	The DDMS shall support the creation of various levels of user privileges to access or manage information in the DDMS.	The DDMS shall support the creation of various levels of user privileges to access or manage information in the DDMS.	Current DDMS POC design, through Users' Privileges matrix, addresses this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 145	The DDMS shall provide a capability to restrict some users from accessing specific information stored in the DDMS, e.g., a Protective Order File.	The DDMS shall provide a capability to restrict some users from accessing specific information stored in the DDMS, e.g., a Protective Order File.	Current DDMS POC design, through Users' Privileges matrix, addresses this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 147	The DDMS shall allow only authorized users, like the Court Clerk, to update or modify information stored in the DDMS system.	The DDMS shall allow only authorized users, like the Court Clerk, to update or modify information stored in the DDMS system.	Current DDMS POC establishes user roles' privileges and authorized functions.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 163		The DDMS shall ensure the timestamp is accurate to current date and time.	NEW REQUIREMENT; current design will have system software synching all servers.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 168	NEW REQUIREMENT	DDMS shall provide electronic note taking capability.	Provide the capability to create private electronic notes as the hearing progresses, time stamped or otherwise linked to the transcript. Notes will be private and secure for each user. Notes can be taken at any time during a hearing, and can be related to testimonies, exhibits, evidence, or presentations. DEFERRED

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 7	The DDMS shall support the electronic marking of evidence/exhibits to be presented. The system shall be capable of marking evidence such as Identified, Received, Rejected, Withdrawn, etc.	The DDMS shall support the electronic marking of evidence/exhibits.	The system shall mark evidence as: Identified, Admitted, Rejected, Withdrawn, and Stricken. When an exhibit is initially submitted, it is marked as Identified. Admitted, Rejected, Withdrawn, and Stricken are all results of Judges directions.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 15	The DDMS shall retrieve pre-filed documents from information filed with SECY.	The DDMS shall retrieve pre-filed documents.	The new or updated version of pre-filed documents, and their associated metadata will be retrieved from EHD. 4/9/03 meeting: pre-file applies to exhibits and testimony only. 4/9/03 meeting: pre-file applies to exhibits and testimony only.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 16	The DDMS shall support capturing pre-filed documents from electronic and paper formats.	The DDMS shall support capturing documents electronically from paper formats, with the following minimum scanner requirements:	DDMS must be capable of supporting the input of scanned documents. The following sub-requirements apply only to the production system. For POC purposes only, NRC will provide a scanner.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 20	The DDMS shall support the retrieval and display or printing of all pre-filed electronic information.	The DDMS shall support the retrieval, display, and/or printing of all electronic information as authorized.	This requirement is limited to pre-filed electronic information, excluding video and audio. Screen shots can be accomplished within OS, via the Print Screen command.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 21	The DDMS shall support the selective retrieval and capture of electronic pleading(s) from the EHD.	The DDMS shall support the selective retrieval of electronic pleading(s) from the HLW EHD.	POC will address HLW specific electronic documents. The Production system will support multiple case dockets. "Selective" retrieval does not mean user-defined retrieval: this term means DDMS will automatically be selective in accessing and retrieving data from EHD, by pulling into DDMS only data that has been updated or added.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 22	The DDMS shall support the electronic document formats supported by the EHD.	The DDMS shall support the electronic document formats supported by the EHD.	This currently includes PDF and tiff. DDMS will be consistent with E-Rules. Note: E-Rules 2.1011,(2)(iii):"following acceptable formats: ASCII, native word processing (Word, WordPerfect), PDF Normal, or HTML." No spreadsheet formats specified.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 24	The DDMS shall support the generation of a full-text index for each pre-filed document.	The DDMS shall support the capability for a full-text search of each pre-filed document.	Pre-filed documents in PDF format will contain hidden text. Pre-filed tiff documents will not include text. 4/9/03 meeting: pre-file applies to exhibits and testimony only.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 25	The DDMS shall support the tracking and identification of multiple versions or revisions of pre-filed documents. The latest version of a pre-filed document shall be presented when a retrieval request is issued.	The DDMS shall support the tracking and identification of multiple versions or revisions of pre-filed documents.	Versions are not required within DDMS.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 26	The DDMS shall support the retrieval and display of pre-filed documents, retaining the original presentation fidelity of the information.	The DDMS shall support the retrieval and display of pre-filed documents, with minimal loss of resolution.	This requirement primarily pertains to the scanning of documents / photos, and the storing of these scanned items (electronic files) into DDMS. Minimal loss of resolution based on mfr-provided specifications for display resolution. All original information should be retained, if possible, in any conversion process.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 27	The DDMS shall support the printing of pre-filed documents to selectable page sizes specified by the user, including but not limited to 8 ½" x 11" and legal size paper.	The DDMS shall support the printing of pre-filed documents to selectable page sizes specified by the user, including but not limited to 8 ½" x 11" and legal size paper.	Printer page size capability is dependent on the types of printers NRC will have configured to the DDMS. It is envisioned the printer will be capable of supporting 11" x 17" (ledger paper).

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 39	The DDMS shall provide a capability to highlight or annotate, and then optionally capture and store, specific portions of displayed still images presented on monitor or workstations, in order to provide clarity or emphasis.	The DDMS shall provide a capability to highlight or annotate, and then optionally capture and store, specific portions of displayed still images presented on monitor or workstations.	An electronic 'white board' (part of the production's 'intelligent podium'), used in being able to retrieve, markup, and then store (save) the marked up 'still images.' Envisioned saving in a tiff format.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 48	The DDMS shall support the capability to insert or append information into the record, e.g., mark evidence as accepted, rejected, or withdrawn.	Same as 1.7	The DDMS shall support the capability to insert or append information into the record, e.g., mark evidence as accepted, rejected, or withdrawn. This marking will be stored in the DDMS database within the "Exhibit Status" field.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 51	The DDMS shall support the creation and capture of documents used to promulgate orders, directives, etc., to SECY and other parties.	The DDMS shall support the creation and capture of documents used to promulgate orders and directives to SECY.	This requirement is entirely outside of DDMS. It will be accomplished through EIE, via web interface, and using existing word processing packages. The Adobe application utilized within DDMS will support the standard functions of copying and pasting.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 52	Issuance documents shall be stored in their native formats.	Documents issued by ASLBP shall be stored in their native formats.	03/26/2003 meeting: agreed DDMS to provide the capability to select and retrieve DDMS record information (not video), and copy and paste this information into a word processing application. There will be NO storing, within DDMS itself, of issuance documents in their 'native' (MS Word, WordPerfect) format. 4/3/03 meeting: reconfirmed 'native format' would be pdf or tiff ("EIE-accepted / approved format").

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 53	The DDMS shall support scanning and conversion of paper documents, e.g., to capture required written signature pages.	Same as 1.16	The DDMS shall support scanning and conversion of paper documents, e.g., to capture required written signature pages.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 54	The DDMS shall support the physical marking of electronic documents with a user selectable/customizable electronic marker, e.g., an image stamp.	Same as 1.7	DDMS shall support the inclusion of a cover sheet containing bibliographic document status information describing the electronic document. Note: This will print as part of the document.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 55	The DDMS shall accommodate input information needed to support records management at pre-hearing conferences and hearings, including such items as:	The DDMS shall be capable of receiving, recording, and storing records management information at pre-hearing conferences and hearings, including such items as:	55 A - Record (4/3/03 meeting: the 'official record' from EHD), 55 B - Judges' instructions are in recorded during the hearings (realtime), 55 C - 4/3/03 meeting: motions and pleadings recorded during the hearings, or pre-filed (agreed to procedural rule that written motions must be prefiled). 03/26/2003 meeting: pre-hearing conferences and 'regular' hearing conferences are the same. (Users will know the difference based on the date.) 4/9/03 meeting: pre-file applies to exhibits and testimony only.

Sub-Requirement

55 A	Record
55 B	Judge Instructions
55 C	Requests from Litigants

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 56	The DDMS shall accommodate output information needed to support records management at pre-hearing conferences and hearings, including such items as:	The DDMS shall be capable of displaying information needed to support pre-hearing conferences and hearings, including such items as:	4/3/03 meeting: removed "records management" from the requirement. 56 A - Reports, applies to any predefined ('canned') reports, such as the Exhibit Status Report, 56 B - insertion of information, applies to new exhibits creating ('inserting') new metadata, 56 C - Update of information, applies to exhibits being updated with markings ('accepted' 'withdrawn,' strike outs. 56 D - Index, this is the metadata. 03/26/2003 meeting: pre-hearing conferences and 'regular' hearing conferences are the same. (Users will know the difference based on the date.)

Sub-Requirement

56 A	Reports
56 B	Insertion of information
56 C	Update of information
56 D	Index

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 60	The DDMS shall support integration with Open Document Management Architecture (ODMA) compliant products such as Word, Excel, Lotus, and WordPerfect. This integration is required to allow issuance documents to incorporate text information from the existing record without retyping the existing information.	The DDMS shall support integration with Open Document Management Architecture (ODMA) compliant products such as Word, Excel, and WordPerfect.	

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 63	The DDMS shall support the capture of any decision issued by a licensing board at or after each pre-hearing conference or hearing.	Same as 1.51	The DDMS shall support the capture of any decision issued by a licensing board at or after each pre-hearing conference or hearing.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 66	The DDMS shall support the capture of documents used to promulgate orders, directives, etc., to SECY and other parties.	The DDMS shall support the capture of documents.	4/3/03 meeting: strike out the wording of the requirement starting at "used to promulgate orders…"

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 67	Issuance documents shall be stored in their native format	Issuance documents shall be stored in their native format	Duplicate of Production Requirement 52.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 68	The DDMS shall support scanning and conversion of paper documents, e.g., to capture required written signature pages	The DDMS shall support scanning and conversion of paper documents, e.g., to capture required written signature pages.	POC Requirement 16 (Scanner) addresses this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 69	The DDMS shall accommodate input information needed to assist judges with the generation and storage of orders, directives, etc., promulgated by the presiding officer, including such items as:	POC Requirement 51 addresses this requirement: The DDMS shall support the creation and capture of documents used to promulgate orders and directives to SECY.	From POC Requirement 51 business rule: This requirement is entirely outside of DDMS. It will be accomplished through EIE, via web interface, and using existing word processing packages. The Adobe application utilized within DDMS will support the standard functions of copying and pasting.

Sub-Requirement

69 A	Decision

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 70	The DDMS shall accommodate output information needed to assist judges with the generation and storage of orders, directives, etc., promulgated by the presiding officer, including such items as:	The DDMS shall provide the capability to display information pertaining to the generation and storage of orders and directives, such as:	4/3/03 meeting: DDMS to display 70 A - Orders, and 70 B - Notices. Design Note: production design to identify these types of hearing documents.

Sub-Requirement

70 A	Orders
70 B	Notices

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 82	The DDMS shall include all pleadings, orders, transcripts of pre-hearing conferences and hearings, pre-filed testimony, and exhibits as a part of the record.	The DDMS shall include all pleadings, orders, transcripts of pre-hearing conferences and hearings, pre-filed testimony, and exhibits as a part of the record.	03/26/2003 meeting: pre-hearing conferences and 'regular' hearing conferences are the same. (Users will know the difference based on the date.)

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 83	The DDMS shall provide for the creation of an index (metadata) for each piece of information or each exhibit that is part of the record.	The DDMS shall manage the metadata for each document.	4/3/04 meeting: agreed to the clarified requirement wording.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 84	The DDMS shall store all electronic documents or multimedia files to be included in the record.	The DDMS shall store all electronic documents or multimedia files to be included in the DDMS database record(s).	4/3/03 meeting: agreed to the rewording of the original requirement as now shown in the clarified requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 86	The DDMS shall maintain an index that includes the unique LSN identifier for each entity (document, files, etc.) originally stored in the LSN.	The DDMS shall maintain an index that includes the unique LSN identifier for each entity (document, files, etc.) originally stored in the LSN.	The "LSN Accession Number" provided by EHD and used within DDMS, will be the field for storing of this information. This information will be maintained as part of the bibliographic data.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 89	The DDMS shall support the creation of an electronic document from a paper document accepted into evidence during the hearing; to be stored as a part of the record.	The DDMS shall support the creation of an electronic document from a paper document accepted into evidence during the hearing; to be stored as a part of the record of the proceeding.	POC Requirement #16 (scanner capabilities) addresses this requirement. 4/3/03 meeting: directed PEC to strike out "the record," and replace with " the record of the proceeding."

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 101	The DDMS shall accommodate input information needed to assist with interactive search and retrieval of record information, including such items as:	The DDMS shall support the capability to retrieve DDMS database information.	04/03/03 meeting: a) directed to reword the original requirement as now shown in the clarified requirement; b) WAIVE 101 A through 101 C.

Sub-Requirement

101 A	Request from Judges
101 B	Request from Parties
101 C	Request from Court Reporter

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 109	The DDMS shall accommodate output information needed to capture and retrieve transcribed testimony, including such items as:	The DDMS shall be capable of displaying information needed to capture and retrieve transcribed testimony, including such items as:	04/03/03 meeting: directed to reword original requirement to the new wording shown in the clarified requirement. Current POC design addresses both 109 A and 109 B. Note: for linking of transcripts and associated exhibits, DDMS provides an option to click on a specific exhibit and have the user taken directly to where in the transcript this exhibit is referenced. (Pre-filed testimony will be appended to the transcript in the 'clean' transcript version, with links 'jumping' from the beginning of the testimony to the end of the testimony, with no video or audio of the actual testimony.) 4/9/03 meeting: pre-file applies to exhibits and testimony only.

Sub-Requirement

109 A	Searchable Text
109 B	Linked transcripts and associated exhibits

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 113	The DDMS shall support the packaging and export of records to be stored on the ADAMS systems with SECY. The exported records shall include the electronic documents and related metadata required for indexing the records and referencing physical evidence.	The DDMS shall support the packaging and export of records to be stored on the ADAMS systems with SECY. The exported records shall include the electronic documents and related metadata required for indexing the records and referencing physical evidence.	04/03/03 meeting: after much discussion, agreed to leave wording of requirement as is. Understanding that the file to receive DDMS export will be used for storing, eventually, into ADAMS. Per Beth DeWoody, this is most likely an export to a folder. NOTE: PEC design documents (ICD) need to address the procedures for performing error checking and document validation, as to how DDMS will address and process those documents that fail the verification process. Production Design Document addresses (verification by analysis).

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 117	The DDMS shall accommodate output information needed to support the transmission of all record information to SECY, including such items as:	The DDMS shall export metadata and DDMS database record content (minus video and audio) to SECY via ADAMS.	04/03/03 meeting: a) agreed to reword original requirement to the wording shown in the clarified requirement; b) waiving of 117 A through 117 C (clarified requirement wording captures all the necessary information types to be exported). This requirement wording is accepted with the understanding the DDMS export will be to a file / folder, used by another HLW subsystem for eventual pulling into ADAMS.

Sub-Requirement

117 A	Metadata
117 B	Electronic Documents
117 C	Physical Evidence

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 128	The DDMS shall provide a capability to easily highlight subsections of the document or information being presented, for emphasis or focus.	The DDMS shall provide a capability to easily highlight subsections of the document or information being presented.	04/03/03 meeting: general agreement that the DDMS production system's 'intelligent podium' ("electronic whiteboard") will provide the requirement's capabilities (to include the ability to highlight and zoom on a portion of the displayed document). NOTE: this requirement is for the presenter only, through the use of the 'intelligent podium.'

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 172		DDMS shall provide the capability to link exhibits electronically to witnesses.	NEW REQUIREMENT. DDMS production system will provide the capability for linking witnesses to appropriate exhibits. Design approach is for parties to designate exhibits when submitting witnesses. In addition, within the hearing room, there is an option to associate a witness to an exhibit.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 1	The DDMS shall provide access to electronically available copies of the rules, policies, and procedures that govern the hearing.	The DDMS shall provide electronic access to copies of the rules, policies, and procedures.	Rules, policies, and procedures governing the hearing can be found at Westlaw and Lexis. Users will be restricted, through DDMS, to only these two online legal services.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 2	The DDMS shall provide a chronological listing of all FRNs, pleadings, and pre-filed information that support the hearing.	The DDMS shall provide a chronological listing of all Federal Register Notices, pleadings, and pre-filed information.	Listings shall be sortable by Docket Date. POC default will be docket date.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 3	The DDMS shall provide access to the EHD to support review of the current electronic docket.	The DDMS shall contain all documents in the electronic docket.	EHD can be accessed through the NRC website, access to which can be provided through DDMS. For testing and verification purposes, a comparison of what resides in EHD and what resides in DDMS must be performed. NOTE: In the event of a DDMS failure, the EHD will be accessible through an Internet link.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 4	The DDMS shall support the generation of an ordered list of witnesses (witness list) that are scheduled to support the hearing.	The DDMS shall support the creation, reading, updating, and deleting of an ordered list of witnesses (witness list).	A witness list shall be sortable at a minimum by Appearance Time/Date, Name, Contention/Issue, party represented, exhibits, and Judges. (In addition, when searching primarily by name, the system will be covered by the Privacy Act which adds system constraints.)

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 5	The DDMS shall support the management of the witness list and support changes to the witness list.	Same as 1.4	The DDMS shall support the management of the witness list and support changes to the witness list. NOTE: reference the DDMS Users' Privileges Table to verify which DDMS user group / role has the authorization to perform updates / changes to the witness list.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 8	The DDMS shall support sealing portions of the record, temporarily stored on the DDMS.	The DDMS shall support sealing or unsealing of any portion, or entire sections, of the official record.	Judges can order the sealing of any or all of a section of the hearing through a Protective Order. Sealing restricts access to only those authorized by the Protective Order. At a minimum, the seal should indicate time, date and Boards. The bibliographic header will contain a status field indicating the hearing video is "Closed", and will be restricted to authorized users.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 9	The DDMS shall support independent or private retrieving and viewing of hearing or record information by the judges.	The DDMS shall support retrieving and viewing of hearing or record information.	Retrieving and viewing record information is determined by user access ID and assigned security access group.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 10	The DDMS shall support the management of multiple hearings, in one or more locations. This management shall include a capability to uniquely identify and correlate information captured and presented at each hearing.	The DDMS shall support the management of multiple hearings. This management shall include a capability to uniquely identify and correlate information captured and presented at each hearing.	04/03/03 meeting: directed to strike out "in one or more locations." This requirement is really two requirements: 1) "support" multiple hearings in one or more locations, and 2) uniquely identify "captured" information at each hearing. Per 3/12/03 Technical Working Group, DDMS production system design shall correlate information by issues (with each issue having multiple contentions) to specific boards, witnesses can appear across multiple boards, witnesses are to be linked to exhibits, boards can have multiple locations, and exhibits can be associated with contentions/issues.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 11	The DDMS shall support the aggregation of information across multiple hearings, allowing search and retrieval across all hearing information with a single request.	The DDMS shall support the aggregation of information across multiple hearings, allowing search and retrieval across all hearing information with a single request.	Current DDMS POC design allows for 1) key word searching and advanced text searching; 2) a user to search across multiple boards.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 12	The DDMS shall support electronic notifications or instructions to participating hearing personnel, e.g., judges and court reporter.	The DDMS shall support electronic notifications or instructions to participating hearing personnel, e.g., judges and court reporter.	Design envisions providing a 'chat' message board for authorized users.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 13	The DDMS shall accommodate input information needed to support the presiding officer in administering the hearing, including such items as:	The DDMS shall be capable of receiving, recording, and storing information needed to support the presiding officer in administering the hearing, including such items as:	4/09/03 meeting: a) 13 H - Precedents; contained within a Motion, or access via Lexis / Westlaw, b) 13 I - Schedule; part of a case management module, a generated list of witnesses scheduled for hearings, for example. TBD: PEC to address scheduling function: the process for defining hearing schedules of boards, witnesses, exhibits.

Sub-Requirement

13 A	Rules
13 B	Procedures
13 C	Policies
13 D	Pleadings
13 E	Evidence
13 F	Parties
13 G	Witness List
13 H	Precedents
13 I	Schedule
13 J	Transcripts

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 14	The DDMS shall accommodate output information needed to support the presiding officer in administering the hearing, including such items as:	The DDMS shall be capable of displaying information needed to support the presiding officer in administering the hearing, including such items as:	04/09/03 meeting: 14 F - Selected portions of the transcripts (display of transcript; 14 G - Public announcements: copying from NRC.Gov website public announcements, and displaying these announcements within DDMS. TBD: PEC to address scheduling function: the process for defining hearing schedules of boards, witnesses, exhibits.

Sub-Requirement

14 A	(Reserved)
14 B	Instructions
14 C	Schedules
14 D	Computer generated reports
14 E	Process flows
14 F	Selected portions of transcripts
14 G	Public announcements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 17	The DDMS shall support storing references to non-electronic exhibits as descriptive profile information.	The DDMS shall support storing references to non-electronic exhibits as descriptive profile information.	As a minimum, the descriptive profile shall match the EHD bibliographic header fields. This will also include item location and other controlling fields.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 19	The DDMS shall support the searching of pre-filed electronic and non-electronic information using the metadata or full-text index information.	The DDMS shall support the searching for electronic and non-electronic information using the metadata and/or full-text index information as authorized.	The non-electronic information searches will be accomplished via bibliographic headers. Media type, text or other structured data may be searched. Access rights on bibliographic header information will be enforced.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 23	The DDMS shall support the indexing of pre-filed documents with metadata (descriptive information), including descriptive information used in the EHD such as docket number, accession number, etc.	The DDMS shall support the indexing of pre-filed documents with metadata, including descriptive information.	This should include at a minimum the following fields: docket number, accession number, exhibit number, LSN number, issues, and keyword. Clarify: Author, Name, Board.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 28	The DDMS shall support the retention of the access control privileges originally assigned by the EHD for using the pre-filed documents by NRC personnel.	The DDMS shall support the retention of the access control privileges originally assigned by the EHD.	This will be addressed using the taxonomy (folder structure) as defined by DDMS ICD.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 31	The DDMS shall provide direct access to external databases and subscription services for the purpose of providing research support to the ASLBP:	The DDMS shall provide access to external research databases and subscription services.	Access via Internet.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 32	The DDMS shall provide web access to research tools to support litigant research.	The DDMS shall provide web access to research tools to support litigant research.	POC Requirement 31 addresses this requirement: The DDMS shall provide access to external research databases and subscription services. NOTE: production design will have the proposed firewall restrict DDMS users to only the legal research websites, and NRC.gov. Action Item: PEC to ensure the web address restriction is covered in the Production Design Document. Production Design Document addresses (verification by analysis).

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 33	The DDMS shall allow research participants to use the native search and retrieval capabilities to request information from the identified repositories.	The DDMS shall utilize the native search and retrieval capabilities for the identified repositories in 1.31.	The DDMS will provide a link to the online services. Each participant is responsible for subscription to these services.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 34	The DDMS shall support the retention of the access control privileges originally assigned by the EHD for using documents by authorized personnel.	The DDMS shall support the retention of the access control privileges originally assigned by the EHD.	POC Requirement #28 addresses this production requirement: The DDMS shall support the retention of the access control privileges originally assigned by the EHD. 4/9/03 meeting: Action Item for NRC / PEC to discuss manual override process for changes to the Access Control List (ACL) for protective orders.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 57	The DDMS shall support the integration of evidentiary, transcription, and research information to assist the judges in making a decision. This includes synchronizing transcripts with video proceedings and links to electronic documents.	The DDMS shall support the integration of evidentiary, transcription, and research information, which includes synchronizing transcripts with video proceedings and links to electronic documents.	Centralized time stamps will come from the database. This is the high-level requirement to synchronize transcript record in all media types.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 58	The DDMS shall support advanced search methods to assist judges in finding evidentiary information.	The DDMS shall support advanced search methods in finding evidentiary information.	Advanced Search methods may include, but are not limited to, natural language searches, literal searches, and text searches. Advanced methods = natural language search, concept search, Boolean, searches, and literal search.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 64	The DDMS shall accommodate input information needed to assist judges with developing and documenting decisions, including such items as:	The DDMS shall be capable of receiving, recording, and storing information to assist judges with developing and documenting decisions, including such items as:	04/17/03 meeting: by "developing and documenting decisions," 64 A (Other Proceeding Information) refers to accessing nrc.gov, and 64 B (Research) refers to the ability, through DDMS, to access Westlaw.

Sub-Requirement

64 A	Other Proceeding Information
64 B	Research

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 65	The DDMS shall accommodate output information needed to assist judges with developing and documenting decisions, including such items as:	The DDMS shall be capable of displaying information needed to assist judges with developing and documenting decisions, including such items as:	Issuances to be derived from Westlaw / Lexis.

Sub-Requirement

65	A	Issuances

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 79	The DDMS shall accommodate input information needed to assist with the capturing of all information presented and discussed during a hearing, including such items as:	The DDMS shall be capable of receiving, recording, and storing all information presented and discussed during a hearing, including such items as:	4/9/03 meeting: 79 C - Administrative Management information - part of the case management functionality, for example, scheduling.. 79 F - Video; the playing of a presenter's video will be 'captured' (recorded) within DDMS.

Sub-Requirement

79	A	Evidence
79	B	Decision
79	C	Administrative Management information
79	D	Pleadings
79	E	Transcription
79	F	Video

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 80	The DDMS shall accommodate output information needed to assist with the capturing of all information presented and discussed during a hearing, including such items as:	The DDMS shall be capable of displaying information needed to assist with the capturing of all information presented and discussed during a hearing, including such items as:	4/9/03 meeting: 80 C - DVD/CD records: to include VCR tape output. The DDMS production's electronic podium to handle the displaying of these items.

Sub-Requirement

80	A	Metadata
80	B	Electronic Information
80	C	DVD/CD records

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 85	The DDMS shall maintain a reference to physical items that need to be included in the record.	The DDMS shall maintain a reference to physical items that need to be included in the record.	POC Requirement #17 addresses this requirement: The DDMS shall support storing references to non-electronic exhibits as descriptive profile information.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 87	The DDMS shall provide a capability to seal a portion of the record.	The DDMS shall provide a capability to seal a portion of the record.	POC Requirement #8 addresses this requirement: The DDMS shall support sealing or unsealing of any portion, or entire sections, of the official record.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 105	The DDMS shall support the active linking of transcribed information with electronic information referenced by the transcript.	The DDMS shall support the linking of transcribed information with introduction of exhibits.	

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 106	The DDMS shall support the capture and storage of transcribed textual information.	The DDMS shall support the capture and storage of transcribed textual information.	While the hearing is in progress, the system will capture real-time video synchronized to the court reporter-generated transcript.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 110	The DDMS shall support the identification of DDMS records that need to be filed as a part of the official record with SECY.	The DDMS shall support the identification of DDMS database records that need to be filed as a part of the official record with SECY.	

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 111	The DDMS shall identify DDMS hearing records to be filed with SECY on a daily basis.	The DDMS shall identify DDMS hearing records to be filed with SECY daily.	Information will be made available for upload to DPC.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 112	The DDMS shall identify those DDMS records required to be filed with SECY at the end of the hearing, including any records of related hearings.	The DDMS shall identify those DDMS database records required to be filed with SECY at the end of the hearing, including any records of related hearings.	

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 127	The DDMS shall provide an interface that allows the professional user (e.g., judge, attorneys) to easily search, retrieve and display information. A seamless interface shall be provided to allow the professional user to focus on the hearing and not the DDMS system, i.e.. do not detract from the operations of the hearing.	The DDMS shall provide an interface that allows the user to search, retrieve and display information.	As per NRC Technical Reference Model (Draft), Microsoft Windows standards as specified in The Windows Interface Guidelines for Software Design. Windows standard for GUI information.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 170	NEW REQUIREMENT	DDMS shall support the ability for selected users to collaborate within a group.	Provide the capability to send and receive instant message type communications between selected users, based on security access table. DEFERRED

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 171		DDMS shall provide the capability to queue and present exhibits based on day or date range.	NEW REQUIREMENT. Current POC's "Today's Exhibits" displays a queue of the exhibits to be presented for today's court date. Production design to add an option for the user to specify a date range. This feature is for the parties, not court personnel, to enter and queue up their exhibits.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 173		The DDMS shall provide the following scheduling capabilities: 1) Schedule sessions, for the duration of the hearing, by one witness, one exhibit, one issue (with related contentions), one contention, one party, one board, one judge, or any combination; 2) Display and print schedule by session, by day, by week, by month, by year; 3) Display, by sessions, the categories of witnesses, exhibits, boards, issues, contentions, parties, judges, and locations.	NEW REQUIREMENT

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 6	The DDMS shall support the control of evidence presentation during the hearing. This shall include the capability to control the display and presentation of information to specific monitor(s), microphones or any input or output source.	The DDMS shall support the control of evidence presentation during the hearing. This shall include the capability to control the display and presentation of information to specific monitor(s), microphones or any input or output source.	Related to Task 2, Exhibit 1 hardware. For this task (Task 1), DDMS to show via design documentation the capability to fulfill this requirement (Production Design Document addresses (verification by analysis, not demonstration).

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 18	The DDMS shall support capturing multimedia electronic information in their original format.	The DDMS shall support capturing multimedia electronic information.	Multimedia information shall include video, audio, digital images, and electronic documents. Current policy requires all electronic document submissions to be in PDF format only. ADAMS can only accept PDF and Tiff formats.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 35	The DDMS shall support the display of all evidence in electronic form on display monitors or workstations distributed inside and outside of the hearing room.	The DDMS shall support the display of all evidence in electronic form on display monitors or workstations distributed inside and outside of the hearing room.	This requirement is related to the Production Requirement # 99 addresses this requirement's intent: The DDMS shall support retrieval of the DDMS record from: Judge's bench, Judge's chambers, Judge's conference room(s), etc. NRC to define all terminal locations for the primary DDMS users. Task 3 will demonstrate. Current task (Task 1) to address this requirement (capabilities) in design documentation. Production Design Document addresses (verification by analysis, not by demonstration). It is envisioned displaying hearing proceedings on monitors outside of the hearing room.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 36	The DDMS shall support the display presentation of litigator case information from:	The DDMS shall support the presentation of litigator case information from:	Courtroom camera feed will record all events in the courtroom, including litigator presentations. DDMS will not have any specific video-conferencing capabilities.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 37	The DDMS shall support the presentation of physical evidence or exhibits to monitors or workstations inside and outside the hearing room. A variable zoom capability shall be provided to selectively view specific details of the information being examined.	The DDMS shall support the electronic presentation of physical evidence or exhibits to monitors or workstations.	4/9/03 meeting: the DDMS production's Elmo / electronic podium to address this requirement. 37 A - zoom capabilities are from 8.33% up to 1600%.

Sub-Requirement

37 A DDMS shall support variable zoom capabilities for viewing displayed information and/or images.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 38	The DDMS shall support the presentation of hearing information to remote locations via video conference.	The DDMS shall support the presentation of hearing information to remote locations (outside of the hearing room) via video conference.	It is envisioned the conducting of hearings in Washington (Rockville, MD), with the video-conferencing of this hearing (live) to a designated Las Vegas, NV location. The test scenario for fulfilling this requirement would be to have testimony at a remote site as input ('feed') to the Rockville, MD hearing room. (Remote location 's audio will automatically trigger the teleconference video feed.)

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 40	The DDMS shall provide a capability to support the Americans with Disabilities Act requirements as applicable. This shall include a capability to provide enhancements for the hearing impaired and closed caption or real-time reporting for the deaf.	The DDMS shall provide a capability to support the Americans with Disabilities Act requirements (as applicable).	04/17/03: current DDMS design fulfills ADA requirements. Action Item: NRC (Pat Smith) to arrange for DDMS staff to interview NRC personnel responsible for certifying information systems as being ADA compliant. Most recent input from Pat in 4/24/03 meeting: many aspects of the full 508 standard as they pertain to the DDMS usage in the HR do not apply. PEC should just submit the vendor statement (Plumtree) that the product is 508 compliant.

Sub-Requirement

40 A DDMS shall provide the capability to increase audio volume and closed captioning (real-time reporting).

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 41	The DDMS shall support the translation of languages to and from U.S. English for non-English speaking participants.	The DDMS shall support the translation of languages to and from U.S. English for non-English speaking participants.	04/17/03 meeting: Judge Bollwerk confirmed the fulfilling of this requirement (from non-English to English translation) is for an interpreter to provide the translation of the witness's words to English. DDMS will, both in real-time transcript and on video, capture this translation.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 42	The DDMS shall provide a capability to play back selected portions of the testimony presented. This shall include the audio, video, and any transcript created during the hearing.	The DDMS shall provide a capability to play back selected portions of the testimony.	Play back capabilities restricted to user ID and assigned group. Reference the Security Access table. Formats are identified in requirement # 18.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 43	The DDMS shall support the selective display of information from all input sources in the hearing room, including computers, projectors, cameras, etc.	The DDMS shall support the selective display of information from all input sources in the hearing room, including computers, projectors, cameras, etc.	04/17/03 meeting: DDMS control panel (control room) design will address all input sources to the hearing.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 44	The DDMS shall support the simultaneous display of information from multiple input sources in multiple windows or viewing partitions on monitors or workstations.	The DDMS shall support the simultaneous display of information from multiple input sources in multiple windows or viewing partitions on monitors or workstations.	04/17/2003 meeting: current POC design (multiple windows within the same screen display) meets this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 61	The DDMS shall support the indexing of the video records to assist in the review of video information.	The DDMS shall support the indexing of the video records.	04/17/2003 meeting: current POC design of a) indexing by witness and by exhibits, b) searching video by key frames, and c) synching the video to the transcript fulfills this requirement.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 71	The DDMS shall support the capture of a video and audio record of specific activities and information presented in the hearing.	The DDMS shall capture the video and audio of specific activities and information presented in the hearing.	04/17/2003 meeting: all hearing-related activities within the hearing room are captured via video and audio. Both control room and electronic podium will fulfill the need for capturing video and audio from direct input ('feed') sources.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 72	The DDMS shall automate the capture process using a voice-activated mechanism to trigger the recording process, subject to over-ride by the clerk or presiding officer.	The DDMS shall automate the electronic hearing capture process using a voice-activated mechanism to trigger the recording process, to include:	04/17/2003 meeting: A/V function of the DDMS design, fulfilled by control room capabilities.

Sub-Requirement

72 A The capability for an authorized operator to over-ride the automatic electronic hearing capturing process.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 73	The DDMS shall capture the presentation of information at local and remote sites when video conferencing technology is used.	The DDMS shall capture the presentation of information at local and remote sites when video conferencing technology is used.	Same functionality and business rule specifications as Production Requirement 38.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 74	The DDMS shall support playback of selected portions or time slots of the proceeding recording.	The DDMS shall support playback of selected portions or time slots of the proceeding recording.	04/17/2003 meeting: requirement applies to within the hearing room itself. DDMS to demonstrate capability to record and playback selected portions of the hearing, and to capture the playing back of the selected portion of the hearing video. (Judge Bollwerk noted to be able to go back and replay an individual's testimony, and for DDMS to capture and record this moment of the replaying of the testimony video.)

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 75	The DDMS shall support video capture for the judges, litigants, and individuals at the witness box.	The DDMS shall support video capture for the judges, litigants, and individuals at the witness box.	Current POC configuration supports the electronic capturing of judges, litigants, and individuals at the "witness box" actions / words. Exhibit 1 software and actual cameras' locations will meet this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 76	The DDMS shall support playback of proceeding recordings.	The DDMS shall support playback of proceeding recordings.	04/17/2003 meeting: similar to Production Requirement # 74, except applies to outside the hearing room.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 77	The DDMS shall record evidence presented during the hearing that is displayed on projectors or other monitors in the hearing room.	The DDMS shall record evidence presented during the hearing that is displayed on projectors or other monitors in the hearing room.	4/17/03: DDMS to demonstrate the recording and storing, within the hearing room process, from a variety of "different inputs" (to include projectors or other monitor(s) input. Relates to electronic podium capabilities.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 78	The DDMS shall provide a capability for the proceeding recording to be indexed and linked with relevant hearing transcripts.	The DDMS shall provide a capability for the proceeding recording to be indexed and linked with relevant hearing transcripts.	Current POC design links video to real time transcript.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 81	The DDMS shall support the real-time creation of a record of pre-hearing conferences and hearings.	The DDMS shall support the real-time creation of a record of pre-hearing conferences and hearings.	03/26/2003 meeting: pre-hearing conferences and 'regular' hearing conferences are the same. (Users will know the difference based on the date.) 04/17/2003 meeting: pre-hearing conferences will be Rockville, MD and / or Las Vegas, NV locations. DDMS design document to show the capability for supporting pre-hearing conferences at other (remote) sites. Production Design Document addresses (verification by analysis), explaining how DDMS will process pre-taped inputs, electronic files, and paper files.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 103	The DDMS shall support the generation of a time-sequenced audio and/or video record of pre-hearing conferences and hearings.	The DDMS shall support the generation of a time-sequenced audio and video record of pre-hearing conferences and hearings.	03/26/2003 meeting: pre-hearing conferences and 'regular' hearing conferences are the same. (Users will know the difference based on the date.) 04/17/2003 meeting: pre-hearing conferences will be Rockville, MD and / or Las Vegas, NV locations. DDMS design document to show the capability for supporting pre-hearing conferences at other (remote) sites. Production Design Document addresses (verification by analysis).

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 108	The DDMS shall accommodate input information needed to capture and retrieve transcribed testimony, including such items as:	The DDMS shall be capable of receiving, recording, and storing information needed to capture and retrieve transcribed testimony, including such items as:	POC design captures testimony on video (to include audio). 4/17/03 meeting: references to both electronic podium presentation (automatic switching of video to DDMS as direct feed input, and the ability for the court reporter to capture podium's processing of the audio tape input (what was being said on the audio tape) within the transcript.

Sub-Requirement

108 A	Audio Tape
108 B	Video Tape
108 C	Arguments

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 114	The DDMS shall support the generation of CD or DVD media with the exported data.	The DDMS shall support the generation of CD or DVD media with the exported data.	The production DDMS equipment to include a CD / DVD burner. 04/17/2003 meeting: DVD refers to data DVD (not video DVD).

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 119	The DDMS shall provide a capacity to store video and other forms of multimedia data, based on the following criteria:	The DDMS shall provide a capacity to store video data based on the following criteria:	04/17/2003 meeting: hearing video stored by morning and afternoon sessions. Changes to 119 B (online duration) and 19 D (see following note): Per Tony (3/6/03) - 19D - we had not planned to encode the video at MPEG-1. MPEG-1 is not being used that much any more. Also Real Networks and Microsoft Media have improved their codes such that you get much better video than MPEG-1 at lower data rates. Also, MPEG-1, which is 1.5Mbs is not always playable on desktop computers because of the high bandwidth that is being streamed and slower CPUs can have a hard time keeping up which results in jerky video.

Sub-Requirement

119 A	Hearing proceedings will be digitized and compressed for storage and distribution via video streaming technologies.
119 B	Hearing video will be retained online for the course of the hearing, and stored on removable media (near-line) for future retrieval.
119 C	Analog video clips or recordings presented as exhibits in the hearing will be digitized and compressed for storage in a digital format. This digitized information will be stored online in the DDMS database.
119 D	Video recordings are estimated to be stored in a Microsoft Media format at 56, 150, and 500 Kbps. For the total of 150 days, the total estimated recording requirement is 1215 GB.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 120	The DDMS shall provide a capability to display evidence on each monitor or display in the hearing room, within 10 seconds of the request to display the document, for 90% of all requests.	The DDMS shall provide a capability, within the electronic hearing room environment, to display evidence on each monitor or display in the hearing room, within 10 seconds of the request to display the document, for 90% of all requests.	04/17/2003 meeting: capable of supporting up to 20 simultaneous users. NOTE: for remote locations, performance impacted by transmission speeds. PEC proposes a minimum of 3 characters when conducting wild card searches.

Req. No	Original Requirement	Clarified Requirement	Business Rules
POC 148	The DDMS shall support the display of more than one output simultaneously.	The DDMS shall support the display of more than one output simultaneously.	DDMS shall have the ability to display multiple screens and windows. Current portal based system satisfies this requirement.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 165		DDMS shall support the capture of digital images of physical evidence.	NEW REQUIREMENT. Elmo capabilities to fulfill this requirement.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 169		DDMS shall provide the capability to selectively store portions of video evidence, and to be able to uniquely mark / indicate each stored portion.	NEW REQUIREMENT. 4/17/03 meeting: need for capturing (and managing) "separate chunk of video." The "relevant part" of the separated video will be handled as physical evidence (Legal-Exhibit document type), with metadata reference to specify part of the whole video presentation.

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 149		The DDMS shall display a warning banner every time a user initially logs into the system.	NEW REQUIREMENT. 05/17/2003 meeting: Action Item for Beth DeWoody to reference appropriate NRC document (see 149 A) and provide to DDMS developers the exact wording of the warning banner. NOTE: NRC AIS Security Program Handbook 12.5, Part II specifies exact warning banner wording.

Sub-Requirement

149 A	The displayed warning banner shall adhere to the warning banner wording defined in NRC Automated Information Systems Security Program, Handbook 12.5, Part II, Administrative Controls.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 150		The DDMS shall require all individuals accessing the system to identify themselves, through the use of typed in passwords, before performing any actions.	NRC AIS Security Program Handbook 12.5, Part II specifies 150 A - 150 K.

Sub-Requirement

150 A	The DDMS shall provide a password authentication mechanism to authenticate each individual accessing the system.
150 B	The DDMS shall allow for accessing and maintaining the system's passwords only by an authorized user.
150 C	The DDMS shall store all passwords in a one-way encrypted form.
150 D	Each DDMS password shall be a minimum of 6 characters in length, and a combination of alphabetic and numeric characters, or special characters ($, #, @).
150 E	The DDMS shall not display the password on any device when entered by the user.
150 F	The DDMS shall provide the capability for every individual user to change their password.
150 G	The DDMS shall require the changing of each password every 90 days.
150 H	The DDMS shall ensure a user's old password to be different than the new password by at least (minimally) two characters.
150 I	The DDMS shall automatically terminate a user session and lock out (prevent from entering DDMS) the individual account, after 3 unsuccessful (prohibited) password logon attempts.
150 J	For every unsuccessful (prohibited) password logon attempt, the DDMS shall display an error message stating, at a minimum, the logon information is invalid.
150 K	The DDMS shall disable the individual password after a period of 90 days of inactivity (not successfully logging into the system with the password).

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 151		DDMS shall provide the following electronic auditing features:	NEW REQUIREMENT. The requirement will be covered both in the Production Design Document (verification by analysis), and upon fully fielding the production system, verification will be performed by demonstration.

Sub-Requirement

151 A	The DDMS shall provide an electronic audit trail file to automatically record all data entered, updated, or deleted in the system databases.
151 B	The DDMS shall ensure the audit files are accessible only to authorized users.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 152		The DDMS shall automatically record the following events and activities:	NRC AIS Security Program Handbook 12.5, Part II specifies 152 A - 152 J.

Sub-Requirement

152 A	All changes to the password file
152 B	User logons, both successful and unsuccessful
152 C	Unsuccessful or unauthorized attempts to access system resources
152 D	Unsuccessful or unauthorized attempts to perform functions denied by lack of assigned privilege.
152 E	Successful or allowed access to security-critical objects (operating system files, data noted as sensitive)
152 F	Changes to DDMS users' security privileges
152 G	Changes to DDMS users' profiles or groups
152 H	Changes to DDMS security configuration
152 I	Modification to DDMS databases
152 J	Changes to individual's password

DDMS Production Requirements

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 153		The DDMS audit record shall, at a minimum, record the following:	NRC AIS Security Program Handbook 12.5, Part II specifies 153 A - 153 E.

Sub-Requirement

153 A	Date and time of auditable event
153 B	User ID of the individual performing the auditable event.
153 C	Type of event
153 D	Type of resource (if applicable) accessed.
153 E	Activity that occurred within the auditable event.

Req. No	Original Requirement	Clarified Requirement	Business Rules
Production 164		DDMS shall provide for Appellate group access, with view only privileges.	NEW REQUIREMENT. No access to judges' notes.

Appendix B – Calendaring Alternatives Analysis

This appendix contains the alternatives study performed to analyze the COTS packages available for the scheduling and calendaring component of DDMS. The NRC will make the final determination of the approach.

	Option 1	Option 2	Option 3
	WebEvent Enhanced	**Center Court**	**PEC Custom Development**
Option Description	WebEvent plus the Web Services Toolkit, with APIs and tools to allow some customization and integration	Center Court package, with customized interfaces, integrated through Plumtree, offering almost complete integration.	Develop custom solution for scheduling with similar functions and look/feel of Center Court.
Estimated Cost (for evaluation purposes)	**$60k**[1]	**$80k**[2]	**$200k**[3]
Plumtree Authentication	Available currently	Available currently	Customizable
Vendor Support Cost	$3k/year after year 1[4]	$6800/year[5]	Wrapped into O&M
Ease of Use	Excellent	Good-excellent, customizable	Excellent, customizable
Requirements			
Resource conflict resolution	Yes	Yes	Yes
Event Scheduling	Yes	Yes	Yes
Notifications and alarms	Yes	Yes	Yes
Day, Week, Month, Quarter, Year views/printouts	Yes	Yes	Yes
Scheduling resources to events	Yes	Yes	Yes
Browser accessible	Yes	Yes	Yes
Customizable	Fully (cost estimate is for limited customization)	Fully	Fully
Self-contained database (SQL server, or compatible)	Yes	Yes	Yes
Multiple time zone support	Yes	Yes	Yes

[1] Estimated Cost includes: product cost and PEC efforts to design and develop minimally customized screens, functions, etc.
[2] Estimated Cost includes: site licensing, full customization to NRC specs, and PEC functional reqs./testing
[3] Estimated Cost includes: full design, development, testing of a custom solution, providing functionality and look and feel similar to Center Court.
[4] If customized by PEC, vendor will not be able to provide support. Support must be provided through the O&M contractor.
[5] If customized by Levare (as in Option 2), Levare will provide ongoing support of the software, software revisions, and bug fixes.

	Option 1	Option 2	Option 3
	WebEvent Enhanced	**Center Court**	**PEC Custom Development**
Authenticate users through Plumtree	Yes	Yes	Yes
Super-user ability to schedule events	Yes	Yes	Yes
Integrated with Plumtree	Fully	Fully	Fully
Other Attributes			
Source Code Available	Yes	Yes	Yes
API Available	Yes	Yes	Yes
Flexibility for future use	Customizable	Customizable	Customizable
Advantages			
	Requires less customization initially	Full source code, long-term support is not an issue	Full source code, long-term support is not an issue
	Lower initial cost than option 2	Fully customizable for any future changes	Fully customizable for any future changes
	Full source code will be turned over	PDF reports available	PDF reports available
	Fully customizable for any future changes	Full Plumtree interface – will act as a gadget	Full Plumtree interface
			Developed specifically for NRC use.
Disadvantages			
	Cost estimate includes only basic customization.	Higher initial cost than option 1.	Higher initial costs
	Long-term support is uncertain—company mergers, loss of support for product.	Moderate risk with vendor. There is some risk of schedule slippage.	Moderate risk—schedule slippage risk
	Source code is Perl—increasingly difficult to support.	Higher customization with Levare will require greater PEC labor costs (included in estimate)	

	Option 1	Option 2	Option 3
	WebEvent Enhanced	**Center Court**	**PEC Custom Development**
	Calendars can become cumbersome to manage (up to 1000 available)		
	Highest risk—SDK not available until Mar-May timeframe, risk of slippage.		

Weighting Factors	Values
Risk	40%
Stability of company	
Availability of product	
Schedule Impact	
Ease of Use	20%
Look and Feel	
Navigation	
NRC specifications	
Cost	20%
Product	
Labor	
Supportability	20%
Long-term availability of tech support	

Factor	WE	CC	Custom
Risk	7	4	5
Ease	2	2	2
Cost	2	3	8
Support	4	1	1

Ratings are: 1 = best, 10 = worst

Score	WE	CC	Custom
Risk	2.8	1.6	2
Ease	0.4	0.4	0.4
Cost	0.4	0.6	1.6
Support	0.8	0.2	0.2
Totals	4.4	2.8	4.2

Lowest score is preferred

Appendix C – Glossary

Foreign Networks (Trusted / Untrusted)

Foreign Networks are other internetworks with direct connections to the NRC that are not part of the Agency core LAN/WAN. The NRC's Foreign Networks Router (FNR1) currently connects to six other networks. The Taft Street site (EER contract) is mentioned here since it will be connected to NRC Headquarters in the near future. The USNRC.gov network is included because it is treated as a foreign network. These eight networks can be categorized in the following ways:

a) Trusted Foreign Networks (2 connections)

Trusted Foreign Networks meet the following three criteria:

1. Use IP addresses that are part of the NRC's assigned class B address space (148.184.0.0)
2. Access the Internet exclusively via the NRC Internet gateway
3. NRC has control over the network environment and management.

The LMIT site (Gude Drive) and the EER site (Taft Street) are the two trusted foreign networks.

b) Untrusted Foreign Networks (5 connections)

Untrusted Foreign Networks meet the following four criteria:

1. The networked organization has an ongoing collaborative or contract relationship with the NRC
2. The NRC requires communication using network protocols not allowed through the NRC Internet firewall by policy
3. The network is not part of 148.184.0.0 address space
4. The NRC has no direct control over the network environment.

The Southwest Research Institute sites at San Antonio and Twinbrook, the Idaho National Engineering and Environmental Laboratory (INEEL) site, the WorldCom (FTSnet) site and the National Business Center (NBC) site are the five untrusted foreign network connections. These sites typically have their own Internet connection.

c) USNRC.gov (no connection, but located within and operated by the NRC)

The USNRC.gov network is a separate Internet Domain Name System (DNS) domain managed by the NRC. USNRC.gov is a hybrid of trusted and untrusted network definitions. It does not use 148.184.0.0 addresses. It has its own Internet connection and DNS servers. It has used protocols across the firewall not on the approved NRC protocol list. There are currently no direct connections between this network and the NRC LAN/WAN.