Nuclear Regulatory Commission Hearing Room Digital Data Management System Study

(REDACTED VERSION)

Prepared for:

U.S. Nuclear Regulatory Commission
Two White Flint North
Atomic Safety and Licensing Board Panel
11545 Rockville Pike
Rockville, Maryland 20852-2738

Prepared by:

Aspen Systems Corporation
2277 Research Boulevard
Rockville, Maryland 20850

AMS - 4598

March 27, 2001

FINAL REPORT

Nuclear Regulatory Commission

Hearing Room

Digital Data Management System Study

U.S. Nuclear Regulatory Commission

Atomic Safety and Licensing Board Panel

Foreword

The United States Nuclear Regulatory Commission (NRC) Atomic Safety and Licensing Board Panel (ASLBP) retained Aspen Systems Corporation (Aspen) to conduct a study for a phased implementation approach of an integrated hearing room digital data management system (DDMS). The DDMS would allow for the creation and use of an integrated, comprehensive digital record for ASLBP hearings. The future system will use electronic data to record, store, display and retrieve the text and image of documents and other information and permit access and retrieval of the electronic and video record of proceedings in a digital electronic format.

ASLBP approved a systematic approach to define the detailed information requirements to meet required system functionality. The three-step process authorized by the ASLBP includes:

1. Perform Requirements Definition efforts to define and document the current operating environment, analyze ongoing and planned technological initiatives, acquire a sound understanding of NRC's vision and objectives for the future environment, assess the user community's support requirements and perceived problems, and identify key business processes, information flows, and functional requirements to assess the impact of future system capabilities on the ASLBP environment;
2. Develop and evaluate at least three Alternative Solutions to meet future DDMS requirements and then recommend the best technical solution; and
3. Formally document the Recommendation, providing a solution cost profile and approach to implement the solution that includes incremental implementation of capabilities leading to full system functionality to support the High Level Waste (HLW) repository proceedings scheduled to begin in the FY 2004 timeframe.

This document records the findings and recommendations prepared by Aspen for this effort.

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EXECUTIVE SUMMARY

The United States Nuclear Regulatory Commission (NRC) Atomic Safety and Licensing Board Panel (ASLBP) retained Aspen Systems Corporation (Aspen) to conduct a requirements study for an integrated hearing room digital data management system (DDMS) to support adjudicatory hearings, in particular the high level waste (HLW) repository proceeding scheduled in the FY 2004 timeframe. The requirements specified in the Code of Federal Regulations (CFR) Part 2, Subpart J mandates the ASLBP to use a technology based solution to conduct the HLW repository proceedings. In addition, the ASLBP needs a solution that:

- Enables a greater expectation of meeting Congressionally mandated timeframes for conducting the hearings;
- Efficiently manages and processes the expected high volume, complex information to be presented in the proceedings;
- Takes advantage of the investments made in digital information management, especially in the Licensing Support Network (LSN) and other NRC initiatives;
- More effectively presents these highly visible and complex hearings to the public; and.
- Ensures the ability to comply with the Americans with Disabilities Act (ADA) as required;

This report identifies the alternatives available to the ASLBP to implement the DDMS. Four alternatives are presented:

- Status Quo wherein existing ADAMS capabilities are upgraded and utilized to support the HLW hearings;
- A Distributed Alternative wherein the DDMS database and data are replicated, installed at a remote site, and maintained current;
- A Centralized Alternative wherein the DDMS database and data are centrally managed with dedicated high-speed communication links to facilitate data exchange requirements; and
- A combination solution with a Centralized index and Distributed data, referred to as the Hybrid solution.

Aspen recommends the ASLBP implement a Web-based DDMS architecture comprised of a centralized index with distributed documents. This architecture provides for centralized control of the database management information while allowing fast and efficient delivery of digital information (textual, video and audio data) to the hearing room participants, regardless of whether the hearings are held in Rockville or in the Las Vegas area. This architecture mitigates inherent risks associated with distributed systems while preserving the capability to locally manage and process required information within the hearing room.

The Full DDMS Solution presented herein will enable the ASLBP to manage the processing, preparing and preserving of adjudicatory information related to ASLBP requirements to:

- Administer the proceedings;
- Process pleadings;
- Generate issuances or directives;
- Conduct research;
- Support evidence presentation at hearings;
- Perform record management functions;
- Prepare decisions;
- Document other proceeding information not in the official record such as judges notes;
- Create hearing records;
- Retrieve hearing records;
- Enable transcription services for pre-hearing conferences and hearings; and
- Forward Official Records to the Office of the Secretary of the Commission (SECY).

It should be noted that the technologies presented in the Full DDMS Solution have been implemented, at least in part, in other courtroom settings. No single solution implemented in other courtrooms fully addresses the HLW hearing room requirements. However, none of the components of the Full DDMS Solution require leading edge technology investment.

The estimated costs to implement and operate the Full DDMS Solution and the Status Quo solution are summarized in the table below. While not meeting all of the ASLBP requirements, the Status Quo solution does require a significant investment to implement. However, the Status Quo solution does little to reduce the risks of accomplishing the hearings within mandated timeframes.

Cost Estimate	Full DDMS	Status Quo
Initial Investment	■■■■■■■■■■	■■■■■■■■■■
Operation and Maintenance	■■■■■■■■■■	■■■■■■■■■■
Total Estimated Costs	■■■■■■■■■■	■■■■■■■■■■

Additionally, when compared to Status Quo processing, implementation of the Full DDMS Solution is expected to save at least 26 labor-years of effort on the part of NRC and other hearing participants during the conduct of the HLW repository proceedings.

1.0 INTRODUCTION

Section 1.0 of the report provides a brief background of the DDMS project, provides an overview of the DDMS project, and describes the report organization.

1.1 BACKGROUND

The ASLBP seeks a comprehensive solution to upgrade, supplement, and/or replace its existing information technology capabilities with additional functionality to support more efficient capture and management of a multimedia digital record for ASLBP adjudicatory hearings. The DDMS would be employed in the Rockville hearing room and other remote locations as necessary to create and use an integrated, comprehensive digital record for ASLBP hearings. Although the DDMS could be used for any adjudicatory proceeding, the target application for the DDMS is the proposed High Level Waste (HLW) repository licensing proceeding scheduled to begin in the FY 2004 timeframe. The future system will use electronic data to record, store, display and retrieve the text and image of documents and other information and permit access and retrieval of the electronic and video record of proceedings in a digital electronic format.

1.1.1 Approach

The ASLBP approved a systematic approach to define the detailed information requirements to meet required system functionality. The three-step process authorized by the ASLBP includes:

- Requirements Definition;
- Alternatives Analysis; and
- Recommendation.

The Requirements Definition phase includes efforts to:

- Define and document the current operating environment;
- Analyze ongoing and planned technological initiatives;
- Document the ASLBP vision and objectives for the future environment;
- Assess hearing participant support requirements and perceived problems; and
- Identify key business processes, information flows, and functional requirements.

Results of analyses and assessments are documented in a Business Process Report and in a Functional Requirements Report (see Section 2 of this report).

In the Alternatives Analysis phase, the functional requirements were assessed to determine the technical capabilities necessary for the DDMS. Three alternatives that meet the DDMS requirements have been evaluated.

Candidate solutions identify alternative hardware and software configurations with various degrees of integration and customization, retention of existing IT elements, etc. All solutions considered support: data capture, editing, transfer, and updating; information storage, organization, correlation, and retrieval; data presentation, communications, security, etc. Additionally, for each alternative, the following is addressed:

- Evaluate the need to expand or revise business processes associated with the electronic hearing room for each proposed solution;
- Assess operational needs and functions associated with the proposed solution;
- Define the system development and operations roles and responsibilities of ASLBP, parties, support personnel, and other stakeholders in the adjudicatory process;
- Define model processes and work flows, including integration with other systems;
- Develop preliminary high-level solution and variation/options;
- Assess general costs for primary system components for the design and implementation;
- Provide a cost profile for each identified solution. Address the value added of each piece of the proposal versus the potential expenditure;
- Describe the efforts, requirements, and relationships essential to integrating proposed solutions with the LSN and the ADAMS-based Electronic Hearing Docket (EHD); and
- Provide a comparative analysis including cost/benefits, risks, technical requirements, and impact on existing infrastructure.

Each alternative assessed will satisfy the specified functional requirements.

An Alternatives Analysis Report is forwarded as Section 3 of this report.

Based on the alternatives analysis, a Recommended solution is presented. A solution cost and an implementation approach are presented that include incremental implementation of capabilities leading to full system functionality to support agency adjudications, in particular the HLW repository proceedings. The Recommendation is documented in Section 4 of this report. This section includes:

- A system description that specifies the elements of the recommended technical solution and supporting infrastructure. The recommended approach is formulated to satisfy current and future functional requirements for the existing hearing room and current and future remote hearing locations;
- A cost profile which addresses major components of the recommended approach, including hardware, software, services, and operating and training costs. The costs are presented in a manner that supports implementation of the overall solution using a phased methodology;
- Descriptions of the options available to implement the major components;
- System descriptions describing the solutions and their operation; and
- A preliminary project management plan for the design and development of the components of the recommended approach providing:
  - A schedule showing significant tasks and milestone completion dates;
  - Budget projections;

- A staffing plan identifying government and contractor FTE's and their projected deployment;
- Outcome-oriented performance goals and metrics for use in the objective assessment of project success;
- Specification of IT architecture, infrastructure, and data and network standards requisite to the achievement of the proposed solution;
- A statement as to whether the proposed IT investment would or would not result in shared benefits or costs with other Federal agencies, state or local governments; and
- An acquisition approach with a short plan explaining how risks can be managed.

1.1.2 Methodology

A number of proven techniques were employed during the course of this effort. During the Requirements Definition phase, five Joint Application Design (JAD) sessions were held with nearly 50 participants providing their insights into the processes and procedures utilized in the ASLBP adjudicatory hearing environment. JAD is an information gathering technique specifically designed to elicit high quality information from key participants in the processes under investigation. Additionally, a number of management meetings were held with ASLBP to discuss their vision of the DDMS. Visits to other relevant activities, such as Court 21 in Williamsburg, Virginia, and discussions with personnel outside the immediate NRC environment provided additional valuable insights into the digital information courtroom vision appropriate for the DDMS study.

The JAD sessions proved to be key contributors to formalizing the DDMS functional requirements. The knowledge and vision of management representatives as well as the insights of process users were surfaced during detailed process discussions. Processes and information flows were examined and process deficiencies discussed. JAD sessions were conducted as follows:

- Judges JAD, with ASLBP representatives - October 13, 2000;
- Technical JAD, with representatives from the Office of the Chief Information Officer (OCIO) and the Office of the Secretary of the Commission (SECY) - October 19, 2000;
- Litigator JAD #1, with representatives from various potential participants in the hearing process including the U.S. Nuclear Regulatory Commission (NRC)/Office of General Counsel (OGC), U.S. Department of Energy (DOE), Nuclear Energy Institute (NEI), Nuclear Information Resource Service (NIRS) and other interested parties - October 23, 2000;
- Records JAD, with representatives from the Office of Commission Appellate Adjudication (OCAA), SECY and Commission (OCM) - October 28, 2000; and
- Litigator JAD #2, with representatives from the State of Nevada, local governments, DOE and other potential participants to the HLW repository proceeding - November 1, 2000.

Results of the ASLBP sponsored JAD sessions are documented as the Functional and System Requirements presented as Sections 2.3 and 2.4 of this report. Appendix 1 lists the JAD attendees. In addition to the specific functional requirements, important themes repeatedly surfaced during these sessions:

- All JADs recognized that NRC has a major problem – how are participants and the NRC to efficiently and effectively manage all of the information, particularly that associated with the HLW repository proceeding, in a litigation context;
- Public access to timely proceeding information is to be considered, as well as provisions to ensure compliance with the Americans with Disabilities Act (ADA) as applicable, must be addressed in any solutions;
- Participants envisioned a critical need for technology to be employed to facilitate all aspects of the hearing process, and specifically to expedite and improve the conduct and administration of the hearings themselves, in particular to avoid the delay and other costs associated with conducting the time-sensitive HLW hearings with "blowback" to paper of the large and unprecedented number of documents that will be involved, and that exist in electronic form in the LSN prior to the hearings; and
- Technology improvements must be available to all participants equally and NOT impose an undue burden on any party.

Meetings were held with key ASLBP management personnel that reinforced the specific requirements as well as the need to conduct the proceedings as efficiently as possible. JAD session results and the review of project materials contributed to a baseline understanding of operations, insight into near-term and long-term system vulnerabilities, and opportunities for process improvement. In addition, the results of these review and analysis activities served as the basis for the system functional requirements for the DDMS Hearing Process detailed in Section 2.

The Hearing Process is also documented in a context diagram developed in System Architect, a Computer Aided System Engineering (CASE) tool that shows information flows and organizational interfaces.

Requirements were analyzed and assessed against the NRC environment and capabilities available in the commercial marketplace. Alternative architectures were examined and evaluated. A recommended architecture was designated and used for planning purposes. Options to implementing the recommended were explored and a recommended configuration was presented.

1.2 PROJECT OVERVIEW

Section 189 (a) of the Atomic Energy Act (AEA) of 1954 provides that interested persons may request a hearing regarding agency reactor or nuclear materials licensing actions. Section 114 (d) of the Nuclear Waste Policy Act of 1982 (NWPA) requires the NRC to conduct any requested hearings and issue a final decision approving or disapproving issuance of the construction authorization for a mined geologic repository to store high-level radioactive waste at Yucca Mountain, NV, within three years of the U.S. Department of Energy (DOE) license application. Absent some Commission directive to the contrary, the ASLBP is the responsible organization for conducting those hearings. As such, the ASLBP is investigating methods for facilitating the hearing process generally, as well as to aid in conducting the HLW repository proceeding within the mandated timeframe. One of these initiatives is the hearing room DDMS.

Should this study show that the hearing room DDMS is of material benefit to the ASLBP generally, and may significantly contribute to meeting the mandated HLW repository proceeding deadline, the ASLBP must submit justification data to the NRC in order for the DDMS to be funded and implemented. A Capital Planning and Investment Control (CPIC) business case analysis is required in order to proceed with the DDMS. The CPIC requires a need analysis/ feasibility study for expanding and integrating digital technology into the ASLBP local and remote hearing room(s). This document will assist with development of the CPIC.

The results of this study will provide the information necessary to allow the NRC/ASLBP to make an effective and cost-efficient business decision on how to progress in expanding and integrating digital technology into the ASLBP hearing room(s).

1.2.1 Objectives

The major objective of the DDMS is to help the NRC meet the time requirements for the HLW repository licensing proceeding and 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 helps achieve time and resource savings by improving the efficiency of conducting this high profile HLW hearing with the anticipated large volume of electronic discovery and evidentiary information.. In conjunction with other initiatives, especially the Licensing Support Network (LSN), Electronic Information Exchange (EIE), and the Electronic Hearing Docket (EHD) initiatives, the DDMS should materially improve the efficacy of hearing information presentation, capture, preservation, storage, retrieval, management and submission to the Agency-wide Document Access and Management System (ADAMS) for permanent record storage and record preparation for appeals.

Without DDMS, the ASLBP faces the prospect of administering these important HLW repository hearings while relying on ADAMS and LSN for hearing room information management - systems not designed to provide interactive trial support and not capable of controlling or integrating the various media and devices that will be in the courtroom. Alternatively, the ASLBP could resort to classic paper-oriented processes and procedures and basically undo the potential efficiencies available from the other initiatives currently in-place or underway by “blowing back” electronic information into paper format and proceeding from there. This, however, can be extremely cumbersome and costly in terms of time, storage, and shipping of paper documents, and personnel needed to manage paper documents, among other factors. Both of these alternatives appears problematic to the ASLBP, particularly as to time and management of the enormous volume of information expected to be involved in the HLW repository proceeding.

The DDMS should be available early in the HLW repository proceeding life cycle in order to be most effective during the expected concentrated hearings to begin in FY 2004 timeframe. The early, incremental implementation of the DDMS should help mitigate the risks of introducing a potentially new model for managing information within the hearing room. Waiting to unveil the DDMS at the height of the HLW repository proceeding (where the most involved and complex management of documentation is required) carries an enormous amount of technological and operational “risk” that may not be in the best interest of the NRC.

1.2.2 Scope of DDMS

The DDMS enables the creation and use of an integrated, comprehensive digital record for hearings using electronic discovery data from the LSN, EHD and EIE systems. The future system is to be used in the ASLBP headquarters hearing room and in remote hearing location(s). The DDMS will record, store, and display the text and image of documents presented in the hearing and permit access and retrieval of the electronic and video record of proceedings in electronic formats compatible with the LSN environment. The DDMS 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 completed record will be continually accessible by the presiding officer and parties in the litigation. The DDMS must support hearing activities and information management during the pre-hearing, hearing, and post-hearing phases, as well.

It should be noted that the technologies investigated have been implemented, at least in part, in other courtroom settings. For example:

- The Eastern District of Washington has similar electronic evidence display equipment installed in four Spokane courtrooms and one Yakima courtroom;
- The 13th Judicial Circuit Court of Hillsborough County in Tampa Florida has a digital recording and transcription management system that ties a digital audio record to digital video and documentation such as court orders or test results;
- The San Jose Federal Court electronic courtroom allows the use of monitors and CD-ROMs to manage and present documents; and
- Eight new high-tech courtrooms in Maricopa County, Arizona have flat screen monitors, electronic presentation podiums, two-way videoconferencing systems, databases, Internet access, voice-activated cameras, video transcript systems with split screen monitors and real time transcript downloads.

No single solutions implemented in other courtrooms fully address the HLW hearing room requirements. However, none of the components of the DDMS involve leading edge technology.

1.2.3 Benefits of DDMS

Professor Fredric I. Lederer, Chancellor Professor of Law and Director of the Courtroom 21 Project at the William & Mary School of Law in Williamsburg, Virginia, in his article “The Road to the Virtual Courtroom? Consideration of Today's - and Tomorrow's - High Technology Courtrooms” states “The courtroom is a place of adjudication, but it is also an information hub. Outside information is assembled, sorted, and brought into the courtroom for presentation. Once presented, various theories of interpretation are argued to the fact finder who then analyzes the data according to prescribed rules (determined by the judge through research, analysis, and interpretation), and determines a verdict and result. That result, often with collateral consequences, is then transmitted throughout the legal system as necessary. The courtroom is thus the center of a complex system of information exchange and management.”

He continues by stating: “Ultimately, it is the fact that lawyers and judges deal continuously with "data" that impels high technology courtrooms….”

The amount of information exchange anticipated at the HLW repository proceedings will certainly mirror this concept. The DDMS is contemplated to specifically address this issue. The DDMS is expected to be an integral part of the information exchange and management specifically designed to facilitate the conduct of the hearings and yield benefits such as those described below:

- Studies from the Courtroom 21 Project indicate that high technology litigation proceedings reduce trial time for a typical case by 25%. This is a result of efficiencies in handling information in electronic form. The HLW repository proceeding, while not a typical case, is expected to be document intensive, and could realistically anticipate at least similar hearing time reductions with the application of electronic document handling.
- In the Virtual Courthouse, May 1998; Issue 3.5, “The Electronic Courtroom”, the Honorable Arthur M. Monty Ahalt states: “The cost of technology is dramatically declining as a result of increased use and production creativity. Increased use has also provided proof that operational costs can likewise be dramatically reduced. The time to complete a task has also been dramatically shortened. It is not uncommon for productivity gains of 40 percent and greater to be shown.”. These gains are potentially applicable to the HLW repository proceedings with the proper implementation of technology.
- In the Law News Network, March 14, 2000, “Arizona Court Builds High Tech Program,” Marty Sauerzopf states “Proponents [of high tech courtrooms] tout the technology as a cost- and time-saving innovation that will speed trials….”. He further cites Michael Arkfeld, assistant U.S. Attorney, who states “When you talk about the computer-integrated courtroom, it’s one that allows you to present a case without paper, the number one advantage just from a purely efficiency perspective is most attorneys, including myself, can save 30 to 50 percent of your time in trial.” Arkfeld further states “You don’t have to bring (a document) to the clerk …. If you have more than five or 10 documents you can misplace them. If you have 100, 200, 1,000 or 5,000, your time savings is incredible.”.

Benefits of the high tech hearing room thus flow to attorneys as well as to judges and result in more effective presentations and streamlined trials.

The NRC has acted on this need and has, in fact, been recognized as a leader in the application of technology to the courtroom due to the capabilities in place at the ASLBP hearing room in Rockville, Maryland. These capabilities are in need of modernization and extension to other hearing locations , particularly to support the HLW repository proceeding.

One of the primary goals of the ASLBP is to conduct the HLW repository proceeding within the timeframe specified in the Code of Federal Regulations (CFR) 10, Part 2, Subpart J and Appendix D. Current planning is that the evidentiary hearing portion of this proceeding will occur over a 150 hearing-day period. Based on the number of documents likely to be presented during the hearings, it appears to be a difficult challenge to meet this timeframe without the infusion of additional technology to facilitate the conduct of the hearings.

1.3 DOCUMENT ORGANIZATION

This report provides the results of the study of the ASLBP integrated hearing room DDMS. This report is organized as follows:

- Section 1.0 of this report provides a brief background of the DDMS project, provides an overview of the project, and describes the report organization.
- Section 2.0 presents the DDMS study Requirements Definition results including identification of the ASLBP Business Processes, major Business Process activities and the associated DDMS functional requirements.
- Section 3.0 presents the DDMS study Alternatives Analysis results including identification and definition of the alternatives considered, cost-benefits analyses, presentation of the evaluation criteria, and documentation of the assessment results.
- Section 4.0 presents the DDMS study Recommended Solution including a system description specifying the elements of the recommended technical solution and supporting infrastructure, a cost profile which addresses major components of the recommended approach, and a project management plan for the DDMS that projects a schedule, budget, staffing plan, and acquisition plan.

2.0 REQUIREMENTS DEFINITION

Section 2.0 presents the DDMS study Requirements Definition results including identification of the ASLBP Business Processes, major Business Process activities and the associated DDMS functional requirements.

2.1 ASLBP ADJUDICATORY PROCESS

The following discussion portrays the existing ASLBP adjudicatory processes and procedures, with some provisions added for the expected environment applicable to the high-level waste (HLW) repository licensing proceeding~~s~~. The focus of the discussion below is on the evidentiary hearing in a "formal" proceeding in which attorneys orally present and conduct cross-examination of witnesses and present exhibits to create a record. Although the "informal" hearing process that the agency also conducts is intended to resolve cases on the basis of a written record, it does provide for an oral hearing in appropriate instances in which the presiding judge would have the primary responsibility for record creation, including examining any witnesses. The business processes involved in such an oral hearing, however, would essentially be the same as the formal evidentiary hearing in terms of the procedures and inputs/outputs.

2.1.1 Pre-Hearing Stage

A case for the ASLBP generally begins when the Commission, through its Office of the Secretary (SECY), sends ASLBP one or more requests for hearing directing the conduct of a formal or informal hearing. This generally, is the first item in the "official record" of any case - called the "Hearing Docket". In "formal cases" such as the HLW repository licensing proceeding, a licensing board of three judges is assigned to the case in a written order that is filed with SECY. In complex proceedings such as the HLW repository case, more than one board may be assigned to different parts of the case. "Informal cases" generally have a single presiding officer.

Each licensing board consists of a legal judge who chairs the board, along with two other judges who are both generally technical/scientific judges. During the proceedings, the chairman of the board will "direct" the proceedings and preside at all pre-hearing conferences and evidentiary hearings. Although the chairman rules on behalf of the board on some procedural matters, all three judges participate in rulings on all significant matters such as discovery disputes, disputes over whether particular evidence is admissible, the final decision "on the merits" of the case, etc. In "informal cases", the presiding officer, generally a legal judge, will make all rulings from start to finish, usually with a technical judge assisting on the technical/scientific aspects of the case.

During the pre-hearing stage of the proceedings, the parties or their lawyers will file various documents called "pleadings" (documents in which parties "plead" their case/viewpoints/arguments on anything in dispute - for example, motions, briefs, petitions, responses, contentions, etc.) Pleadings are filed with SECY in the official Hearing Docket and become part of the official record. Currently, pleadings are filed as paper copies, but a judge may order them filed in electronic form also. It is expected that the vast majority of documents will be filed electronically in the future and, in the case of the HLW repository proceeding, electronic filings are mandated by rule.

Also during the pre-hearing stage, various orders, memoranda, notices and other issuances may be sent out by the board, or by the chairman on behalf of the board, generally in response to pleadings or on the judges' own initiative. These may be short issuances on "procedural matters" (setting deadlines for the filing of various motions, etc.), or longer issuances on various legal matters (such as discovery-related motions, summary disposition motions, motions "in limine" to limit or exclude certain evidence that is expected to be presented at the hearing, or a multitude of other matters that may arise in a legal proceeding). All issuances are filed with SECY to be made part of the official Hearing Docket.

The licensing board does not take part in the discovery process, unless required to resolve disputes on discovery issues. Discovery is between the parties, and is a method for each party to learn about the other parties' evidence in preparation for the hearing (so that the hearing will be more "to the point" and organized). Discovery may include requests for documents, written questions called "interrogatories" and "requests for admission", "depositions" (verbal questioning of a witness that is transcribed), and other methods. For the HLW repository case, the Licensing Support Network (LSN) is designed to simplify the discovery process by requiring all parties to make all of their documentary information available electronically via the internet-based LSN so that all other parties can have access to it. For other cases, "normal" discovery procedures apply. In informal proceedings there is no discovery per se, but the NRC staff is charged with compiling and filing a "hearing file" containing all relevant materials, which then becomes part of the hearing docket.

Pre-hearing conferences may be held prior to the actual hearing for various purposes, including scheduling of various steps and deadlines in the proceeding, discussing the issues to "narrow" them and thus get them into more organized and manageable form, hearing argument from the parties on very specific issues, etc. These conferences may be held in person, by telephone conference, or by videoconference, and generally will be transcribed, with the transcripts made part of the official record with SECY. Pre-hearing conferences will generally consist of discussion between the judges and attorneys (and parties representing themselves), that often include more formal "legal argument" by attorneys (and parties representing themselves). Pre-hearing conferences will generally not include testimony or the introduction of exhibits, but may in certain circumstances. Usually, an order will be issued after a pre-hearing conference, in the same manner as all other pre-hearing orders (filed with SECY with copies sent to the parties).

At some point near the end of the pre-hearing stage, the parties will file their witness lists, the pre-filed testimony of some witnesses, and their pre-filed exhibits, according to deadlines that have previously been set by order (subject to any time extensions permitted). These documents, and non-documentary electronic and physical exhibits, are filed with SECY.

It is possible that, during the pre-hearing stage, some licensing board orders may be appealed to the Commission on an "interlocutory" (interim) basis. In this event, there will likely be an order issued by the Commission that will be entered into the official record in the same manner as pleadings and board orders. Most Commission orders and any licensing board orders that dispose of any part of a case or are otherwise considered significant will be published in the Nuclear Regulatory Commission Issuances (NRCIs), and will also be included in Westlaw, Lexis, and Premise.

2.1.2 Evidentiary Hearing and Decision Stage

In instances in which it is necessary to convene an evidentiary hearing, the hearing will begin with the chair of the licensing board introducing the board members, with all attorneys and unrepresented parties introducing themselves (and their clients). From the first word spoken "on the record" as indicated by the licensing board chairman, everything said aloud during the hearing will be transcribed, unless the chair affirmatively announces a recess, etc., or other adjournment to go "off the record." There may be some preliminary matters that will be taken care of at the beginning of a hearing session, involving the submission of documents, possible verbal motions, rulings on various issues, etc. Anything filed at this point would be made part of the record by reason of its introduction at the hearing, and would later be filed with SECY along with the rest of the record created on that day (week, etc.) of the hearing.

After all preliminary issues have been taken care of, each party (through counsel if represented by an attorney) may be given the opportunity to make an "opening statement," to explain what it intends to show in the hearing.

After opening statements, the presentation of the evidence begins. Generally, the order of the parties' presentation of their witnesses and evidence will have been determined prior to the hearing. The evidence may include witness testimony (either pre-filed written testimony offered by one side, deposition written testimony consisting of questioning from both sides, or live verbal testimony in response to questions at the hearing) and exhibits in various forms. Generally, the testimony of a witness or panel of witnesses would begin with pre-filed "direct" testimony, which would be noted for the record when presented, with any corrections that are necessary. This is followed by questioning of the witness by the various lawyers and unrepresented parties (or spokespersons for various groups of parties with similar interests).

"Direct" testimony is testimony elicited by questions from the lawyer who is offering the testimony of a witness, through "direct examination". Often, direct testimony is pre-filed in written form, as noted above. The other form of questioning and testimony is "cross-examination" by other parties of a witness who has provided direct testimony. Each party generally has the right to cross-examine the witnesses of all other parties. All direct examination, cross-examination, "redirect," "re-cross" and back-and-forth continuation of questioning of one witness until all questions that are allowed by the board for that witness have been asked, will generally be completed before the questioning of another witness starts. The judges may also question witnesses as necessary to clarify various issues. All verbal testimony proceeds in question-and-answer format, and if any "objections" are raised, the board generally rules on those before the question-and-answer process continues.

Except for the off-the-record recesses, all of the testimony and interaction between the board and the attorneys and parties, including presentation of any exhibits or demonstrations, will be memorialized into the record via the transcript prepared by the court reporter. However, if portions of the hearing are closed for security reasons, portions of the transcript, as well as any exhibits, that refer to safeguards, classified, proprietary or other confidential material may be sealed, and handled separately.

By pre-filing exhibits and allowing pre-hearing "in limine" objections beforehand, much of the work of "authenticating" exhibits to establish a basis for their admission during the hearing can be avoided. If necessary, a witness may be called upon to "authenticate" an exhibit (i.e., say the exhibit is what it is purported to be) through testimony. The lawyer "proffering" the exhibit will have the exhibit "marked for identification" (the court reporter will do this or it may have been done prior to the hearing) and will give the exhibit (or copy) to the witness. After asking the witness certain questions to establish a "foundation" for relevance, etc. (i.e. grounds for finding the exhibit appropriate for entry into the record in the case), the lawyer will ask that the exhibit be introduced into evidence. If there is no objection, the exhibit is introduced and the court reporter marks it as "admitted" or "received". If there is an objection, the same process for hearing argument and ruling on this by the board as noted for objections to questions or answers will be followed. If the objection is "overruled" and the exhibit admitted, it will be marked "admitted" or "received" by the court reporter. If the objection is "sustained", the exhibit will be marked "not admitted" or "rejected". In both cases, the exhibit will become part of the official record (but will not be considered by the licensing board in making its decision if it was rejected).

There may also be various demonstration materials (e.g. charts, models) used during the evidentiary hearing that may or may not be introduced into evidence depending upon what the parties request, any subsequent objections and rulings thereon, and the capabilities available within the hearing room to support preserving the demonstrations for the record. Even if an objection to a demonstration is sustained, there may be a need to it to be included in the record, albeit as "rejected".

During the hearing, various legal issues may arise that lead to verbal motions and/or legal argument by counsel (and unrepresented parties) and verbal rulings by the board (often after conferring privately off the record). All of these discussions and rulings will generally get into the official record through the transcript.

During the hearing, the judges, lawyers and parties will often need to have quick and easy access to the various pleadings, orders, exhibits and earlier testimony. For example, participants may need to:

- Recall the legal arguments previously made by parties;
- Review previous orders that relate to the argument being made;
- Compare exhibits;
- Compare the testimony of different witnesses;
- Review the earlier testimony of a witness who is testifying; or
- Research various legal issues through Westlaw, Lexis, etc.

Normally, much of this is accomplished by looking at paper copies of documents or transcripts of previous testimony, or by having the court reporter read back earlier testimony from the same day of hearing.

After all the parties have presented all their witnesses and exhibits, all objections ruled on, etc., the last activity in the hearing is generally the verbal closing arguments of the parties. Closing arguments will also be transcribed as part of the record.

After the hearing, the parties will file "proposed findings of fact and conclusions of law," along with legal briefs, and responses to each other's proposed findings and conclusions. The board then begins a process of deliberation, conferring off the record with each other, and referring as necessary to the record, to the parties' proposed findings and conclusions, and to relevant law through various research processes. Through this process, an initial decision will be drafted that the board will sign and issue. If all judges do not agree on all issues, one or more judges may issue dissenting and/or concurring opinions on various issues, which will be attached to the primary order.

Generally, the issuance of orders by all boards disposing of the matters they have to decide in the case will complete the hearing process. (It should be noted that a number of boards may be convened for a complex case such as the HLW repository proceeding, and the issuance of orders by the various boards within a complex case may follow or overlap each other in time.) A "request for reconsideration" or "motion to reopen the record" regarding an order may be filed, which, if granted (by order), will lead to more legal argument, pleadings, possibly more hearing, and another "final" order on the issue that was reconsidered.

The pre-hearing, hearing, and post-hearing material that is submitted by the parties and the board is maintained by SECY as part of the Electronic Hearing Docket (EHD). This record includes all pleadings, orders, transcripts of pre-hearing conferences and hearings, and exhibits. The record may also contain some "limited appearance statements," which can be either written letters or other documents, or transcribed statements made by members of the public during "public sessions" which are less formal than the evidentiary hearings described above. Although there will be one official record for each case, parts of a case may, at various points, be separated out and need to be indexed accordingly, depending upon the matters at issue.

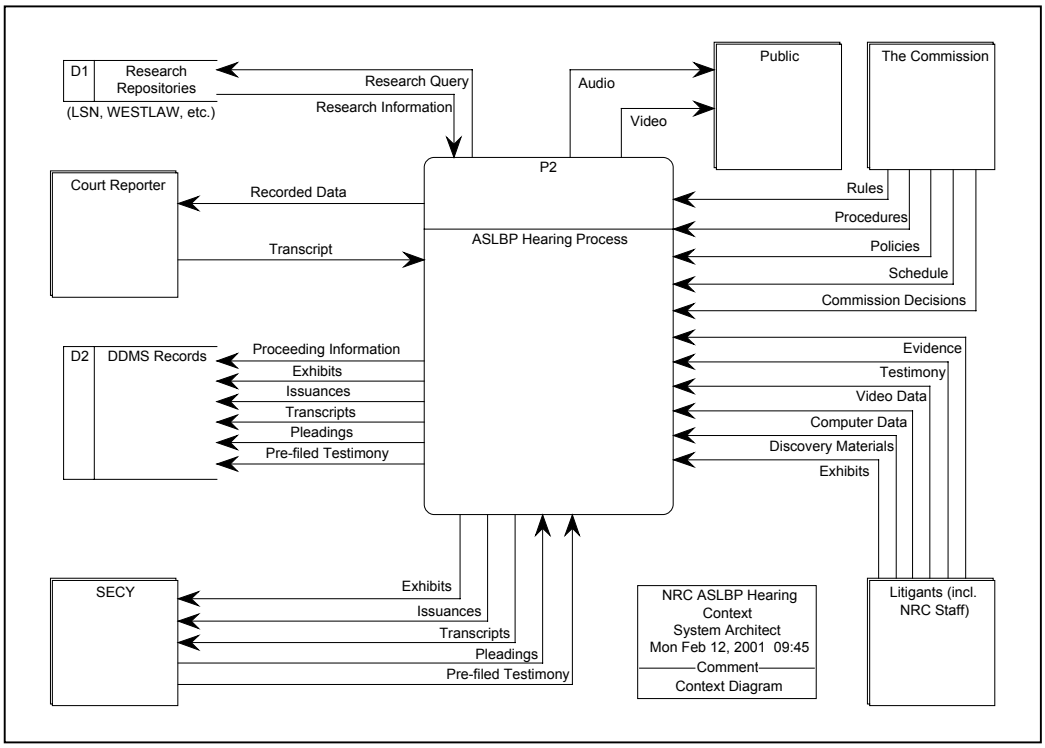
2.1.3 Post-Decision Stage

Licensing board decisions may be appealed. The appeal process may be interspersed within the hearing stage on some issues. Usually, appeals will take place after a hearing on a significant aspect of the case has been completed and the licensing board's partial decision on that aspect of the case has been issued. The first appeal is to the Commission. Thereafter, once the entire case is completed, the next appeal level is to a United States Court of Appeals, with the final appeal to the United States Supreme Court, if appropriate.

It is possible that, after the licensing board decision has been rendered, the case or parts of it may be sent back to the licensing board, i.e., remanded, by any of the appellate review levels. These subsequent proceedings may be minimal or extensive, likely requiring additional hearings, legal argument, pleadings, and orders, all accomplished in the same process as outlined above, and again, subject to appeal.

2.2 HEARING PROCESS

From a DDMS perspective, the ASLBP operational requirements logically fall into a single Business Process. The Business Process Report submitted to the ASLBP provided a preliminary perspective of the Business Processes that revised as presented herein. The DDMS must be able to support all of the functions presented in Section 2.1.2 above, especially in the context of the HLW repository proceeding. As shown in the context diagram below, the DDMS must support the flow of information between the ASLBP and SECY, hearing participants and various data stores including the LSN, ADAMS, Westlaw, etc. The DDMS must be capable of supporting ASLBP activities associated with administering the proceeding, evidence presentation, record creation, record management, record retrieval, transcription services, research support, hearing issuances, and submission of record materials to SECY.



2.3 FUNCTIONAL REQUIREMENTS

The system oriented functional requirements are provided in the following paragraphs. Requirements are separated by the activities required of the Hearing Business Process that relate to the processing and management of information in support of the ASLBP hearing rooms. Inputs to the functional requirements and outputs from the functional requirements are also recorded by activity.

2.3.1 Administrative Management

Administrative Management is described as the ability of the technical solution to support the presiding officer efforts to administer the hearing.

2.3.1.1 Functional Requirements

2.3.1.1.1 The DDMS shall provide access to electronically available copies of the rules, policies, and procedures that govern the hearing.

2.3.1.1.2 The DDMS shall provide a chronological listing of all FRNs, pleadings, and pre-filed information that support the hearing.

2.3.1.1.3 The DDMS shall provide access to the EHD to support review of the current electronic docket.

2.3.1.1.4 The DDMS shall support the generation of an ordered list of witnesses (witness list) that are scheduled to support the hearing.

2.3.1.1.5 The DDMS shall support the management of the witness list and support changes to the witness list.

2.3.1.1.6 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.

2.3.1.1.7 The DDMS shall support the electronic marking of evidence/exhibits to be presented. The system must be capable of marking evidence such as Identified, Received, Rejected, Withdrawn, etc.

2.3.1.1.8 The DDMS shall support sealing portions of the record, temporarily stored on the DDMS.

2.3.1.1.9 The DDMS shall support independent or private retrieving and viewing of hearing or record information by the judges.

2.3.1.1.10 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.

2.3.1.1.11 The DDMS shall support the aggregation of information across multiple hearings, allowing search and retrieval across all hearing information with a single request.

2.3.1.1.12 The DDMS shall support electronic notifications or instructions to participating hearing personnel, e.g. judges and court reporter.

2.3.1.2 Inputs, including items such as:

- Rules
- Procedures
- Policies
- Pleadings

- Evidence
- Parties
- Witness List
- Precedents
- Schedule
- Transcripts

2.3.1.3 Outputs, including items such as:

- Instructions
- Schedules
- Computer generated reports
- Process Flows
- Selected portions of transcripts
- Public announcements

2.3.2 Pre-Filed Information

Pre-filed information covers the ability of the technical solution to capture, store, and retrieve pre-filed pleadings, testimony and exhibits submitted in advance of the pre-hearing conferences and evidentiary hearings.

2.3.2.1 Functional Requirements

2.3.2.1.1 The DDMS shall retrieve pre-filed documents from information filed with SECY.

2.3.2.1.2 The DDMS shall support capturing pre-filed documents, from electronic and paper formats.

2.3.2.1.3 The DDMS shall support storing references to non-electronic exhibits as descriptive profile information.

2.3.2.1.4 The DDMS shall support capturing multimedia electronic information in their original format.

2.3.2.1.5 The DDMS shall support the searching of pre-filed electronic and non-electronic information using the metadata or full-text index information.

2.3.2.1.6 The DDMS shall support the retrieval and display or printing of all pre-filed electronic information.

2.3.2.1.7 The DDMS shall support the selective retrieval and capture of electronic pleading(s) from the EHD.

2.3.2.1.8 The DDMS shall support the electronic document formats supported by the EHD.

2.3.2.1.9 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.

2.3.2.1.10 The DDMS shall support the generation of a full-text index for each pre-filed document.

2.3.2.1.11 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.

2.3.2.1.12 The DDMS shall support the retrieval and display of pre-filed documents, retaining the original presentation fidelity of the information.

2.3.2.1.13 The DDMS shall support the printing of pre-filed documents to selectable page sizes specified by the user, including but not limited to 8 1/2" x 11" and legal size paper.

2.3.2.1.14 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.

2.3.2.2 Inputs, including items such as:

- Motions
- Briefs
- Petitions
- Electronic Records (e.g. LSN, EHD)
- Testimony
- Witness Lists
- Exhibits
- References to models, video, and other information
- Responses
- Contentions

2.3.2.3 Outputs, including items such as:

- Computer-generated Reports
- Acknowledgements
- Issuances

2.3.3 Research Support

Research Support is described as the ability of the technical solution to provide the capability for participants to conduct independent research during the conduct of a hearing.

2.3.3.1 Functional Requirements

2.3.3.1.1 The DDMS shall provide direct access to the Input sources listed below.

2.3.3.1.2 The DDMS shall provide access to the identified repositories to provide research support to the ASLBP.

2.3.3.1.3 The DDMS shall provide Web access to support litigant research.

2.3.3.1.4 The DDMS shall allow research participants to use the native search and retrieval capabilities to request information from the identified repositories.

2.3.3.2 Inputs, including items such as:

- Electronic Records (e.g. LSN, EHD)
- Lexis
- Westlaw
- Premise

2.3.3.3 Outputs, including items such as:

- Information

2.3.4 Evidence and Argument Presentation

Evidence and Argument Presentation is described as the ability of the technical solution to support the introduction, presentation, and retrieving of information at pre-hearing conferences and hearings.

2.3.4.1 Functional Requirements

2.3.4.1.1 The DDMS shall support the retention of the access control privileges originally assigned by the EHD for using documents by authorized personnel.

2.3.4.1.2 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.

2.3.4.1.3 The DDMS shall support the display presentation of litigator case information from:

- Laptops
- CD or DVD
- Video
- Audio

2.3.4.1.4 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.

2.3.4.1.5 The DDMS shall support the presentation of hearing information to remote locations via videoconference.

2.3.4.1.6 The DDMS shall provide a capability to highlight or annotate specific portions of displayed still images presented on monitor or workstations, in order to provide clarity or emphasis.

2.3.4.1.7 The DDMS shall provide a capability to support the American with Disability 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.

2.3.4.1.8 The DDMS shall support the translation of languages to and from U.S. English for non-English speaking participants.

2.3.4.1.9 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.

2.3.4.1.10 The DDMS shall support the selective display of information from all input sources in the hearing room, including computers, projectors, cameras, etc.

2.3.4.1.11 The DDMS shall support the simultaneous display of information from multiple input sources in multiple windows or viewing partitions on monitors or workstations.

2.3.4.2 Inputs, including items such as:

- Documents (images, text, paper, et al.)
- Video Clips
- Laptops/computer inputs
- Computer Models
- Physical evidence
- Oral presentation/report/testimony
- Depositions
- Video Conference
- CD/DVD
- Reference to Pre-filed court information
- Projector

2.3.4.3 Outputs, including items such as:

- Screen or Display
- Printer
- Reports
- Hearing Record
- Remote hearing site – video conference

2.3.5 Record Management

Record Management is described as the ability of the technical solution to assist with the management of record information during a hearing.

2.3.5.1 Functional Requirements

2.3.5.1.1 The DDMS shall support the capability to update information previously stored in the record.

2.3.5.1.2 The DDMS shall support the capability to insert or append information into the record, e.g. mark evidence as accepted, rejected, or withdrawn.

2.3.5.1.3 The DDMS shall support the deletion of electronic information or references to exhibits from the record.

2.3.5.1.4 The DDMS shall support modifying existing portions of the record as directed by the judge(s).

2.3.5.1.5 The DDMS shall support the creation and capture of documents used to promulgate orders, directives, etc. to SECY and other parties.

2.3.5.1.6 Issuance documents shall be stored in their native formats.

2.3.5.1.7 The DDMS shall support scanning and conversion of paper documents, e.g. to capture required written signature pages.

2.3.5.1.8 The DDMS shall support the physical marking of electronic documents with a user selectable/customizable electronic marker, e.g. an image stamp.

2.3.5.2 Inputs, including items such as:

- Record
- Judge Instructions
- Requests from Litigants

2.3.5.3 Outputs, including items such as:

- Reports
- Insertion of information
- Update of information
- Index

2.3.6 Decision Support

Decision Support is described as the capability of the technical solution to assist judges with developing and documenting decisions.

2.3.6.1 Functional Requirements

2.3.6.1.1 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.

2.3.6.1.2 The DDMS shall support advanced search methods to assist judges in finding evidentiary information.

2.3.6.1.3 The DDMS shall provide access to the record from the judges' chambers.

2.3.6.1.4 The DDMS shall support integration with Open Document Management Architecture (ODMA) compliant products such as Word, Excel, and WordPerfect. This integration is required to allow issuance documents to incorporate text information from the existing record without re-typing the existing information.

2.3.6.1.5 The DDMS shall support the indexing of the video records to assist in the review of video information.

2.3.6.1.6 The DDMS shall support the creation of customized or ad hoc reports to assist the judges in reviewing the record captured during the hearing.

2.3.6.1.7 The DDMS shall support the capture of any decision issued by a licensing board at or after each pre-hearing conference or hearing.

2.3.6.2 Inputs, including items such as:

- Record
- Other Proceeding Information
- Research

2.3.6.3 Outputs, including items such as:

- Issuances

2.3.7 Issuances

Issuances is described as the capability of the technical solution to support the generation and storage of orders, directives, etc. promulgated by the presiding officer.

2.3.7.1 Functional Requirements

2.3.7.1.1 The DDMS shall support the capture of documents used to promulgate orders, directives, etc. to SECY and other parties.

2.3.7.1.2 Issuance documents shall be stored in their native formats.

2.3.7.1.3 The DDMS shall support scanning and conversion of paper documents, e.g. to capture required written signature pages.

2.3.7.2 Inputs, including items such as:

- Decision

2.3.7.3 Outputs, including items such as:

- Orders
- Notices

2.3.8 Other Proceeding Information

Proceeding Information is described as the ability of the technical solution to assist with the capturing of all information presented and discussed during a hearing.

2.3.8.1 Functional Requirements

2.3.8.1.1 The DDMS shall support the capture of a video and audio record of specific activities and information presented in the hearing.

2.3.8.1.2 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.

2.3.8.1.3 The DDMS shall capture the presentation of information at local and remote sites when videoconferencing technology is used.

2.3.8.1.4 The DDMS shall support playback of selected portions or timeslots of the proceeding recording.

2.3.8.1.5 The DDMS shall support video capture for the judges, litigants, and individuals at the witness box.

2.3.8.1.6 The DDMS shall support playback of proceeding recordings.

2.3.8.1.7 The DDMS shall record evidence presented during the hearing that is displayed on projectors or other monitors in the hearing room.

2.3.8.1.8 The DDMS shall provide a capability for the proceeding recording to be indexed and linked with relevant hearing transcripts.

2.3.8.2 Inputs, including items such as:

- Evidence
- Decision
- Administrative Management information
- Pleadings
- Transcription
- Video

2.3.8.3 Outputs, including items such as:

- Metadata
- Electronic information
- DVD/CD records

2.3.9 Record Creation

Record Creation is described as the ability of the technical solution to support the creation of the hearing record.

2.3.9.1 Functional Requirements

2.3.9.1.1 The DDMS shall support the real-time creation of a record of pre-hearing conferences and hearings.

2.3.9.1.2 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.

2.3.9.1.3 The DDMS shall create an index (metadata) for each piece of information or each exhibit that is a part of the record.

2.3.9.1.4 The DDMS shall store all electronic documents or multimedia files to be included in the record.

2.3.9.1.5 The DDMS shall maintain a reference to physical items that need to be included in the record.

2.3.9.1.6 The DDMS shall maintain an index that includes the unique LSN identifier for each entity (document, files, etc.) originally stored in the LSN.

2.3.9.1.7 The DDMS shall provide a capability to seal a portion of the record.

2.3.9.1.8 The DDMS shall provide a capability to correlate types of multimedia information, to facilitate an easy retrieval process.

2.3.9.1.9 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.

2.3.9.2 Inputs, including items such as:

- Evidence (electronic and physical)
- Decision
- Pre-filed Testimony
- Pleadings
- Transcription

2.3.9.3 Outputs, including items such as:

- Metadata
- Electronic Information
- Links or references
- Physical Evidence
- CD/DVD

2.3.10 Record Retrieval

Record Retrieval is described as the ability of the technical solution to interactively search and retrieve record information from the DDMS database.

2.3.10.1 Functional Requirements

2.3.10.1.1 The DDMS shall support searching of the DDMS record using one or more metadata fields.

2.3.10.1.2 The DDMS shall support the searching of the DDMS record using a full-text index.

2.3.10.1.3 The DDMS shall support the searching of the DDMS record using a combination of metadata and full-text searches.

2.3.10.1.4 The DDMS shall support the retrieval of the DDMS record from a web browser.

2.3.10.1.5 The DDMS shall support the display of metadata or a profile for each entity stored in the DDMS record.

2.3.10.1.6 The DDMS shall support the display of each type of electronic information stored in the record, including documents, video files, images, etc.

2.3.10.1.7 The DDMS shall support the production of a result list for information matching the specified search criteria.

2.3.10.1.8 The DDMS shall support retrieval of the DDMS record from:

- Judge's bench
- Litigant desk locations
- Clerk of Court
- Court Reporter
- Judges' chambers
- Judge's conference room(s)
- Litigant support conference rooms at the hearing

2.3.10.1.9 The DDMS shall support local and remote access to DDMS data for 21 hours per day, 7 days per week.

2.3.10.1.10 The DDMS shall support the display of more than one output simultaneously.

2.3.10.2 Inputs, including items such as:

- Request from Judges
- Request from Parties
- Request from Court Reporter

2.3.10.3 Outputs, including items such as:

- Results from Judges
- Results from Parties
- Results from Court Reporter
- Removable media

2.3.11 Transcription Services

Transcription Services is described as the ability of the technical solution to support the capture and retrieval of transcribed testimony.

2.3.11.1 Functional Requirements

2.3.11.1.1 The DDMS shall support the generation of a time-sequenced audio and/or video record of pre-hearing conferences and hearings.

2.3.11.1.2 The DDMS shall support a real-time transcription of pre-hearing conferences and hearings.

2.3.11.1.3 The DDMS shall support the active linking of transcribed information with electronic information referenced by the transcript.

2.3.11.1.4 The DDMS shall support the capture and storage of transcribed textual information.

2.3.11.1.5 The DDMS shall support the indexing of the transcribed record with metadata and a full-text index.

2.3.11.2 Inputs, including items such as:

- Audio Tape
- Video Tape
- Arguments

2.3.11.2 Outputs, including items such as:

- Searchable Text

2.3.12 Record to SECY

Record to SECY is described as the ability of the technical solution to support the transmission of all record information to SECY.

2.3.12.1 Functional Requirements

2.3.12.1.1 The DDMS shall support the identification of DDMS records that need to be filed as a part of the official record with SECY.

2.3.12.1.2 The DDMS shall identify DDMS hearing records to be filed with SECY on a daily basis.

2.3.12.1.3 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.

2.3.12.1.4 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.

2.3.12.1.5 The DDMS shall support the generation of CD or DVD media with the exported data.

2.3.12.1.6 The DDMS record forwarded to SECY shall be retrievable from remote locations including:

- Litigant Offices
- Sites with Web access

2.3.12.2 Inputs, including items such as:

- Record
- Index
- Proceeding Information

2.3.12.3 Outputs, including items such as:

- Metadata
- Electronic Documents
- Physical Evidence

2.4 SYSTEM REQUIREMENTS

The technical system requirements address the technical issues presented below.

2.4.1 Performance

Performance is described as the ability of the technical solution to deliver required functionality, achieve productivity improvements and provide projected service enhancements. Specifically, the DDMS shall support the following requirements.

2.4.1.1 The DDMS shall provide capacity to store 10% of the high-end estimates for HLW repository document storage in the LSN.

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

2.4.1.2 The DDMS shall provide a capacity to store video and other forms of multimedia data, based on the following criteria:

- Hearing proceedings will be digitized and compressed for storage and distribution via video streaming technologies.
- Hearing video will be retained online for 2 days, and stored on removable media (near-line) for future retrieval.

- 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.
- Video recordings are estimated to be stored in a MPEG format at 1.5 Mbps. For the total of 150 days, the total estimated recording requirement is 1215 GB.

2.4.1.3 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.

2.4.1.4 The DDMS shall display a result list within 10 seconds of the search request to find the information, for 90% of all requests.

2.4.2 Flexibility/Scalability

Flexibility/Scalability is described as the ability of the technical solution to accommodate changes in requirements, new functions, new reports, new data items, document volume expansion, increases in number of users, etc. Specifically, the DDMS shall support the following requirements.

2.4.2.1 The DDMS shall utilize an open architecture that will accommodate integration with legacy systems (ADAMS).

2.4.2.2 The DDMS shall support the migration to newer information and A/V technologies.

2.4.2.3 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.

2.4.2.4 The DDMS shall support the hearing room environments for Rockville, a remote location in Las Vegas Area, as well as other sites in remote locations.

2.4.3 Ease of Use

Ease of Use is described as the ability of the technical solution to incorporate human engineering or ergonomic methodologies that make the solution more acceptable to users. Specifically, the DDMS shall support the following requirements.

2.4.3.1 The DDMS shall use tailored user interfaces that are consistent with industry standards and paradigms for information presentation.

2.4.3.2 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 must 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.

2.4.3.3 The DDMS shall provide a capability to easily highlight subsections of the document or information being presented, for emphasis or focus.

2.4.3.4 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.

2.4.3.5 The DDMS shall support the casual, infrequent user that needs to search and retrieve information from the DDMS.

2.4.3.6 The DDMS shall support the technically proficient user that needs to use advanced tools to find and manipulate information in the DDMS.

2.4.3.7 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.

2.4.3.8 The DDMS shall use accepted industry icons to represent the format of the information being reviewed, i.e. audio, video, image, Word, etc.

2.4.3.9 The DDMS shall provide a basic entry level manual as a training and reference tool.

2.4.4 Interoperability

Interoperability is described as the ability of the technical solution to make effective uses of existing and planned investments in hardware, application software, and network facilities.

2.4.4.1 The DDMS shall integrate with the existing NRC enterprise infrastructure.

2.4.4.2 The DDMS shall make optimal use of existing communications infrastructure including but not limited to the LANs, WAN, and telecommunications.

2.4.4.3 The DDMS shall use existing client desktop computers, enhancing the technology to meet requirements not currently supported.

2.4.4.4 The DDMS shall use, as far as is 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.

2.4.5 Reliability/Maintainability/Availability

Reliability/Maintainability/Availability (RMA) is described as the ability of the technical solution to deliver interruption-free processing support, mitigating the impact of system downtime.

2.4.5.1 The DDMS shall be available to support conducting the HLW repository hearing 12 hours per day, 7 days per week. This includes multiple concurrent hearings conducted at multiple locations.

2.4.5.2 The DDMS shall support intercommunications with the EHD in Rockville, MD 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.

2.4.5.3 The DDMS shall be available 7 days per week, a minimum of 1 hour each day, to support ongoing or required maintenance activities.

2.4.5.4 The Mean Time To Repair (MTTR) the DDMS shall be no more than 1 hour, during the 7 day/week operating time frame.

2.4.6 System Security

System Security is described as the ability of the technical solution to provide password protection of data and system capabilities, the establishment of access rights for each system user, support of multi-level security structure to the data element level, and appropriate security accounting and auditing capabilities.

2.4.6.1 The DDMS shall support the creation of various levels of user privileges to access or manage information in the DDMS.

2.4.6.2 The DDMS shall provide a capability to restrict some users from accessing specific information stored in the DDMS, e.g. a Protective Order File.

2.4.6.3 The DDMS shall restrict all users, except the System Administrator, from deleting information stored in the DDMS.

2.4.6.4 The DDMS shall allow only authorized users, like the Court Clerk, to update or modify information stored in the DDMS system.

3.0 ALTERNATIVE SOLUTIONS

The ASLBP must conduct the HLW repository licensing and other proceedings and is faced with the need to conduct these hearings regardless of whether new technology is infused into the adjudicatory process or not. The use and extension of existing technology capabilities to conduct required proceedings is considered as a alternative solution to be considered, even though this alternative fails to meet many of the operational and system requirements presented in section 2. The second alternative considered is the application of IT and A/V capabilities specifically designed to support the conduct of hearings. Evaluations of the alternative architectures are also presented.

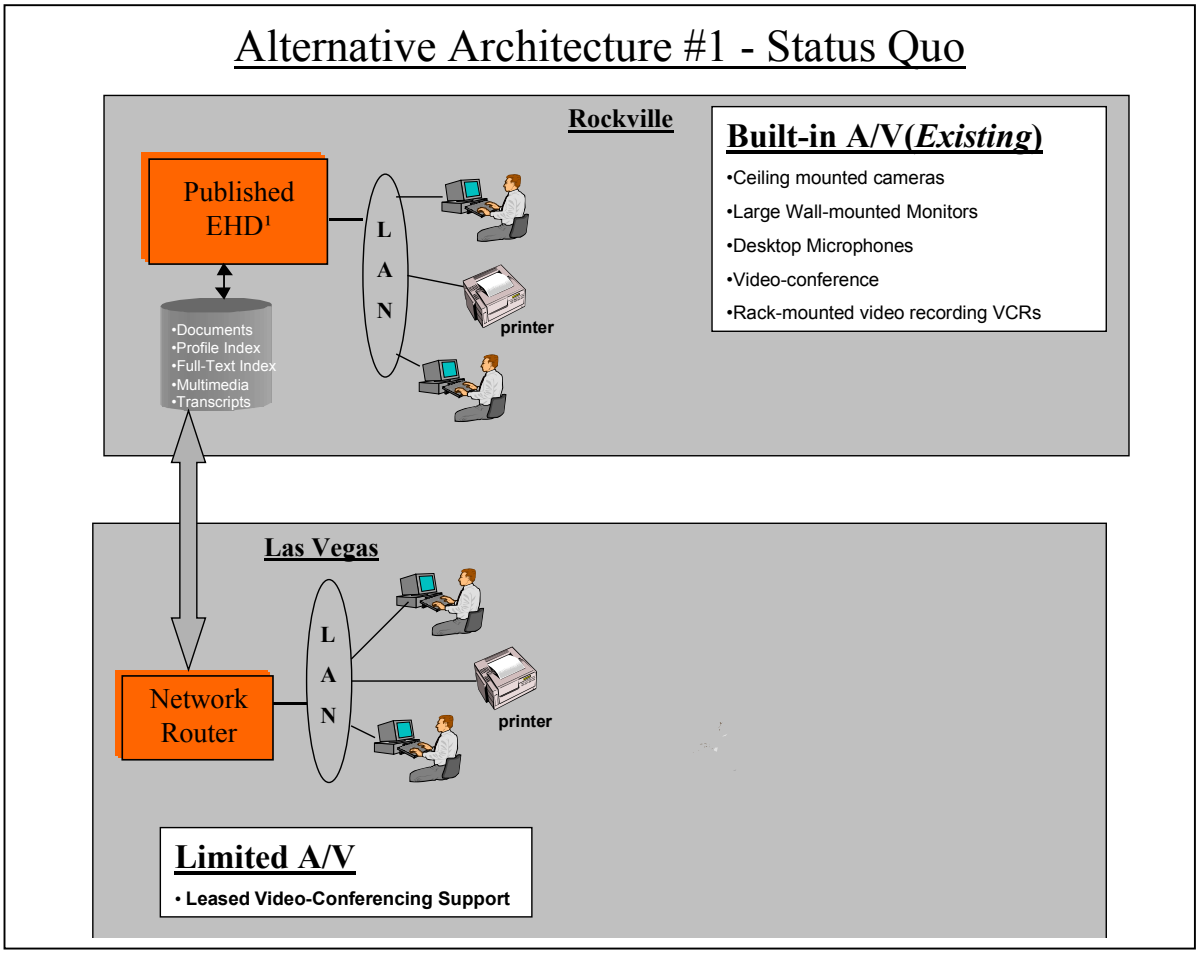
3.1 STATUO QUO ALTERNATIVE

The costs and benefits of using existing capabilities with an enhanced EHD to conduct agency adjudications, in particular the HLW repository hearings, are examined as the first alternative available to the ASLBP.

This alternative is characterized as follows:

- The EHD component of the ADAMS system will be modified to serve as the DDMS for this option.
- All DDMS related functions not supported by the EHD will be performed by manual methods and "back filled" into the EHD as soon as possible.
- All paper documents submitted as part of normal proceedings will be accepted and managed as part of the hearing record.
- All electronic documents submitted as part of normal proceedings and available from the EHD may be presented electronically, however, any changes to electronic documents occurring as a result of the hearing (including marking as an exhibit) must be submitted as paper.
- Existing audio/video capabilities at the Rockville hearing room will be retained and modernized as required.
- Remote sites will have sufficient audio capability to support the local audio requirements within the immediate hearing room.
- Other Hearing locations will have limited video conferencing capability to support specific needs when they arise.

The basic concept of this option is that participants may rely on electronic information within or obtained from the EHD to support the hearing. However, participants should not rely on the EHD to present or preserve their case on line during the hearing. All paper information presented in the proceedings will be sent to SECY as memorialized in the proceedings for conversion into electronic formats for permanent record storage. The Status Quo Alternative is depicted in the figure that follows:



The Status Quo Alternative ensures that the ASLBP can meet its mandatory requirement to conduct the HLW hearings. Major advantages and disadvantages of the Status Quo Alternative are summarized on the following table:

Advantages	Disadvantages
Relatively small investment in technology required in order to conduct the hearings	The hearing room facility may need a larger facility or require modifications to planned facilities in order to accommodate large volumes of paper
Familiar business practices and rules employed in the hearings	Will likely take longer than planned to conduct the hearings
	Reduces the effectiveness of productivity improvement initiatives already implemented or being developed for the hearings
	Some ASLBP staff may be required to manage an extremely large volume of paper which will also involve storage and shipping costs

Advantages	Disadvantages
	The EHD has performance and usability issues that need to be resolved to make it suffice for the hearing
	Planned enhancements to the EHD do not fully address requirements to conduct hearings
	Present and planned EHD security requirements are too stringent to meet hearing requirements
	Cannot electronically mark exhibits
	Cannot introduce new documents (electronic or paper) into the database during a hearing
	No selected display of exhibit information
	No switching control of display to selected workstation monitors

3.2 DDMS ALTERNATIVE SOLUTIONS

Three alternative solutions are identified that provide a DDMS capability to support the requirements presented in section 2, each offering its own strengths and weaknesses. These technical alternatives concern the structure of the DDMS database are labeled as follows:

- Distributed Database and Documents (Distributed);
- Centralized Database and Documents (Centralized); and
- A combination with a Centralized Database and Distributed Documents (Hybrid).

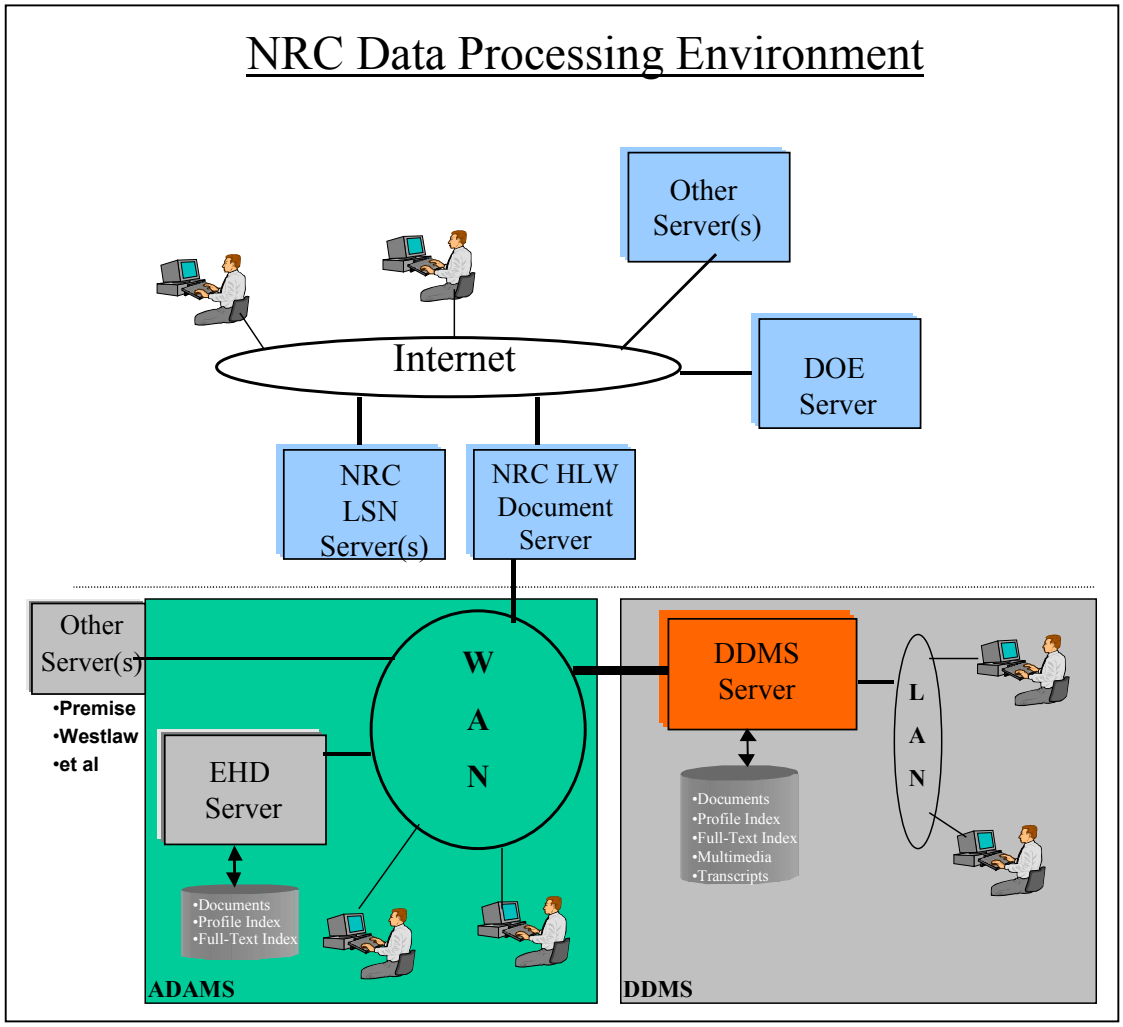
All of these alternatives assume a standard audio/video (A/V) configuration to support the Rockville hearing room, a Las Vegas Area site, and a transportable capability to support hearings at other hearing locations . All technology enhancements considered utilize Commercial-Off-The-Shelf (COTS) products that will be integrated to form a seamless solution.

3.2.1 Anticipated NRC Environment

The DDMS solution, regardless of alternatives considered, must support the functional and system requirements previously stated in section 2. These requirements can be categorized into two primary areas:

- Information Systems (IT) Requirements; and
- Audio/Video (A/V) Requirements.

Descriptions of the general functions required to support the two primary categories of requirements are discussed below. The DDMS, including those components relating to the HLW repository proceeding, can be integrated into the existing NRC information-processing environment as illustrated below. The DDMS is intended to coexist with the current NRC information systems processing environment including those components relating to the HLW repository licensing proceeding. The current environment supports the NRC enterprise via a modern, heterogeneous processing environment, consisting of multiple, diverse servers supporting the three thousand agency users. In addition, the NRC supports public access to official records that are housed on an Internet server, outside of the secure NRC firewall environment.



The objective of the LSN is to support document discovery for the HLW repository proceeding. Implementation plans for the LSN include the use of an Internet Portal that integrates multiple servers from the NRC, DOE, and other parties participating in the hearing process. Documents from the LSN may be filed with SECY and stored on the EHD. The EHD is included within ADAMS, the current electronic document management system used by the NRC that houses documents for all agency adjudicatory proceedings, including the HLW repository proceeding. NRC employees access the EHD via a Wide Area Network (WAN) that is accessible at all agency headquarters and four regional offices. All hearing documents will be stored on the EHD.

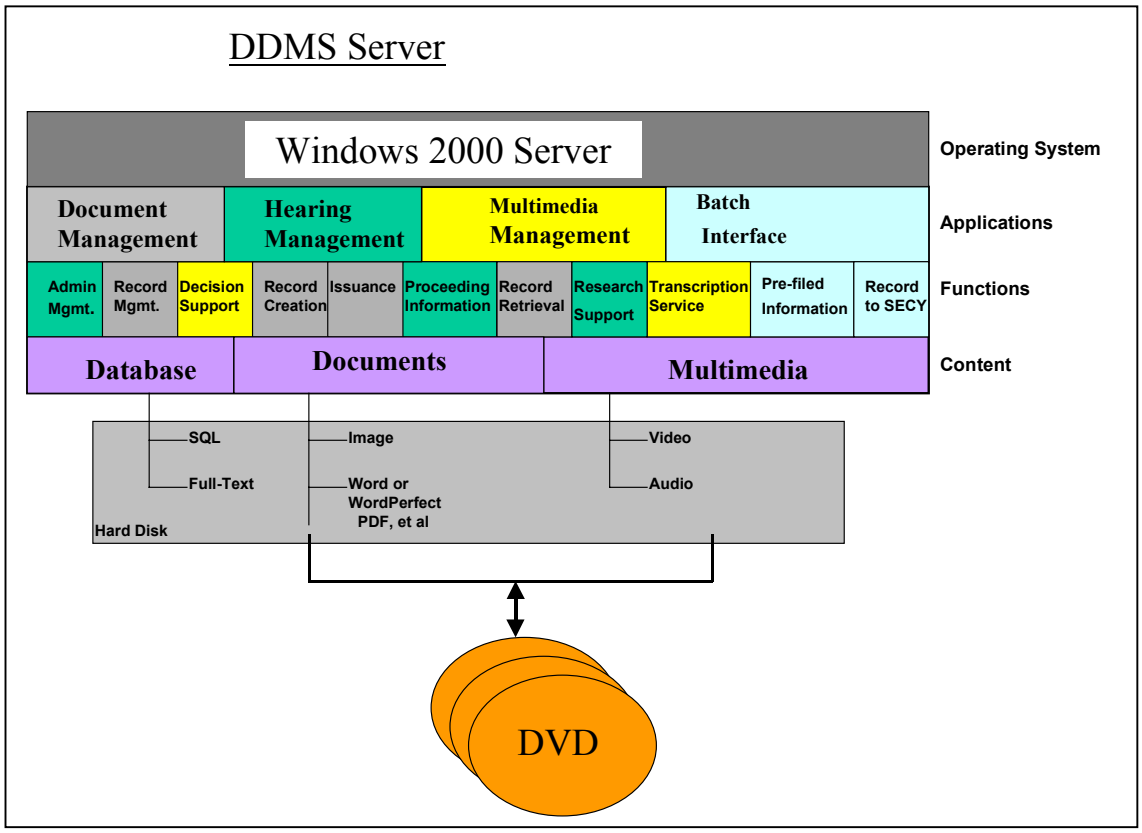
The DDMS will receive documents or pleadings from the EHD. This will require a batch interface between the EHD and the DDMS to facilitate the transfer of information, if a separate DDMS server is used. The DDMS Server would be used to support all of the information processing and management needs for the hearing.

3.2.1.1 DDMS Server

The DDMS Server is the central element or component that supports the information processing functions performed by the DDMS. The Figure below provides a description of the server and the sub-components required to support the DDMS.

As illustrated in the figure that follows, the Microsoft Windows 2000 Server environment is recommended to house the DDMS Server. There are four major applications required to support the functional requirements listed:

- Document Management – supports the capture, storage, management, and retrieval of electronic documents;
- Hearing Management – supports the organization and presentation of hearing case information;
- Multimedia Management – supports the capture, storage, distribution, and management of video and audio information; and
- Batch Interfaces – supports the import and export of electronic information between the DDMS environment and the EHD.

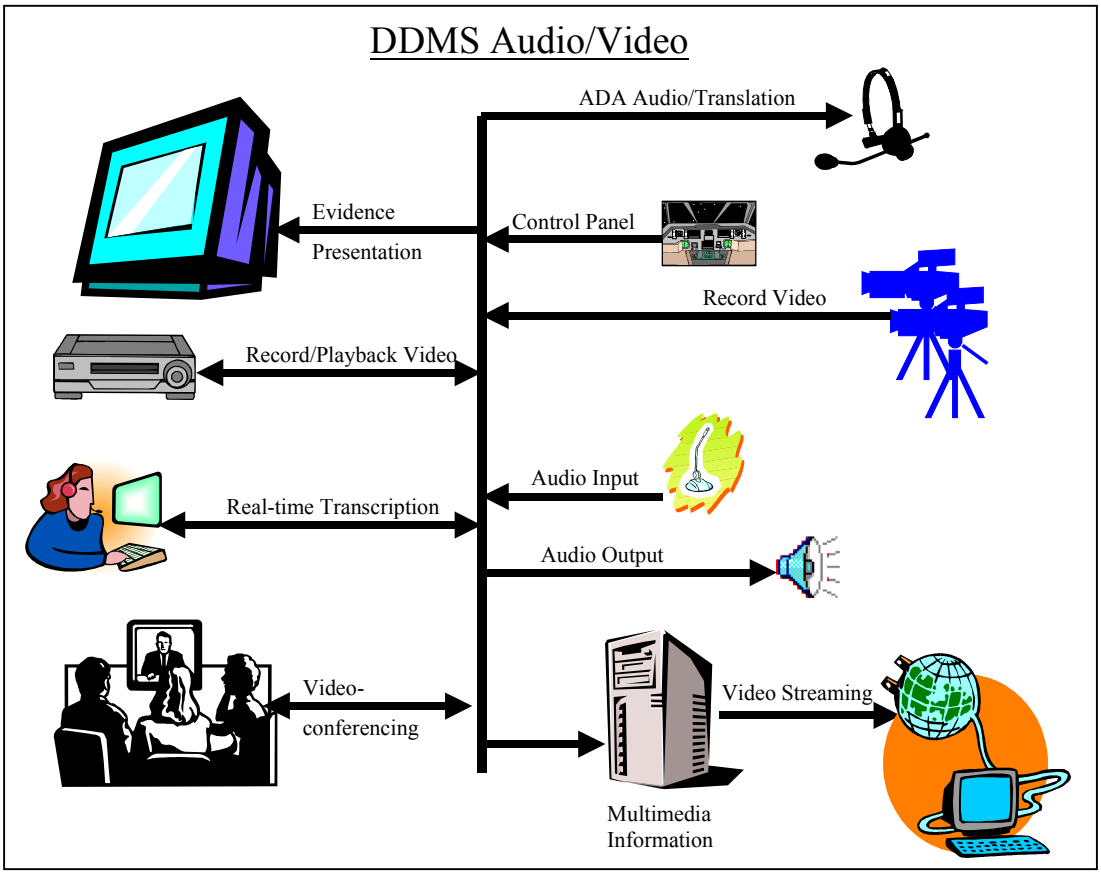


There are two types of Database contents supported, SQL and Full-Text information. The SQL is a relational database format used to host descriptive information related to an electronic or non-electronic object. This is sometimes called the document profile. The Full-Text represents an index of the content of the electronic document stored on the DDMS Server.

Two types of storage media are recommended; hard disk and DVD. Hard disk is recommended for fast, online access while DVD is recommended to support the offline, high volume storage needs of multimedia type contents.

3.2.1.2 DDMS Audio/Video

The major components of the DDMS audio/video system are illustrated in the figure below. The DDMS will be a full evidence presentation system for use by attorneys. This will include a litigator podium with document camera, VCR, printer and annotation capability. Multiple computer inputs for the attorney at the podium as well as inputs at each counsel table and each judge's position will be available.



Each witness and the presenting attorney will have annotation capability with a touch screen LCD panel.

There will be a video/data control/distribution system. This system will include an audio/video router for all cameras and microphones to feed court selectable locations including press/spectator area, counsel conference rooms, far side video conferencing and potential web streaming and a control panel equipped at the judges bench and Clerk of the Court for managing input and output devices. The Video control distribution system will also incorporate a "video follows audio" recording system for recording the court proceedings.

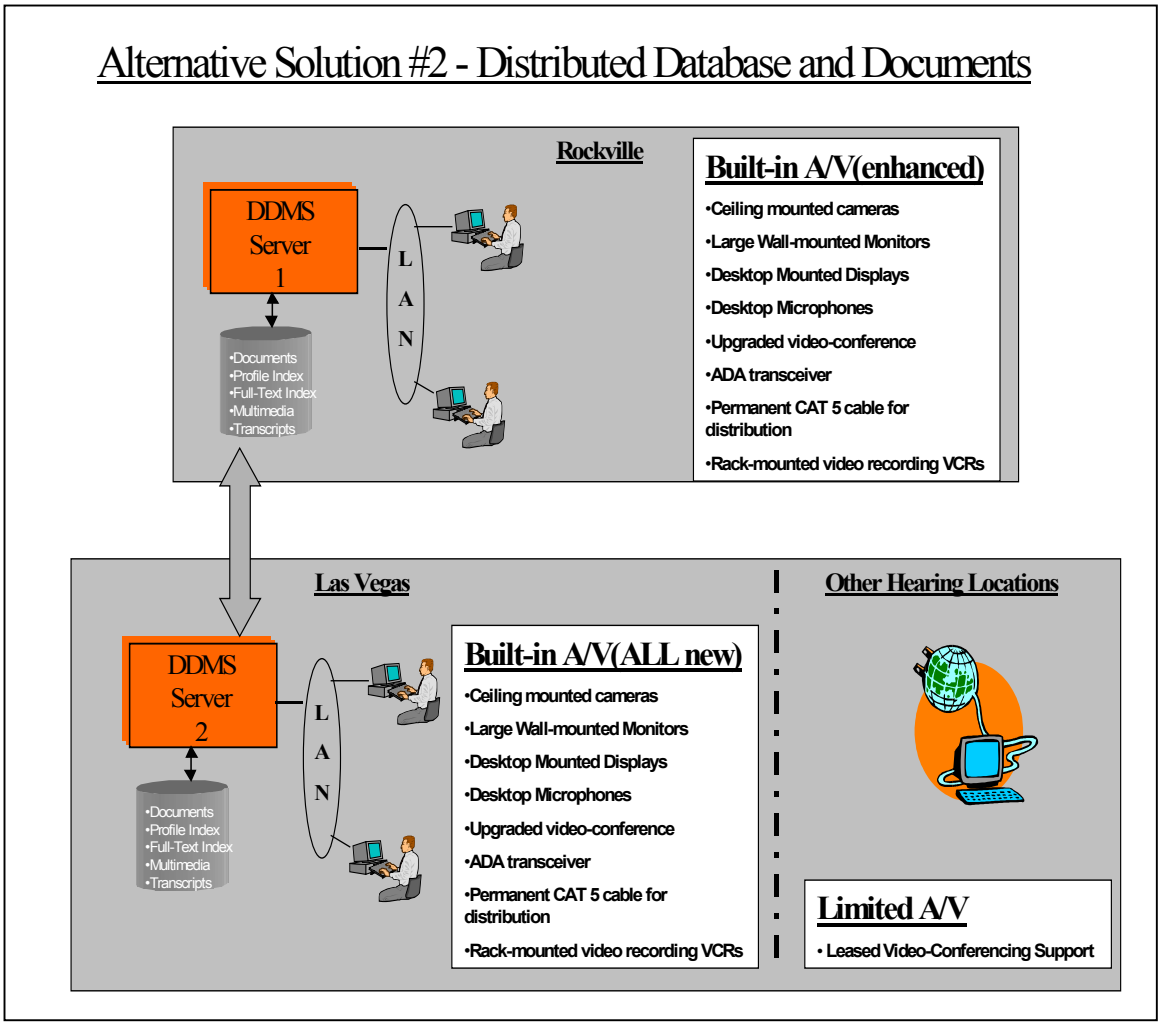
The DDMS will include a real-time distribution network for real-time transcription. Each counsel table and judge location will receive real-time transcript from the Court reporter. The DDMS will contain a video conferencing codec (compression-decompression) and control for initiating video conferencing calls. A camera and a central control processor with LCD panel interfacing at the clerk and judges locations will also be provided. Due to the quantity of electronic components, it is assumed that all routing,
switching, and control equipment will be built into an equipment closet adjacent to the hearing room. Infrastructure will consist of Cat5 cabling integrated into the courtroom under a raised modular floor.

In addition to a large venue projector, the courtroom will be outfitted with video displays at all the appropriate locations (low profile flat panel monitors and Plasma screens where necessary). Each of the conference rooms will be outfitted with video displays (plasma screens), as well as computer inputs to support real-time transcription, if necessary.
The judges will be provided override capabilities to immediately "cut off" any objectionable evidence that is being presented regardless of its originating source.

Control of the entire system will be accessible from a wireless touch-screen panel that will be placed at both the clerk's desk and the judge's bench with both panels having an override capability.

3.2.2 Alternative Solution #2 – Distributed Database and Documents

The Distributed Database and Documents alternative (Distributed) consists of multiple DDMS Servers, one in Rockville and a second configuration at Las Vegas Area, and a transportable, capability to support other hearing locations. The Figure that follows illustrates this alternative.



The Distributed solution is based on a concept of placing the information close to the user to provide improvements in performance and availability of information. This alternative is particularly attractive because it provides an environment that gives hearing officials more local control of the information required to support the hearing. In addition, the close proximity of the information also helps to provide one of the best access time performances that can be architecturally achievable.

This approach requires having more than one copy of the data, i.e. multiple copies of the same information is distributed and stored in close proximity to the user. In the case of DDMS, there are at least two locations that would require access to information; headquarters in Rockville and the hearing location in Las Vegas Area. The duplication of data also requires duplicate servers to host the redundant information. At least two server configurations are required to support the DDMS solution, one for Rockville and another for Las Vegas Area.

The primary challenge for the totally distributed solution is to keep the databases in synch, i.e. maintain a consistent set of records that each local party can rely on. This synchronization is required because data is added to the DDMS Server at each hearing. This new information includes:

- Transcript record
- Newly added testimony
- Judges' Issuances
- Disposition of exhibits or pre-filed information

This synchronization can only be accomplished by having a communication channel between the Servers. This communication channel is also required to support:

- Research support at NRC headquarters
- Access to administration headquarters such as e-mail
- Download newly filed information from the EHD
- Upload new record information to the EHD
- Video-conferencing support

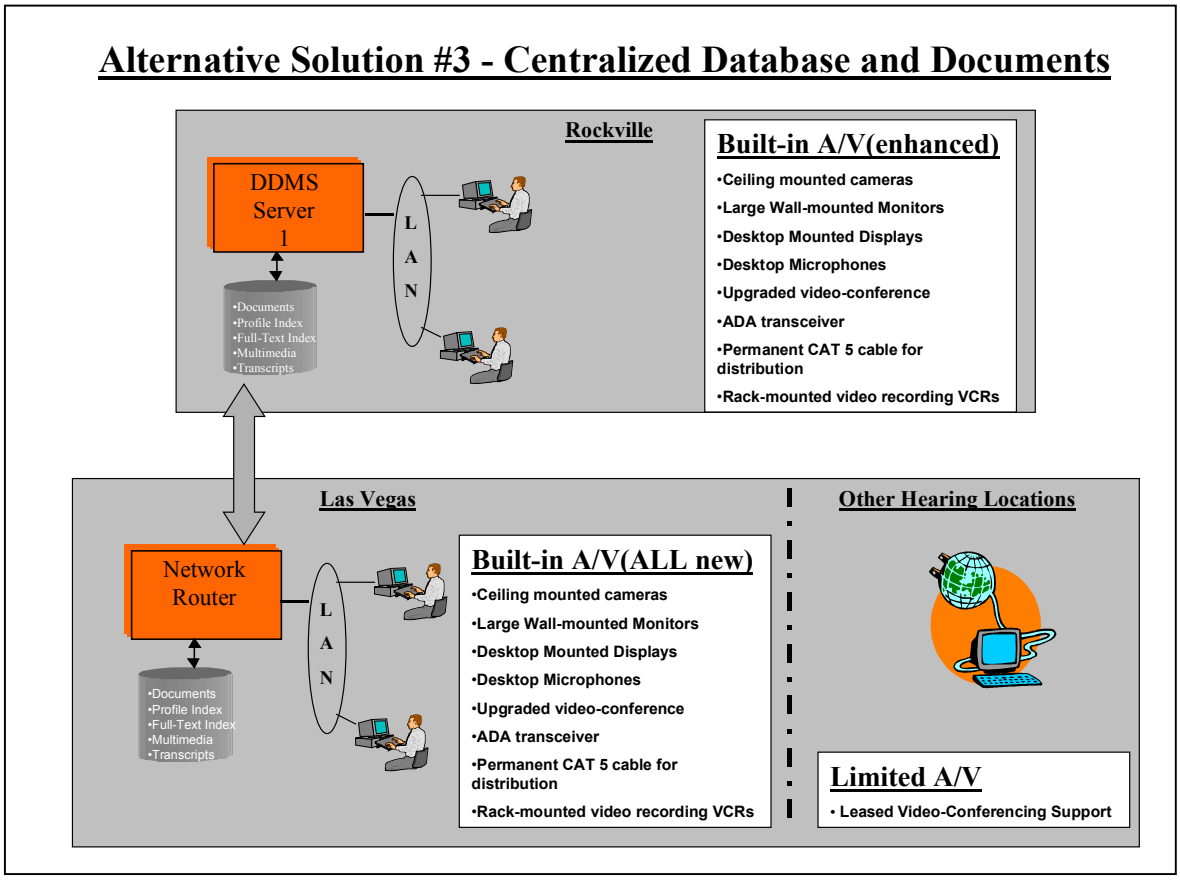
The need to support other applications such as E-mail during the hearing illustrates the need for a dedicated communication channel between locations, independent of the DDMS database synchronization requirement.

Major advantages and disadvantages of the Distributed Alternative are summarized on the following table:

Advantages	Disadvantages
Local control of hearing information	Need to synchronize multiple databases
Fast access to locally stored information.	Duplicate information infrastructure required.
Reduction in the requirement for high-speed remote communication capacity.	Complexity in administration, multiple configuration installation and maintenance.
Increased availability due to dependency on locally managed IT resources.	Requires multiple support personnel to support each server environment.

3.2.3 Alternative Solution #3 – Centralized Database and Documents

This alternative utilizes a single DDMS Server configuration, located in Rockville, that is accessed via a high speed communication channel from other hearing locations, including hearings scheduled to occur in Las Vegas Area. The diagram below provides an illustration of this alternative.



The Centralized Database and Documents solution is based on a philosophy of providing a single server that is shared by remote users via high-speed communication networks. The focus of this design is to simplify the data management complexity, while reducing the administration and related support requirements. In this environment, all hearing users in Rockville and Las Vegas Area can have real-time access to each other's hearing information. No information synchronization is required since all data is stored on a shared resource, partitioned and managed by a single DDMS server configuration. A single server administrator, located in Rockville, can be used to setup, configure, and manage the DDMS server configuration. The additional IT resources locally available at headquarters can also be used as a backup or supplement in the event of failures, etc.

This solution requires high-speed communication links to other hearing locations, especially where large documents need to be transferred to the end-user. This is particularly true of the HLW repository hearing for the following reasons:

- Most of the discovery documents were created by scanning in paper documents, and stored as images. Image documents are approximately ten times larger than their original word processing equivalent.
- Video records are another form of information expected to be used. Video records, even when compressed, can be very large and are usually in the megabyte size range.
- To facilitate the retrieval of hearing information, one solution is to create a digital, searchable video that is synchronized with the hearing transcript. The resulting files created will be in the megabyte size range.

Fortunately, with the acceptance of the Internet as a vehicle for disseminating information, the communications industry has been very busy expanding the pipelines for data distribution. Today, in various locations, the options for using DSL and Cable modem technologies are providing consumers and businesses with economical options for high-speed data channels. This growth is expected to continue, and all predictions are to have more reliable, higher speed channels for each of the upcoming years.

Major advantages and disadvantages of the Centralized Alternative are summarized on the following table:

Advantages	Disadvantages
Simple database and document management.	Higher speed communication channels required to support performance requirements for transmission of large documents.
Single point of control for administration and support.	Single point of failure in the event the system is not available, i.e. both Rockville and Las Vegas Area goes off-line.
Reduction in the requirement for high-speed remote communication capacity.	Dependencies on remote facilities to support availability requirements.

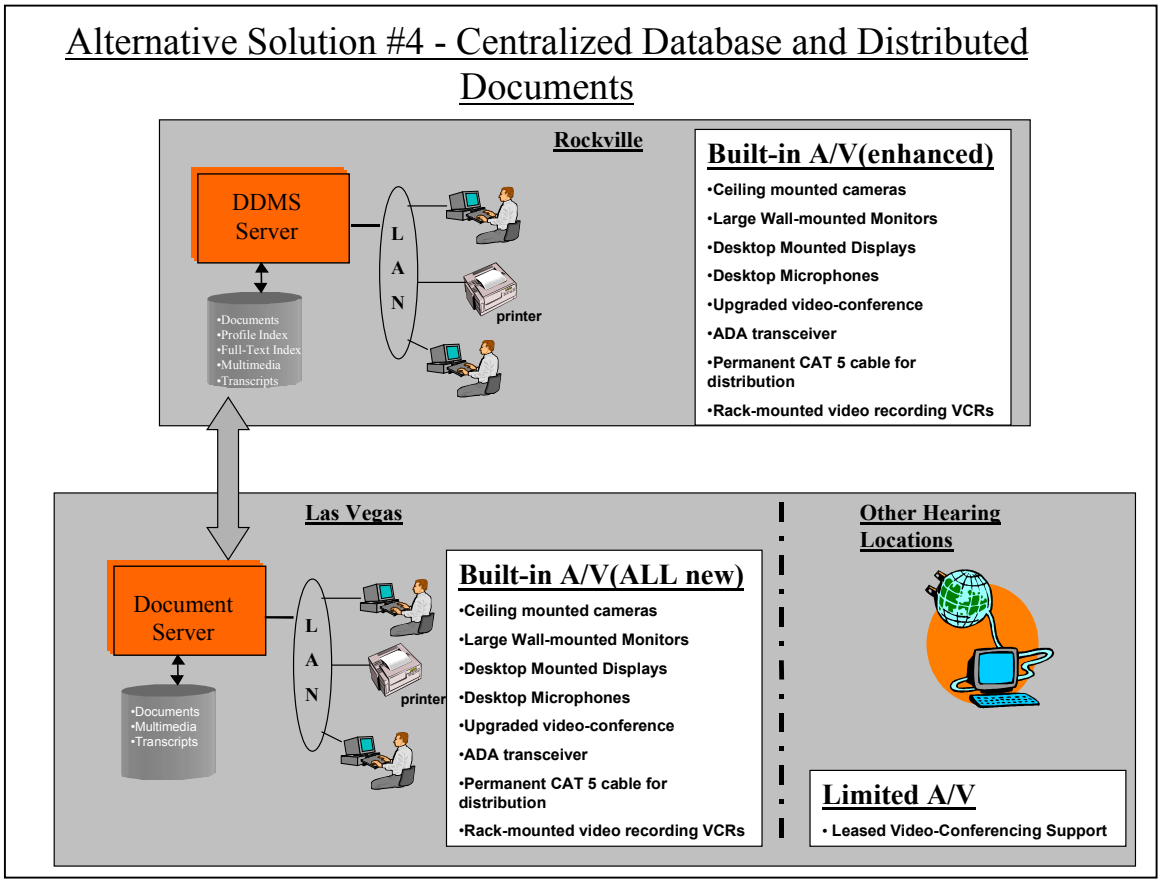
3.2.4 Alternative Solution #4 – Centralized Database and Distributed Documents

This alternative pulls from the strengths of Alternatives 2 and 3 - i.e. forming a hybrid solution built on the best of both worlds. The applicable strengths from the previously discussed alternatives include:

- Alternative 2 – the distribution of documents locally provides improved response times and less dependency on high-speed communications for transmission of large documents.
- Alternative 3 - the centralized management of a database offers the simplicity of design, with ease of management and support.

It includes a centralized database of all hearing information with electronic copies of all documents locally available at the hearing. This will require that documents locally captured will need to be copied and stored at the remote location, i.e. document synchronization is still required with this option. However, this is a much easier problem to solve than database synchronization. Most documents can be copied overnight or at some convenient time to keep the document storage in synch. However, in the event that a document requested is not locally available, it will be copied and stored locally for future retrievals.

An illustration of this alternative is provided below.



Major advantages and disadvantages of the Hybrid Alternative are summarized on the following table:

Advantages	Disadvantages
Simple database and document management.	Single point of failure in the event the system is not available, i.e. both Rockville and Las Vegas Area goes off-line.
No need to synchronize multiple index databases.	Dependencies on remote facilities to support availability requirements.
Single point of control for administration and support.	
Reduction in the requirement for high-speed remote communication capacity.	
Uses the distributed document storage design for performance improvements.	

3.3 ALTERNATIVE EVALUATIONS

This section provides a technical evaluation of each architecture alternative. The criteria employed in this comparative evaluation derive from the requirements presented during Joint Application Development (JAD) sessions.

Evaluation criteria for this report are as follows:

- Ease of Use - the ability of the technical solution to incorporate human engineering or ergonomic methodologies that make the solution more acceptable to users.
- Performance - the ability of the technical solution to deliver required functionality, achieve productivity improvements and provide projected service enhancements.
- Technology Risks - the ability of the technical solution to mitigate the apparent technical risks associated with implementing the alternative. Factors include items such as the install base for the solution, years in operation on the recommended platform, the number of similar customer profiles installed and expected viability of the alternative over a period of time.
- Flexibility/Scalability - the ability of the technical solution to accommodate changes in requirements such as new functions, new reports, new data items, document volume expansion, increases in number of users, etc.
- Implementation Complexity - the relative complexity of the installation and operation of the technical solution including items such as number of components to be implemented, synchronization issues, etc.
- System Availability - the ability of the technical solution to deliver interruption-free processing support, mitigating the impact of system downtime.
- ASLBP Level of Control - the ability of the technical solution to enable direct control of information presentation by the presiding officer or designate.
- Infrastructure Impact - the relative impact of the installation and operation of the technical solution on the infrastructure of the existing and planned hearing facilities.
- Business Resource Impact - the relative impact of the installation and operation of the technical solution on the existing and planned resources necessary to conduct the HLW repository hearings.
- Cost - the relative assessment of the estimated cost to implement the technical solution. All alternatives are rated against each other at the minimum costs to achieve requirements. The apparent least cost alternative will receive the highest rating, while the comparatively more expensive alternatives will receive lower ratings.

Each evaluation criteria is assessed against each technical alternative. Ratings are presented for each of the criteria and range in value from 1 to 3 and a brief description of the more significant factors that contribute to the rating applied. A rating of 1 indicates a high level of value, 2 indicates a medium value, and a 3 indicates low or no value. All criteria are valued equally, thus the lowest total score of the alternatives signifies the alternative of most value to ASLBP.

3.3.1 Status Quo Alternative Evaluation

The Status Quo alternative evaluation criteria ratings and rationale are summarized in the table below:

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
Ease of Use	3	The user interface for data information and audio/video solutions are independent of the alternatives selected. The local and remote users use the same user interface. The only difference is that remote users communicate over a high-speed connection for data information.	The current ADAMS document management solution has a poor usability reputation with NRC employees and outside Cytrix users.
Performance	3	This solution depends on a high-speed connection to support the transmission of all information to remote sites. Remote transmission lines are slower than the local area network used for distribution the large images or multimedia files. Consequently, the performance will be less than in architectures that distributes data information over local networks. Also performance issues have been raised with the current ADAMS implementation.	The local data and audio/video information distribution is expected to be consistent across all architectures. The current ADAMS document management solution is very slow, especially when using the full-text search index to find information.
Technology Risks	1	This alternative is based on a proven technology base.	Small remote hearings that require new broadband technology like DSL add risk.
Flexibility or Scalability	3	The local data information systems in Rockville can be scaled to meet additional users and capacity requirements. The capability to scale is limited to the speed of the remote communication links available. Capacity to add additional fields to the database may be limited.	
Implementation Complexity	1	Low complexity to implement this solution. The single server configuration means that no synchronization of database or documents are required.	

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
System Availability	2	A single server configuration means that if this system is not operational, no electronic information exchange at the hearing can take place.	
Level of Control	3	Lowest level of control for the remote hearings. Rockville hearing, because of the local configurations, is the only site that has optimum level of control.	
Infrastructure Impact	1	Low impact to NRC infrastructure. The communication channels are leased lines that are not permanent impacts on infrastructure.	
Business Resource Impact	1	Low impact to Business resources to support this alternative. Local data management support is required only in Rockville, where the support already exist.	Some additional resources may be required to implement improvements to ADAMS and perhaps to prepare for processing larger amounts of paper for the HLW hearings
Cost	1	This may be the least cost alternative subject to any investments required to upgrade/modify ADAMS.	
Total Score	19		

3.3.2 Distributed Database Evaluation

The Distributed Database alternative evaluation criteria ratings and rationale are summarized in the table below:

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
Ease of Use	1	The user interface for data information and audio/video solutions are independent of the alternatives selected.	The new implementations are assumed to optimally meet the ease of use requirements.
Performance	1	This alternative offers the best performance since the database and data are local to system users. There are no dependencies on high-speed communication, except to support the synchronization of databases. The synchronization is expected to be performed as a batch job, overnight, and not during a live hearing.	The local data and audio/video information distribution is expected to be consistent across all architectures.
Technology Risks	1	This alternative is based on a proven technology base.	
Flexibility or Scalability	1	This alternative provides optimum flexibility and scalability by tailoring solutions to support each site's unique capacity requirements.	
Implementation Complexity	2	The synchronization of databases and data across multiple sites adds complexity to the design and operation of the DDMS.	
System Availability	1	The distribution and hence replication of systems and information provides the highest level of system availability.	A failure at a single hearing will not affect the operations of other hearing since each hearing can independently operate.
Level of Control	1	The Highest level of control can be achieved since all information and infrastructure required to conduct the hearing are locally managed and maintained.	
Infrastructure Impact	3	Highest impact to NRC infrastructure to provide and support a duplicate set of configuration for Las Vegas Area.	

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
Business Resource Impact	3	Highest impact to Business resources to support this alternative. Local and Remote data management support is required.	
Cost	3	Highest relative cost to implement.	
Total Score	17		

3.3.3 Centralized Database Evaluation

The Centralized Database alternative evaluation criteria ratings and rationale are summarized in the table below:

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
Ease of Use	1	The user interface for data information and audio/video solutions are independent of the alternatives selected. The local and remote users use the same user interface. The only difference is that remote users communicate over a high-speed connection for data information.	The new implementations are assumed to meet the ease of use requirements.
Performance	2	This solution depends on a high-speed connection to support the transmission of data information to remote sites. Remote transmission lines are slower than the local area network used for distribution the large images or multimedia files. Consequently, the performance will be less than in architectures that distributes data information over local networks.	The local data and audio/video information distribution is expected to be consistent across all architectures.
Technology Risks	1	This alternative is based on a proven technology base.	Small remote hearings that require new broadband technology like DSL add some risk.
Flexibility or Scalability	2	The local data information systems in Rockville can be scaled to meet additional users and capacity requirements. The capability to scale is limited to the speed of the remote communication links available.	
Implementation Complexity	1	Low complexity to implement this solution. The single DDMS server configuration means that no synchronization of database or documents are required.	
System Availability	2	A single DDMS Server configuration means that if this system is not operational, no hearing can take place. The distributed alternatives mitigate this risk by distributing the risks across multiple configurations.	

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
Level of Control	3	Lowest level of control for the remote hearings. Rockville hearing, because of the local configurations, is the only site that has level of control.	
Infrastructure Impact	1	Low impact to NRC infrastructure. The communication channels are leased lines that are not permanent impacts on infrastructure.	
Business Resource Impact	1	Low impact to Business resources to support this alternative. Local data management support is required only in Rockville, where the support already exist.	
Cost	2		
Total Score	16		

3.3.4 Hybrid Solution Evaluation

The Hybrid Solution alternative evaluation criteria ratings and rationale are summarized in the table below:

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
Ease of Use	1	The user interface for data information and audio/video solutions are independent of the alternatives selected. The local and remote users use the same user interface. The only difference is that remote users communicate over a high-speed connection for searches only.	The new implementations are assumed to meet the ease of use requirements.
Performance	1	This solution depends on a high-speed connection to support the transmission of search request and results to remote sites. The local area network is used for distribution of the large images or multimedia files.	The local data and audio/video information distribution is expected to be consistent across all architectures.
Technology Risks	1	This alternative is based on a proven technology base.	Small remote hearings that require new broadband technology like DSL add some risk.
Flexibility or Scalability	1	The local database information systems can be scaled to meet additional users and capacity requirements. The local Document server can be scaled to support the need for local data management.	
Implementation Complexity	1	Low complexity to implement this solution. The single DDMS database server configuration means that no synchronization of database is required. Document synchronization is a very simple task to implement.	Database synchronization is the most complexity of the 2 synchronization requirements.
System Availability	2	A single DDMS Server database configuration means that if this system is not operational or the high-speed communication lines are down, no hearing can take place.	

Criteria	Rating 1= high; 2=medium; 3=low	Evaluation	Comments
Level of Control	2	Modest level of control for the remote hearings because of the dependency on the centrally managed database	
Infrastructure Impact	2	Low impact to NRC infrastructure. The communication channels are leased lines that are not permanent impacts on infrastructure.	Local Document server required to store locally managed information.
Business Resource Impact	1	Low impact to Business resources to support this alternative. Local data management support is required only in Rockville, where the support already exist.	
Cost	2		
Total Score	14		

3.3.5 Evaluation Comparison Table

The comparative alternative evaluation criteria ratings are summarized in the table below:

Criteria	Status Quo	Distributed Database	Centralized Database	Hybrid Solution
Ease of Use	3	1	1	1
Performance	3	1	2	1
Technology Risks	1	2	1	1
Flexibility or Scalability	3	1	2	1
Implementation Complexity	1	2	1	1
System Availability	2	1	2	2
Level of Control	3	1	3	2
Infrastructure Impact	1	2	1	2
Business Resource Impact	1	3	1	1
Cost	1	3	2	2
Total Scores	19	17	16	14
Average Score per Criteria	1.9	1.7	1.6	1.4

It is apparent that the Hybrid Solution Alternative offers more advantages to the ASLBP for this application. Therefore, it is recommended that the Hybrid Solution, Alternative #4 be implemented as the Full DDMS Solution to support the conduct of adjudicatory hearings, particularly the HLW repository hearing.

4.0 RECOMMENDATION

This section explores the options available to meet the HLW hearing room requirements and presents the Full DDMS Solution for implementing a DDMS in support of ASLBP hearings. This section explores and evaluates the alternative options under consideration. The recommended approach and project implications are presented. A comparative cost benefit analysis is presented. A high level milestone Project Plan is also presented. The HLW Status Quo Solution (based on the Alternative Architecture #1, the Status Quo) is presented for comparison purposes.

4.1 SOLUTION OPTIONS

The recommended architectural approach for the ASLBP DDMS is to implement Alternative Architecture #4, the Hybrid Solution. This recommended architecture will be discussed as the Full DDMS Solution, i.e. a solution that meets all of the DDMS requirements. Within that architecture, a number of options exist as to specifically how the recommended architecture can fulfill the DDMS requirements. Seven capability options are presented. These are:

- Document Management Component;
- Audio-Visual Component;
- Hearing Management Component;
- Multimedia Management Component;
- Communications;
- Data Storage; and
- Web Access

The sections below describe the capabilities and associated cost ranges available for component options.

4.1.1 Document Management Component

The Document Management component is designed to integrate the main elements of the court record including real-time and historic transcript, depositions, electronic evidence, private, and public information sources. The document management component is primarily responsible for supporting the following functional requirements:

- Record Creation
- Record Retrieval
- Record Management
- Issuance

Consequently, all of the functions related to the capture, store, retrieval, and distribution of the record are supported by this component. This component also supports the access control or security policies implemented to ensure the Protective Order File is available to authorized

users only. In addition, this component will manage the variety of electronic information stored on the DDMS server including text (e.g. transcripts), images, and video files.

Document management is a very mature technology that is used by many industries using information technology to manage large volumes of electronic information. These systems are therefore general-purpose information management solutions that can be customized to support multiple industries. Customization flexibility is usually achieved using an SQL relational database that can be used to define a variety of related information. Below are some of the leading suppliers of this technology, including the ADAMS vendor Filenet, that represent the spectrum of possible solutions that could be implemented. This list is not exhaustive, and could change as the implementation timeframe draws closer.

4.1.1.1 Filenet's Panagon

Panagon is Filenet's document management solution for small and large enterprise customers. This product is the foundation on which the ADAMS implementation at the NRC is built. It is possible that Panagon can be tailored or customized to meet the document management requirements for the DDMS, i.e. a different implementation than ADAMS solution using the same base product. In addition, the NRC is planning to upgrade the existing Panagon solution to take advantage of the new web-based client.

Some concerns are associated with using this Electronic Document Management System (EDMS) include:

- Takes advantage of the existing support infrastructure and skills at the NRC.
- Resources used to support ADAMS will not have the capacity to support another implementation of Panagon, especially at a remote location in Las Vegas Area.
- Easier EHD integration between a common product set.
- Planned performance and user interface improvements to overcome ADAMS poor performance concerns have not been demonstrated.
- Reduced life cycle costs with a common product set.
- Reduction in Profiling fields, as a means of improving Panagon's performance, could make Panagon incompatible with the DDMS requirements.

4.1.1.2 OpenText's LiveLink

LiveLink was one of the first document management solutions built from the ground up based on using the Internet Web application paradigm. This web-centric solution has been adopted by other document management vendors, and has become the new standard for EDMS. The primary reason for its adoption is that the cost for implementing and maintaining web-based clients is much cheaper than the traditional fat client solutions. The Windows operating system has a web browser already installed, and so the client install usually involves pointing to a URL that contains the server address.

The major concern with using this EDMS is that a more difficult integration with EHD is expected due to disparate EDM solutions attempting to communicate.

4.1.1.3 HummingBird's DocsOpen

DocsOpen is the EDMS solution used to implement the SECY Tracking and Reporting System (STARS) application used by SECY to manage commission documents like Correspondence and Memos. DocsOpen also provides a web-centric client that allows web-based users to search and find information stored in the server.

The major concern with using this EDMS is that a more difficult integration with EHD is expected due to disparate EDM solutions attempting to communicate.

4.1.1.4 IBM's Domino.Doc

This EDMS solution evolved from the Lotus Notes product that became a part of the IBM product set after the Lotus acquisition. This is the latest entry into the EDMS world, and represents the least mature EDMS product presented. Another distinction of this solution is that it is not based on a SQL relational database like the others, but is based on a proprietary tree-based database structure.

The major concern with using this EDMS is that a more difficult integration with EHD is expected due to disparate EDM solutions attempting to communicate.

4.1.1.5 Summary Table for the Document Management Component

Criteria	Panagon	LiveLink	DocsOpen	Domino.Doc	Prerequisite
Meet Functional Requirements	Yes	Yes	Yes	Yes	
Web Based Solution	Yes	Yes	Yes	Yes	
Ease of Integration with [1]existing infrastructure	1	2	2	3	
Support architectural configuration	Yes	Yes	Yes	Yes	
Solution Experience	1	2	1	3	

The estimated costs for implementing the Document Management component are provided below in the following tables. The 'common cost element' table refers to the cost categories that are common across all product solutions and required to support the implementation, regardless of the specific solution selected.

The "options" table documents cost estimates to implement the application software options presented.

[1] 1= High, 2=Medium, 3=Low/No benefit/advantage

Common Cost Elements		Cost	Total Costs	Comments
System[2]	**Servers**	■■■■■■■■	■■■■■■■■	**Fully redundant clustered systems at Rockville and Las Vegas Area.**
	Laptop Server	■■■■■■■■		**Portable Laptop based system.**
	Workstations	■■■■■■■■		**Hearing/Conference room workstations**
	Laptops	■■■■■■■■		**Judges portable workstations**
	Printer	■■■■■■■■		
	Scanner	■■■■■■■■		**Workstation included**

Options		Cost	Total Costs	Comments
Panagon	**Clients**	■■■■■■■	■■■■■■■■	**Panagon 5.1 Web solution, Excalibur web client.**
	Server	■■■■■■■		
	Implementation[3]	■■■■■■■		
	Integration	■■■■■■■		
LiveLink	Clients	■■■■	■■■■■■■	Web based solution
	Server	■■■■■■■		
	Implementation	■■■■■■■		
	Integration	■■■■■■■		
DocsOpen	Clients	■■■■■	■■■■■■■	DocsFusion Server with CyberDocs.
	Server	■■■■■■■		
	Implementation	■■■■■■■		
	Integration	■■■■■■■		
Domino.Doc	Clients	■■■■■■■	■■■■■■■	
	Server	■■■■■■■		
	Implementation	■■■■■■■		
	Integration	■■■■■■■		

Note that the highlighted, **bolded** rows in both of the tables reflect the options used in costing the DDMS solution.

[2] **System** includes Hardware and System Software components.
[3] Implementation includes Design, Installation, Customization, and Product Integration.

4.1.2 Audio-Visual Component

The audio-video (AV) component is responsible for supporting the following functional requirements:

- Evidence Presentation
- Decision Support
- Other Proceeding Information

4.1.2.1 AV Industry

As various mediums (PC's, TV, Video, Telephone, Cinema, Internet, Records, Game Consoles, E-books) move toward being digitally based, it becomes easy for them to share research and development (R&D) advances. Advances in one industry can be used to improve products in a related industry. These improvements allow for further convergence of multiple industries that in turn accelerate product improvements. For example, ten years ago, advances in the quality of CD technology could be shared across the recording industry and the PC industry, but not in the video industry. A CD simply did not have enough storage to hold a full-length movie. But today, advances in Digital Video Disks technology (DVD) are applied to products in the recording industry (DVD Audio), in the PC industry (DVD and recordable DVD-R) and in the video industry (DVD video). The ability to share R&D efforts greatly accelerates quality improvements, performance enhancements, and even decreases the costs to benefit from the improved technologies.

The high level budget planning numbers provided today will buy a lot higher quality product two years from now than they will today. Due to the rapidly evolving nature of this business, a chart of basic AV capabilities along with estimated costs is provided for budget planning purposes. Please note that some emerging technology enhancements will likely result in significant capability improvements while remaining within the budget estimates provided.

4.1.2.2 AV Overview

The AV component can be viewed as a single system consisting of a large variety of elements from different product categories. Firms like DOAR, Dolman, Jefferson Audio Video Systems, and Court Vision Communications specialize in blending specific product choices from the various technologies into single, well-integrated systems optimized for the courtroom environment. For each product category there is a wide range of capabilities and prices. As an example, video cameras can range in price and quality from ■■■■■■ to ■■■■■■■■. The material provided below provides the range of capabilities and prices for major elements of an audio-visual system. While each of these product areas has been looked at separately, it is likely that an integrated system will be procured from one of the firms that specialize in AV systems optimized for the courtroom environment. While each supplier of integrated courtroom AV systems will have some latitude to use new technologies or products, they will also have some constraints. As an example, it may be easy to substitute a DLP™ (Digital Light Processing™) based projector for a LCD (Liquid Crystal Display) projector, it would be virtually impossible for them to use new HDTV (High Definition Television) cameras. Use of the new

DLP™ products has almost no cost or integration implications while use of HDTV would significantly impact the cost and require the use of higher end components throughout the rest of the system. The disadvantage to in integrated system is that the individual parts may not offer the best technology available in the industry.

On the other hand, purchasing discrete or individual parts can guarantee that the best technology is chosen for each technology area. The disadvantage to this option is that the integration of specialized solutions (one of a kind) product suites is generally more expensive and complex to integrate.

The following sections will discuss the technology options available to satisfy each of the major parts of the AV system. The major parts are:

- Videoconferencing
- Real-time Transcription
- Video Capture/Record/Playback
- Evidence and Argument Presentation
- Audio Translation
- Audio Support
- Audio/Video System Control

4.1.2.3 Videoconferencing

The videoconference capability allows other locations to participate in the proceedings, along with the sharing of any video, audio or data sources, via ISDN, T1 or fiber optic connections in the courtroom. This allows judges and/or others to participate fully from different locations.

Videoconferencing firms continue to improve their products in order to provide more intuitive, content-rich remote communication, on PC-based integrated collaboration systems. Latest advances depend upon the increased availability of increases in telecommunications bandwidth to deliver IP-based, interactive communication solutions. See appendix 1 for more details regarding issues in the videoconferencing field today. It may be premature to consider using a teleconferencing system that is based on using IP transmission media.

Several years ago when the NRC purchased its PictureTel Venue 2000 teleconferencing system, it was state-of-the-art. The PictureTel 900 Teleconferencing system is today's state-of-the-art videoconferencing solution. It can be purchased at about the same cost as the Venue. While the same price as the older version, the new PictureTel 900 offers significant improvements over the older Venue system. The Venue did a good job of integrating video and the telephone. The PictureTel 900 has integrated video, telephone, and PC technologies and significantly upgraded the sound and video qualities.

The new PictureTel 900 offers true sustained 30 frames-per-second video quality. The PictureTel 900 also offers 14-Khz audio (regular telephone service is 3.5-Khz). The PictureTel 900 offers two new features called Sure Connect and Network Optimizer. Sure Connect allows a connection virtually every time and the Network Optimizer allows the PictureTel 900 system to

adapt to limitation presented by the network connection. Whenever a bandwidth degrades, the Network Optimizer down speeds rather than completely dropping its connection. The PictureTel 900 Web Remote allows administrators to control the systems and all conference activities through a standard browser interface. The People and Content feature allows the PictureTel 900 to use a higher frame rate and lower resolution for people and to use a lower frame rate but higher resolution for Content. In addition the PictureTel 900 allows each user to have both its people content and its presentation content to be displayed on monitors that are optimal for the type of content being displayed on them.

The following table offers a comparison of three systems available on the market today.

Option	Advantages	Disadvantages	Prerequisite
PictureTel Venue • H.320/H.323 Max data rate 768Kbps/768Kbps • PictureTel Remote	Existing videoconference system.	Not very capable compared to systems shipping today	
PictureTel 900 Series • **H.320/H.323 Max data rate 2Mbps/2Mbps** • **Down speed support** • **Embedded Web presentation support** • **Graphics Capture** • **People and Content dual streams** • **Error resiliency software** • **PictureTel Remote**	• **Compatible with current system** • **Supports automatic down speeding as opposed to dropping connection** • **Supports Web presentations** • **Supports graphics capture** • **Smart enough to split bandwidth in order to optimize use of bandwidth on still images and motion.** • **Allows remote control**	**Cost**	
Polycom ViewStation FX • H.320/H.323 Max data rate 2Mbps • Embedded Web based presentation support • Graphics capture support • Remote management support	• Has high speed • Supports embedded web presentations. • Supports graphics support	• Expensive • Not compatible with existing system	

The cost for the systems compared are presented in the following table. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Unit Cost	Total Costs	Comments
PictureTel Venue	■■■■■■■	■■■■■■■	1 additional unit for Las Vegas Area
PictureTel 900 Series	■■■■■■■	■■■■■■■	**Rockville upgrade + new system for Las Vegas Area.**
Polycon ViewStation FX	■■■■■■■	■■■■■■■	

4.1.2.4 Real-time Transcription

Real-time transcription is necessary to support closed captioning to accommodate the hearing-impaired, and meet the ADA requirements. In addition, this feature is also necessary to support the synchronization of transcripts with video information. There are basically two options to enable real-time transcription support during the hearing:

- On-site Transcription Support
- Remote Transcription Support

On-site Transcription Support Option

Enabling the hearing room so that it supports a Court Reporter supplying real-time transcription services adds virtually no costs because the Court Reporter will supply all the needed equipment. There are some minor additional costs (less than ■■■■■■) needed for the purposes of adding the necessary network connections.

Remote Transcription Support Option

Enabling the hearing room so that it supports a Court Reporter in a remote location requires the following:

- Good quality audio output
- Phone line to support the delivery of the audio to the reporter (800 number)
- Phone line to support the transmission of the transcribed text (800 number)
- Encoder to insert the transcribed text into a format suitable for display on a TV screen

The benefits and costs of these options are discussed in Section 4.1.4.1.

4.1.2.5 Video Capture/Record/Playback

This category includes the cameras and VCRs required to support the DDMS.

Cameras

Video cameras are necessary to capture and broadcast the proceedings to the public hearing participants. Although digital cameras are the current state of the art, there is a multitude of options to consider when purchasing this technology. Video cameras can range in price and quality from ■■■■■■■■■■■■■■■■■■, reflecting the many features that are available to the consumer. In addition, the lightning can make a difference on the quality of the recording and presentation.

A voice activated camera switching system that functions similarly to the one installed in the Rockville hearing room is required for each facility. The DDMS will require two types of cameras:

1. Fixed Cameras
2. Pan Tile Zoom Cameras.

Fixed cameras will be aimed at the three judge positions, the parties' table, the intervenors' tables, and witness positions. The judges will each have their own camera shot, and the other positions will have either one or two people per camera shot. When someone talks, the system will instantly select the corresponding camera. The selected camera image along with audio from all microphones and other sources will then be recorded and/or distributed as needed.

The two pan-tilt-zoom cameras will be strategically mounted for wide-angle coverage of the well of the well area. The table below provides a list of fixed image cameras available. The table also highlights some of the features, advantages, and disadvantages of each camera.

Fixed Image Cameras			
Option	**Advantages**	**Disadvantages**	**Prerequisite**
Panasonic WV-CP234 • 1/3" color chip camera • with 480 lines of resolution • 2.0 lux.	Low price	Lowest quality	
Sony UNIPM324 • Indoor Camera/Lens/Housing • Utilizes Sony's SPT-M324 B/W High Resolution Exwave HAD camera • Provides excellent picture quality in low light situations	Mid range price	Black and white	

Fixed Image Cameras			
Option	**Advantages**	**Disadvantages**	**Prerequisite**
Panasonic WV-CP464 • **Color camera** • **1/3 type double speed CCD** • **dynamic range 64 times that of standard CCD cameras** • **Uses F1.4 lens for low** • **operates with only 0.81x (0.08 fc) of available light** • **offers digital enhancement to boost sensitivity up to 32 times**	• **Highest Quality** • **Operates in low light conditions** • **Color**	**Twice the cost of WV-CP234**	
Sony UNIPC334 • Indoor Camera/Lens/Housing • Utilizes Sony's SSC-DC334 Color High Resolution Exwave HAD camera to provide excellent picture quality in low light situations.	Highest Quality	Highest Price	

The cost for the systems compared are presented in the following table. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Unit Cost	Qty	Total Costs	Comments
Panasonic WV-CP234	■■■■	■■	■■■■■	
Sony UNIPM324	■■■■	■■	■■■■■	
Panasonic WV-CP464	■■■■	■■	■■■■■	
Sony UNIPC334	■■■■	■■	■■■■■■	

In the above table we have chosen the Panasonic WV-CP464 because it is the highest quality device at a mid range price.

Pan Tilt Zoom Cameras

The table below provides a list of pan tilt zoom cameras available. The table also highlights some of the features, advantages, and disadvantages of each camera.

Option	Advantages	Disadvantages	Prerequisite
Sony EVID30 • Color NTSC PTZ(Pan –Tilt-Zoom) Camera • High speed wide range pan tilt head	• Best features for the price • Integrated 12X high speed auto focus zoom lens • Auto tracking and motion detection.	Only has a 12X zoom	

The cost for the systems compared are presented in the following table. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Cost	Qty	Total Costs	Comments
Sony EVID30	■■■■■■	■	■■■■■■	
Panasonic WV-CS554	■■■■■■	■	■■■■■■	

In the above chart we have chosen the Sony EVID30 because it was the lowest price while having sufficient capability.

Video Cassette Recorder (VCR)

VCRs are required to capture the video images recorded by the various video cameras operating throughout the hearing room. Several VCRs are required to operate simultaneously during a hearing.

VCRs must record VHS format tapes and be able to signal the designated operator when the tape is about to become full during a recording session.

Two options exists in this technology area:

- Analog Recording
- Digital Recording

The current VCRs used at the NRC are analog recording devices. This technology is still being used in the industry as an effective way for recording video. Analog is still effective in archiving and playback of video information, except when a large volume of information needs to be managed. The disadvantage in this technology is that the storage and management of video requires a conversion from analog to digital. This conversion of analog video to digital usually also involves the use of a compression algorithm which greatly reduces the amount of storage needed but also lowers the fidelity and resolution of the video.

Digital Recording allows the video record of a courtroom to be saved to a computer file format rather than stored on videotape. This allows a user instant access to a any moment of a trial. Since the file is just computer data, all existing networks and storage techniques can be used to house the information. Any authorized computer user on the network can access this information.

The digital recording technology is slowly replacing analog recordings. This is particularly true where distribution of video, example Internet video streaming, is required. Digital recording also supports the concept of indexing video to support a convenient way of retrieving the information from a large database of recordings.

Option	Advantages	Disadvantages	Prerequisite
Digital video recording	• Any moment of a hearing can be retrieved on a real time basis without needing to find the correct tape. • Cost of digitization is required before you can provide remote web access.	• Requires a lot of disk storage. • Costly	• DVD jukebox • MPEG compression device.
Analog recording to VHS tape	• This is a familiar process that uses a proven technology. • Low cost.	• You need to mount the correct tape and wait for the tape to fast forward to the correct spot before playback can start. • You need to digitize the tapes if you want to enable remote web access.	

This study recommends utilizing both technologies:

- Analog to perform initial capture and archival of the proceeding, and
- Digital to support the management, distribution, and searching of video information.

The cost of the analog VCR recordings for Las Vegas Area is estimated to be ■■■■■■■. This assumes 12 VCRs allocated to 10 litigants, one to Hearing, and one for playback support.

The digital recording costs are included in section 4.1.6 titled “Data Storage”.

4.1.2.6 Evidence and Argument Presentation

This section covers the multiple components required to present evidence and argument in the hearing room. These components include:

- Displays/Monitors
- Projectors/Screens
- Digital Presentation Devices
- Video Markers

These devices are needed to support the functional requirements of the various users of the DDMS system. For example, the large high-resolution wall mounted screens are used for the gallery or for public viewing outside the hearing room. The following sections discuss these components, and provide the benefits and costs for using the various options in each category.

4.1.2.6.1 Displays/Monitors

Two types of monitors will be discussed in this section:

- Large Wall Mounted Displays
- Desktop Displays/Monitors

Large Wall Mount Displays (Gas Plasma)

Large Gas Plasma Display Monitors are specified for use in the gallery or outside the courtroom the following chart provides basic characteristics of some of the gas plasma screens available today. The following table provides some of the benefits of using various product options currently available in the marketplace. The highlighted row reflects the recommend product used in costing the solution.

Option	Advantages	Disadvantages	Prerequisite
NEC PlasmaSync 3300 • 33" diagonal screen size • Display formats: VGA, SVGA, NTSC, PAL and SECAM • 4:3 aspect ratio • 640X480 resolution	• Lowest cost	• Lowest quality • Smallest screen size • Lowest resolution	
Sony PFM-500A2WU • **42" diagonal screen size** • **Display formats: VGA, SVGA, XGA, HDTV 480p, 1080i, 720p** • **16:9 aspect ratio** • **852X480 resolution**	• **Moderate cost** • **Excellent quality**	• **Fairly expensive**	

Option	Advantages	Disadvantages	Prerequisite
NEC PlasmaSync 5000W • 50" diagonal screen size • Display formats: VGA, SVGA, NTSC, PAL SECUM • 16:9 aspect ration • 1365X768 resolution	• Very high quality • Largest screen size	• Very High Cost	

The cost for the systems compared are presented in the following table. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Cost	Qty	Total Costs	Comments
NEC PlasmaSync 3300	■■■■■■	■	■■■■■■■	
Sony PFM-500A2WU	■■■■■■	■	■■■■■■■	
NEC PlasmaSync 5000W	■■■■■■	■	■■■■■■■	

Desktop Displays/Monitors

Electronic evidence or exhibits need to be presented to judges, litigants, clerks, witnesses, and the audience. This will require a variety of technologies to support the unique requirements for each participant. The current state of the art is to use flat panel screens to support the individual users, in contrast to the very deep PC type displays that most computer users are currently using. Flat panel displays offer some significant benefits such as:

- Less space required
- Low power consumption
- Adaptable for integration into furniture
- Easier to see the corner of the screens

The participants in the hearing room that need individual access to a computer screen or will need to view AV presentations will each be provided a flat panel displays on the table in front of them.

Option	Advantages	Disadvantages	Prerequisite
Regular CRT Monitors	Low Cost	These were not considered because they occupy two much desk space to be practical.	
ViewSonic VG150 • 15" viewable • 1024X768 resolution • Dimensions 15.3"W X 14,6" H X 5.4" D	Lowest Cost	Lower Resolution	
NEC LCD 1500M • 15" viewable • 1024X768 resolution • Dimensions 15.2"W X15.4" H X7.9" D	Low Cost	Lower Resolution	

Option	Advantages	Disadvantages	Prerequisite
SONY CPD-M151 • 15" viewable • 1024X768 resolution • Dimensions 15.5"W X14.1"H X6.8"D	Low Cost	Lower Resolution	
NEC LCD 1525S • **15" viewable** • **1280X1024 resolution** • **Dimensions 15.6"W X15.2"H X 6.2"D**	**Relatively low cost** **High Resolution**	**Large Size**	
NEC LCD LCD 1800 • 18.1" viewable • 1280X1024 resolution • Dimensions 18.1"W X15.6"H X8.7"D	High Resolution	Cost Large Size	
ViewSonic VG180 • 18.1" viewable • 1280X1024 resolution • Dimensions 17.1"W X 17.4" H X 3.6" D	High Resolution	Cost Large Size	

The total costs below include monitors that are needed at both Rockville and Los Vegas for those seats that do not have a workstation. If the seat has been supplied a workstation than the cost of the flat panel display has been included with the cost of the workstation. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Unit Cost	Qty	Total Costs	Comments
ViewSonic VG150	■■■■■	■■	■■■■■■	
NEC LCD 1500M	■■■■■	■■	■■■■■■	
SONY CPD-M151	■■■■■	■■	■■■■■■	
NEC LCD 1525S	■■■■■	■■	■■■■■■	
NEC LCD LCD 1800	■■■■■	■■	■■■■■■	
ViewSonic VG180	■■■■■	■■	■■■■■■	

4.1.2.6.2 Projectors/Screens

The projectors and screens are discussed in the following sections.

Projectors

LCD projectors are the current state of the art, but are rapidly being replaced by the DLP technology described in Appendix 1. DLP provides a capability for improved quality and consequently sharper images for use on screens or large monitors shared by multiple hearing participants. Table below provides some of the features, advantages and disadvantages of using various projectors available today.

Option	Advantages	Disadvantages	Prerequisite
Plus U2-1130 • 1,300 Lumens • XGA resolution • DLP	Low Cost Slim Size	Not very bright	
Proxima DP9280 • 3,000 Lumens • XGA resolution • Standard or cat-5 cabling	3,000 Lumens High Quality Projector		
Epson Powelite 8100I • **3200 Lumens** • **XGA resolution** • **PolySi LCD**	**3200 Lumen** **Good Quality at reasonable price.**		
Proxima DP9400+ • 3000 Lumens • SXGA 1280X1024 • Poly Si LCD	Designed for large venues High Resolution Very Bright	Very Costly	
Clarity Lion SXGA Display • 67" SXGA (1280X1024) LCD rear-projection display	Screen and projector all in one unit. Can be viewed from low angle.	Does not mount flat against the wall. Include ventilation space front screen will be 39" from wall. Very Costly	
Barco Elm G10 • 10,000 Lumens • SXGA • DLP	Extremely high quality	Very Costly	

The cost for the projectors discussed above, are presented in the following table. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Cost	Qty	Total Costs	Comments
Plus U2-1130	■■■■■■■	■	■■■■■■■	
Proxima DP9280	■■■■■■■	■	■■■■■■■	
Epson Powelite 8100I	■■■■■■■	■	■■■■■■■	
Proxima DP9400+	■■■■■■■	■	■■■■■■■	
Clarity Lion SXGA Display	■■■■■■■	■	■■■■■■■	
Barco Elm G10	■■■■■■■	■	■■■■■■■	

Screens

Due to their ultra small glass bead coating which does a superb job of reflecting light, Da Lite screens are considered the best choice on the market today. The table below discusses the features, advantages, and disadvantages of screens available in the marketplace today.

Option	Advantages	Disadvantages	Prerequisite
Da Lite Elecrol ceiling recessed motorized screen matte white glass bead screen. 6' X 8'	• Low cost • Best reflectivity on the market due to exclusive glass bead screen	Smallest Size	Projector
Da Lite Elecrol ceiling recessed motorized screen matte white glass bead screen. 8'X 10'	• **Relatively low cost** • **Best reflectivity on the market due to exclusive glass bead screen**		**Projector**
Da Lite Elecrol ceiling recessed motorized screen matte white glass bead screen. 12' X 12'	• Best reflectivity on the market due to exclusive glass bead screen	• Highest Cost • Too Large	Projector

The table below provides the cost for the screens described in the previous table. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Cost	Qty	Total Costs	Comments
Da Lite Elecrol ceiling recessed motorized screen matte white glass bead screen. 6' X 8'	■■■■■■	■	■■■■■■	
Da Lite Elecrol ceiling recessed motorized screen matte white glass bead screen. 8'X 10'	■■■■■■	■	■■■■■■	
Da Lite Elecrol ceiling recessed motorized screen matte white glass bead screen. 12' X 12'	■■■■■■	■	■■■■■■	

4.1.2.6.3 Digital Presentation Device (DPD)

The ELMO is an example of a DPD. DPDs are used to present paper or physical exhibits not yet in an electronic format. The options in this arena are mostly focused on the resolution of the camera used in the DPD, and the additional features used remotely to manipulate the DPD. The table below presents some of the DPDs available in the marketplace today.

Option	Advantages	Disadvantages	Prerequisite
Sony VID-P110 • Excellent image reproduction • High speed auto focus • Auto Iris Control • Auto White Balance	Low price		Projector Screen

Option	Advantages	Disadvantages	Prerequisite
ELMO EV-550 • Input image data to and from a computer • Instantly make finely typed print large • Detailed adjustments can be controlled by remote control	10X Zoom	Remote control fairly busy.	Projector Screen
Panasonic WE-MV-180A • **Includes LCD monitor for checking displayed image.** • **Auto focus** • **Free Angle camera head**	**Ability to do a preview on the LCD.** **High Resolution**		**Projector Screen**
Canon DZ-3600U • High Resolution 1900X1424 • 8 pt. Type legible at full 8.5"X11" display • USB connection	High resolution Captures complete 8.5"X11"	High Price	Projector Screen

The table below presents the cost for the DPDs. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Unit Cost	Qty	Total Costs	Comments
Sony VID-P110	■■■■■■	■	■■■■■■	
ELMO EV-550	■■■■■■	■	■■■■■■	
Panasonic WE-MV-180A	■■■■■■	■	■■■■■■	
Canon DZ-3600U	■■■■■■	■	■■■■■■	

4.1.2.6.4 Video Markers

Video markers allow presenters to draw or point on video images as easily as you would use a pen. Connected between a video source and monitor, the video marker is used to circle or underscore specific features as well as to write or type notes on top of the video image. Systems allow the presenter or witness to use keyboards, light pens, digitizing tablets, or touch screens in order to mark up the video presentation. Boeckler Instrument's Pointmaker appears to one of the few commercially available off the shelf video markup products at the present time. Each unit cost approximately ■■■■■■.

4.1.2.7 Audio Translation

The audio translation equipment will allow skilled interpreters to deliver simultaneous and consecutive interpreting to groups and individuals using telephone communications equipment. Allowing interpreters the ability to listen and respond via the telephone means interpreters can handle clients anywhere in the world from their homes or offices without traveling to the interpreting location. Users of the interpreting service are only a phone call away from interpreting, which simplifies administration, improves productivity and reduces costs. The remote telephone interpretation service is generally used for short duration situations where all parties are willing to pause after speaking. For the purposes of supporting a multiparty long duration hearing it would be best to use on-site interpreters. The table below provides a list of the advantages and disadvantages of using the various options available for audio translation.

Option	Advantages	Disadvantages	Prerequisite
On-site interpretation service	• **Required for long term multiparty continuous speech translation service.** • **Faster translation process.**	• **Local availability of interpreter.** • **Travel expenses might be required**	
Remote interpretation service	• Great for Ad hoc translation requirements. • Low total cost for short duration translation services because it is billed in one-minute increments.	• Can only be used for short duration interpretation activities. • Longer hearing time because all parties must pause for interpretation to be done. • Difficult to accurately identify and support multiple speakers.	

The cost for audio translation is provided in the following table. Although the on-site option is 25% more expensive, the accuracy of the transcription is critically important to the hearing operation. Consequently, it is worth paying the difference to provide the required accuracy for hearing transcripts. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Cost	Total Costs	Comments
On-site interpretation service	■■■■■■■■■■■■■	■■■■■■■■	**Assumes seventy five (75) twelve-hour days.**
Remote interpretation service	■■■■■■■■■■■■■	■■■■■■■■	Assumes seventy five (75) twelve-hour days.

4.1.2.8 Audio Support

In order to conduct any proceeding, it is mandatory that an audio system be present in the hearing room in order to broadcast and record the audio proceedings. The quality of the audio can impact dependent services such as audio translation and transcription. Control of the microphones may be manual or automatic (voice-activated).

Manual control requires a microphone to be activated by an individual before it can be operative. Some microphones may be "permanently on" (e.g. the witnesses microphone(s) or a central microphone at a presentation table), while others may require a participant (judges or attorneys) to push a switch to enable or disable "his or her" microphone. It is most likely that the audiovisual contractor will have already chosen a microphone vendor but for budget trade-off purposes a ■■■■ per microphone estimate would be prudent.

Automatic control of microphones results when the judge allows microphones to activate automatically when a speaker initiates conversation. The options available are presented in the following table.

Option	Advantages	Disadvantages	Prerequisite
MGS-2 Speco MGS-2 Gooseneck microphone	Low price	Mid level quality	
Shure MX418S 18" Gooseneck microphone	**High quality**	**Mid level price**	
ADIX ADX118 18" Gooseneck microphone	High quality	High price	

The cost for the options discussed are presented in the table below. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options	Cost	Qty	Total Costs	Comments
MGS-2 Speco MGS-2 Gooseneck microphone	■■■■	■■	■■■■■	
Shure MX418S 18" Gooseneck microphone	■■■■	■■	■■■■■	
ADIX ADX118 18" Gooseneck microphone	■■■■	■■	■■■■■	

For purposes of broadcasting the audio speakers will be located throughout the hearing room and the cost for these is bundled into the cost for the AV System control component. In addition to speaker support for people with normal hearing the AV System Control segment has a 4-channel infrared audio transmission capability bundled into it for the purposes of supporting the needs of translation services and assistive listening.

4.1.2.9 AV System Control

The heart of the AV system is the controlling component, the AV system control. The hearing room capture devices will require a sophisticated control system to manage and control the capture devices during the hearing. This control system is necessary for the judge or clerk to enable the capture devices to function as required. A state-or-the-art control system is necessary to coordinate control of the system, VCRs, projectors, monitors, sound system, and virtually any other electronic additions to the room.

- Matrix Switchers. Video and audio matrix switchers are necessary to accept all video, audio and computer outputs, and control which sources are sent to which devices. They will allow any video, computer or audio source to be sent to any or all the connected devices, anywhere at any time, including media feeds for press.
- Touch panel controls. Touch panel controls are required to control the system and all other room media systems. These panels will be custom programmed for the NRC, using powerful one-touch macros to set the rooms up into various operational modes. Two remote control panels are required to support the hearing, one for the judge and another for the Courtroom Clerk.

Today there are two well-known manufacturers of AV control systems the old AMX now called Panja and Cestron. Both these companies make systems that allow the integrated mixing and multicasting of audio, visual, lighting, climate control, security systems, data communications over IP networks. Both these manufactures offer extremely easy to use color, LCD, touch panel controls. The general contractor who designs the central control and recording system will most likely use one of these two manufacturers products.

The current controls used at the Rockville facility represent old technology. In addition to the fact that this technology is not user-friendly, it is no longer available to be purchased today. Consequently, this study recommends upgrading the Rockville controls with a newer technology that is consistent with the solution used for the Las Vegas Area site. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Options		**Cost**	**Total Costs**	**Comments**
Audio Visual Control System/Room Design/Integration and Installation	**Rockville Upgrade**	■■■■■■■■	■■■■■■■■	
	Las Vegas Area	■■■■■■■■		

4.1.3 Hearing Management Component

This component is responsible for ensuring that the administrative and logistic supporting information is available to assist the judges in conducting the hearing. Some of the Hearing Management information will be managed by the Document Management components that also contain bibliographic or profile linkages from documents to exhibits, witness lists, etc. In fact, a significant number of administrative fields normally managed by Case Management System can now be easily integrated with the Document Management components as related field information. The EDMS will also provide the functional capabilities to manage these informational fields.

In addition, the A/V Component provides control panels for managing the evidence presentation during the hearing, i.e. specifies the input and output devices that are active at any time during the hearing. Consequently, this section will focus on the additional capabilities required to support hearing management, which will not be supported by other DDMS components.

4.1.3.1 Administrative Reports

The DDMS must have the flexibility to provide customizable reports that can be used by the judges in the administration of the hearing. These reports will include information such as:

- Witnesses scheduled to testify at a specific date
- List of Exhibits related to witnesses scheduled for a specific date
- List of Exhibits used in a specific hearing

The information contained on these reports can be crucial to informing the administrative judge with details that are important to the operational management of the hearing.

Some of these reports can be pre-defined, while advanced reporting must also be available to generate the ad hoc reports that are inevitable. These reports can be generated using available reporting tools that provide a graphical user interface for designing and producing various report types. Some effort must be spent with ASLBP participants to design and develop the initial reports required to support the hearing. In addition, some training of the use of the reporting tool, to facilitate additional report generation, must also be included in the planning for the DDMS.

Leading reporting tool products include:

- Microsoft Access
- Crystal Reports

The following table presents a summary of the benefits and cost related for implementing a reporting tool. A reporting tool is a required feature that can only be differentiated by the various product vendor options listed above.

Required [4]Option	Advantage	Disadvantage	Prerequisite
Reporting Tool	Support generation of administration reports.	Users can impact database performance.	ODBC compliant database
	Friendly, easy end-user interface.		
	Customizable reports.		
	Ad Hoc reporting capability		

The table below presents the cost for each of the options. The highlighted, **bolded** row reflects the option used in costing the DDMS solution.

Product Options	Qty.	Unit Cost	Total Costs	Comments
Microsoft Access	■■	■■■■■	■■■■■	
Crystal Reports	■■	■■■■■	■■■■■	**5-user packs**

4.1.3.2 Research Support

This functional requirement will be met by providing access to research databases and the record that can support the administrative management of the hearing as well as in other legal decisions. This will allow access at the user's expense to the Westlaw, Lexus, Premise, and other research databases currently used by the judges and attorneys. In addition to those online case law databases, there are rules and other policy documents (e.g. CFR Part J) that are available in electronic forms that can be stored on the DDMS server. The electronic access to these documents will facilitate the efficient search for information that might be required to assist the administrative judge in making decision.

This is a required feature that will rely on the communications infrastructure selected. Consequently, the cost for implementing this feature will be incorporated in the communications cost provided in a later section.

4.1.3.3 Integrated Case Management System

At the high end of the Hearing Management spectrum is what the industry refers to as an Integrated Case Management System (CMS). This system integrates the Document Management, the Multimedia Management, with the administrative tools required to support the hearing. Unlike the general purpose Document Management systems, the CMS is a specialized solution that have been developed specifically to support the requirements for a trial or hearing environment.

The integrated CMS is a new concept, with only a few vendors providing the complete solution described above. This system provides functional capabilities that are not requirements

[4] Required to support the administrative users only. Estimated at 10 user licenses.

for the DDMS. For example, the EHD is responsible for maintaining the docket, managing the interfaces with the lawyers and other traditional CMS functions, which are not requirements of the DDMS.

The two candidate solutions are:

- Ringtail Suite – Capture, CaseBook, CourtBook, and FullText modules.
- SCT Banner

The benefits and disadvantages of an integrated CMS are illustrated in the following table:

Option	Advantage	Disadvantage	Prerequisite
Integrated CMS Solution	Ease of integration, since most of the functions are already integrated as a solution.	Integration with existing legacy information systems can be very complex	
	Built to specifically meet the needs of a court environment.	Individual component parts of an integrated suite are functionally inferior to competitive component parts available as separate products.	
	Seamless or common interface to use component parts already integrated as a single product solution.	Purchase functionality that's not required by the DDMS	
		High risk to use new technology that does not have a mature implementation history	

The table below presents the cost for each of the options. Note that none of the options listed were used in costing the DDMS solution.

Product Options		Cost	Total Costs	Comments
RingTail		N/A	N/A	Assumed to run on the DDMS Server. Not all the RingTail modules are available in the US, some are only available in Australia where it was developed.
SCT Banner	Software	■■■■■■■■	■■■■■■■■	Assumed to run on the DDMS Server.
	Services	■■■■■■■■		

4.1.4 Multimedia Management Component

This component is responsible for the management of multimedia information, making it accessible to the hearing participants. One of the most difficult problems with traditional multimedia is that it was difficult to find specific video information in the hours of content captured. However, recent changes in technology make it possible to index, search and retrieve video and other multimedia content. In the following sections, various options for managing multimedia content are presented.

4.1.4.1 Transcripts

The following options exist for indexing hearing transcripts:

- **Full-Text Index** – this option is implemented using the EDMS system. This allows users to search and find information based on the content of the transcript. No additional expense (outside of the EDMS implementation) is required to provide full-text indexing.
- **Manual Timestamp** – Time-stamps can be manually inserted into a transcribed transcript using tools like the Timaro (Post production time-stamp) PTS Software. Time-stamps are beneficial for not only searching the transcript based on a time period, but also to synchronize the playback of the transcript with other information captured during the hearing. For example, the TrialPro software allows synchronized playback of the transcript with the video recording of the hearing. Manual time stamping requires an additional expense to have a clerk insert a time-stamp into an ASCII text using the Timaro PTS software after the transcription is completed.
- **Real-time Transcription** - Real-time transcription is the only alternative that supports the requirement to provide trial information to ADA hearing participants. This option requires a Court reporter using computer aided transcription devices or Voice Recognition based Stenomasks to provide a power method of capturing and distributing real-time testimony. This real-time text can be made immediately available to the judges, attorneys, and other participants in the hearing. Real-time transcription is not 100% accurate, and therefore some clean-up will be required. Consequently, the cost of this option is the highest of all the candidates, but it also provides the greatest benefits to hearing participants.
- **Speech Recognition Technology** – the current speech recognition technology is not accurate enough across a broad base of hearing participants to consider using it for the DDMS hearing. Significant improvements in this area would be required to make it a feasible solution.

The following table provides a comparison of the benefits or disadvantages for using the options described above.

Options	Advantage	Disadvantage	Prerequisite
Full-Text	• Search transcript based on content. • By-product of EDMS. • Search across all transcripts produced. • Linked with related documents.	• Not synchronized with video or audio information.	Document Management.
Manual Timestamps	• Search for events by time. • Synchronize transcript with other records.	• Slow process to create events. • Expensive use of Court clerk time.	Timaro PTS Software or equivalent.
Real-time Transcription	• Supports ADA requirement. • Provides real-time transcripts to Hearing personnel. • Synchronize transcript with other records. • Provides Closed Caption support. • Time-sequenced records.	• Additional expense for real-time transcription. • Requires clean up of dirty transcription.	Real-time access to transcripts by court personnel requires LiveNote software or equivalent.
Speech Recognition	• Eliminates human involvement in process.	• Poor accuracy, except for trained professional speakers. • Technology not mature or accurate to support Hearing. • Extensive clean up required for accuracy.	

The table below provides the cost for implementing each option. The highlighted, **bolded** row reflects the options used for costing the DDMS solution. Although the Real-Time Transcription Offsite is less expensive, we are recommending the On-site approach because of the complexity involved in creating accurate transcripts for multiple speakers in the off-site transcription approach.

Options		Cost	Total Costs	Comments
Full-Text		■■■■■■	■■■■■■	By-product of EDMS.
Manual Timestamps	Transcription	■■■■■■	■■■■■■■	Assume ■■■■/day for current transcription
	Services	■■■■■■		Assume ■■■■/day to perform timestamp
	Software	■■■■■■		1 copy for Las Vegas Area and 1 for Rockville
Real-time Transcription Onsite	**Services**	■■■■■■	■■■■■■■	**■■■■■/day – 225 pages/day**
	Software	■■■■■■		**25 LiveNote FT licenses**
Real-time Transcription Offsite	Services	■■■■■■	■■■■■■■	■■■■■/day
	Software	■■■■■■		25 LiveNote FT licenses

4.1.4.2 Video

The following options exist for indexing video-hearing information:

- **Time Sequenced** – this option is currently used in the Rockville hearing room. The analog video is time-stamped, and a clerk can log on a separate file, some descriptive information related to each time-stamp sequence. No additional expense is required to implement this option.
- **Video Profiling (Manual)–** this option involves manually creating descriptive bibliographic information for various scene changes or segments of a video. There are multiple companies that provide technologies that support this requirement. The top two candidates are Virage's Video Logger and Excalibur's Screening Room. Both technologies capture analog or digital video information, creates story boards for scene changes or other video segments, compresses the video, provides a user the capability to add descriptive information, and links the profile to the video for future retrieval. Searching can be performed using any profile information used to index the video. The biggest benefit to this technology is to aid the judges or other hearing participants to quickly search through the video records to find and playback specific video segments.
- **Video Profiling (Automated)–** this option involves automatically creating an index for video recordings created during the hearing. Real-time transcription technology can be used to synchronize video with computerized court reporting. Stenographic text of the proceedings taken down by the court reporter is translated by real-time and integrated with a simultaneously created videotape so that the text of the testimony appears on the screen (in Closed Caption format) with the video record of courtroom events. An internal clock in the video camera or VCR is synchronized with the court reporter's computer to ensure that the video and text records of trial proceedings match. Synchronization of the transcript with video can be performed with either the Virage Video Logger or Excalibur Screen Room products. This allows a specific portion of the video record to be found by searching the text record, which is a much more efficient and thorough method than a video-only search.

The following table provides a comparison of the benefits or disadvantages for using the options described above.

Options	Advantage	Disadvantage	Prerequisite
Time-Sequenced	• Search for events by time. • Synchronize transcript with other records.		

Options	Advantage	Disadvantage	Prerequisite
Video Profiling - Manual	• Synchronize transcript with video records. • Direct access to video records by frame or time event. • Faster review of video recording. • Text search for video information.	• Additional expense to manually create profile.	Video indexing software.
Video Profiling - Automated	• Eliminates human involvement in process in indexing process. • Synchronize transcript with video records. • Direct access to video records by frame or time event. • Faster review of video recording. • Text search for video information.	• Technology not mature or accurate to support Hearing. • Extensive clean up required for accuracy.	Real-time Transcription Support.

The table below provides the cost for implementing each option. The highlighted, **bolded** row reflects the options used for costing the DDMS solution.

Options		Cost	Total Costs	Comments
Time-Sequenced		■■■■■■	■■■■■■	By-product of VCR.
Video Profiling - Manual	Service	■■■■■■■	■■■■■■■■	Assume ■■■■/day
	System	■■■■■■■		Includes CODEC, Video Indexing software, and workstation.
Video Profiling - Automated	**System Only**	■■■■■■■	■■■■■■■■	**Service cost is eliminated via using Closed Caption, by-product of Real-Time transcription, to perform automated indexing.**

4.1.5 Communications

Various types of communications are required to support the DDMS hearing. These communications are needed to support the transmission of electronic information within and between hearing locations. The various types of communication infrastructure required are described below.

4.1.5.1 Telecommunications

Telecommunications are used to connect distant, remote locations. In the DDMS, telecommunications are required to:

- Transmit information between the Rockville NRC location and other remote locations like Las Vegas Area. The information to be transmitted include:
  - Documents pre-filed in the EHD required at a remote hearing
  - Email messages for ASLBP officials
  - Remotely captured hearing documents to be added to the SECY record
  - Transcripts from remote hearing to be added to the SECY record
  - Bibliographic updates to pre-filed exhibits
- Support videoconferencing transmissions
- Internet Access to support Research

The technology in this arena is rapidly improving to support the rapid demand for high bandwidth application requirements, e.g. the Internet. As plans are made for the DDMS hearing in the 2003-2005 timeframe, it is important that technology is not chosen that becomes obsolete during the implementation phase. The assessment provided below provide a comparison of some of the currently available communication technologies that could be used to support the telecommunications needs for the DDMS hearing.

Generally, the implementation cost increases proportional to the increases in performance and reliability of the transport service. The NRC currently uses T1 transport services to connect the regions with NRC headquarters in Rockville. Options available include:

Transport Service or Technology Option	Advantages	Disadvantages	Prerequisite
ISDN – digital transmission of information over copper or fiber at speeds from 64 Kbps to 128 Kbps.	• Connects to a wide variety of video equipment. • Used extensively for video-conferencing. • High reliability and availability.	• Sharing leads to reduced efficiency and speed. • Not enough bandwidth for very large transfers. • High cost for high usage.	

Transport Service or Technology Option	Advantages	Disadvantages	Prerequisite
Frame Relay – high-speed transmission services that moves data in frames across the public network at speeds from 56Kbps to 45 Mbps.	• Cost effective for connecting LANs. • Flat rate – distance insensitive pricing. • High quality network performance for large transfers. • 100% uptime Service Level Agreement guarantee	• Limited video and voice capabilities.	
T1 – dedicated digital circuit (private line) that transmits at speeds up to 1.54 Mbps.	• **Fast, reliable transmission.** • **100% uptime Service Level Agreement guarantee** • **Single line can handle voice and data traffic.** • **Piggyback on existing NRC pricing structure.**	• **Distance sensitive pricing.**	
DSL (Digital Subscriber Line)– newest technology that supports both synchronous and asynchronous transmissions at speeds up to 7 Mbps over a public network.	• Lowest cost high-speed network. • Uses existing copper infrastructure.	• New technology. • Difficult to implement. • Inconsistent availability. • Not currently available in most places due to distance limitations. • No uptime Service Level Agreement guarantee	
T3 – dedicated digital circuit that transmits at speeds up to 45 Mbps (approx. 28 T1 lines).	• Fastest transmission over point-to-point private lines. • Supports large data and image transmissions. • Single line can handle voice, video, and data traffic. • Constant availability. • 100% uptime Service Level Agreement guarantee	• Distance sensitive pricing. • High cost transmission.	
ATM (Asynchronous Transfer Mode) – high-speed connection oriented service that transmits voice, data, and video traffic at speeds from 1.54 Mbps to 155 Mbps.	• Best transport for transmission of delay sensitive data like voice and video. • Can deliver 2-way audio and full motion video across multiple locations. • Best suited for multimedia applications. • Currently used to support NRC connectivity with regions - at T3 speeds of 45 Mbps.	• Very complex to deploy. • Very expensive. • Overkill for DDMS Hearing.	

The table below provides the cost for implementing each option. The highlighted, **bolded** row reflects the options used for costing the DDMS solution.

Options[5]		Cost (line/month)	Total Costs	Comments
ISDN		■■■■■	■■■■■■■	256 Kbps capacity – 2 lines
Frame Relay	Install	■■■■■	■■■■■■■	768 Kbps capacity
	Monthly	■■■■■		
T1	**Install**	■■■■■	■■■■■■■	**1.5 Mbps capacity**
	Monthly	■■■■■		
DSL		■■■■■	■■■■■■■	2 Mbps capacity – 2 lines
T3	Install	■■■■■	■■■■■■■	45 Mbps capacity
	Monthly	■■■■■		

4.1.5.2 Local Area Networks (LAN)

The LAN is required to support the following DDMS requirements:

- Transmit share pre-filed documents/exhibits stored on a server to hearing participants.
- Connect multiple workstations, displays, printers, and input devices that support the hearing.
- Allow hearing participants to transmit new electronic documents/exhibits to the server.

A LAN can be built using of the two types of infrastructure options described below:

- Category 5 cabling (Cat 5) – supporting transfers speeds up to 100 Mbps. This option provides greater bandwidth, but is more costly to implement because cables and connector have to be installed in the ceiling or floors of the facility.
- Wireless connectivity – using the current 802.11b (or higher) standard, supporting transfer speeds up to 11 Mbps. This option is the easiest and cheapest to implement since connections are maintained via a wireless transfer protocol. In the future, the cost of this technology is expected to drop as the performance improves.

In the Full DDMS Solution, the Rockville facility will utilize the Cat 5 wiring option to complement/upgrade the existing wiring currently installed. In the Las Vegas Area facility, either a Cat 5 or wireless option can be implemented.

For other hearing locations, the wireless option is recommended. This option will use a portable NT-based DDMS Document Server, based on a laptop configuration. Each connecting client workstation (Judges laptops for example) would connect to this laptop server via a wireless LAN, eliminating the need to run cables to support the hearing.

The following table provides a comparison of the benefits or disadvantages for using the options described above.

[5] Assume 27-month contract period.

Options	Advantage	Disadvantage	Prerequisite
Category 5 Cable	• **Higher performance – speeds up to 100 Mbps.** • **Support both IT and A/V communications.** • **Support unified mgmt. of A/V and IT from a single control panel**	• **Time and expense to lay cables**	
Wireless LAN	• No cables to install. • Easy of installation.	• Lower transmission speeds – 11 Mbps limitation. • Separate controls for managing IT and A/V.	Wireless NIC transceivers for workstations.

The table below provides the cost for implementing each option. The highlighted, **bolded** row reflects the options used for costing the DDMS solution.

Options		Cost	Total Costs	Comments
Category 5 cabling		■■■■■■	■■■■■■	**Retrofit Rockville, and create a LAN in Las Vegas Area with 100 Mbps.**
Wireless LAN	Hub	■■■■■■	■■■■■■	Las Vegas Area Only; 3 judges, 10 attorneys, 7 conference rooms, 1 Clerk. Includes ■■■■ required for Rockville LAN.
	NICs	■■■■■■		

4.1.6 Data Storage

Disk storage is required for the management of electronic information used during the DDMS hearing. The hearings will be conducted over a 150 hearing day period. Assuming twelve (12) hours of hearings per day, this would result in 1800 hours of recorded hearing video information. If video-streaming support is required, this data must be compressed and stored or forwarded to accommodate the various types of Internet users. The compound effect of managing video could result in the storage of video in multiple formats/resolutions (Real Video, Windows Media, and QuickTime). Based on the projected dominance and availability of the Windows Media, this study recommends using the Windows based format for storing digital multimedia information.

This study estimates the following requirements for the DDMS:

- 79 GB for electronic documents
- 4 GB for information Profiles
- 8 GB for Full-text indices
- 1.2 TB for video recording storage (assume 1.5 Mbps recording rate using an MPEG format)

The electronic documents, profile descriptions, and full-text indices will be stored online to support the performance requirements for the DDMS. These items combined will require a total of approximately 91 GB of online disk storage. It is not necessary to store all 150 hearing days of video information online on disk drives. The video storage requirement for a single day is approximately 6 GB or 12 GB for two days (the required storage time frame for video). A total of approximately 103 GB of online storage is required for the DDMS.

Offline or near-line storage devices like tapes and CD/DVD can be used to provide a more cost-effective media for managing the large volume of hearing video. This requires hierarchy storage management (HSM) of data, i.e. software that moves and tracks data across multiple storage media. When a retrieval request is made for data, the HSM software identifies the location of the data, and distributes the requested information.

The following sections look at the trade-off for using tapes, DVDs or optical storage for managing the large volume of video data.

4.1.6.1 Tape

The NRC, to manage near-line or archived electronic information, currently uses a large tape silo. Tape silos are typically used in large enterprise environments where data is centrally managed, maintained and distributed. These tape silos are usually large, mechanical devices that store tapes/cartridges in slots/shelves in the silo. The tape silo is not very reliable because of the movement required to retrieve the tapes and load/unload them on the tape drive(s) that support the silo. This media represents the lowest price, and slowest performance media primarily due to its sequential data retrieval method.

A dedicated tape silo represents an over-kill as a solution for the DDMS hearing. In addition, sharing the tape silo between the existing NRC enterprise and the DDMS is not a practical solution for the Las Vegas Area or other remote sites. The workaround to this problem is to have a local tape drive at each remote location that would be used to read a copy of the tape stored in the silo. The storage density of the tapes may require more loads/unloads, i.e. more user involvement to retrieve the requested information.

4.1.6.2 DVD

DVDs clearly represent the technology the industry is looking at as the media for managing multimedia information, quickly replacing the CDs that store up to 650 MB. Current direct access capacity of 4.6 GB is expected to double in the next year, and on and on. In addition, the standards for this technology are firming up to allow ubiquity across the multiple readers and writers of DVDs. The size and density of this media makes it very portable and efficient for carrying DDMS hearing information.

4.1.6.3 Optical Disks

Optical disk became the standard for managing images and other large documents. However, CD and DVD technology are rapidly replacing optical disks. Consequently, this technology is expected to become obsolete more quickly and should not be considered as the media for the DDMS hearing.

The following table provides a comparison of the benefits or disadvantages for using the options described above.

Options	Advantage	Disadvantage	Prerequisite
Tape	• Currently used by the NRC. • Proven technology.	• Slow, sequential access not appropriate for video retrieval applications. • Less reliable than optical media management devices. • Reduced density requires more tapes; hence more motion to retrieve information.	
DVD	• **Direct access to subset of information on media.** • **Best density per inch available** • **Technology of future** • **Faster retrieval rate than tape.**	• **New technology** • **Standards evolving**	

The table below provides the cost for implementing each option. The highlighted row reflects the options used for costing the DDMS solution.

Options	Cost	Total Costs	Comments
Tape	■■■■■■■	■■■■■■■	Two 2-drive Jukebox
DVD-RAM	■■■■■■■	■■■■■■■	**Two 4-drive DVD Jukebox**

4.1.7 Web Access

The two major requirements supported by this component are:

- Video Streaming of the HLW proceeding to the public
- Remote access to DDMS information by authorized personnel

Both of the items listed above will use the web as the vehicle or medium for satisfying their requirement. The options for resolving these requirements are described below.

4.1.7.1 Video Streaming

Video streaming involves providing video and audio information of the HLW proceeding over the Internet to the public. This solution must be available at the two primary sites, Rockville and Las Vegas Area. No video streaming will be provided for the other remote hearings. A total of approximately 1.2 TB of video information will be created during the 150-day HLW hearing. It is expected that the video streaming solution will only support access to a 2-day time period, the previous and current day's hearing information. In addition, during the HLW hearing, portions of the hearing will be involved in proprietary information that will not be streamed to the public. This means that the output from the cameras currently used to record the entire proceeding cannot be randomly distributed to the public. Public distributed data must be controlled by the judges (via a preview monitor) to ensure that secure information is not accidentally or unintentionally distributed.

The options for implementing a video streaming solution are presented below.

ASP Model

This solution involves hiring an outside vendor to host and deliver the DDMS audio and video information. The NRC would be responsible for transmitting the video files to the ASP vendor based on a predetermined frequency, using an agreed to distribution format. The ASP vendor would be responsible for placing the video file on a publicly available server for public access. This solution is not a real-time video streaming since there is a built-in delay for passing information between the NRC and the ASP vendor.

NRC Hosting Model

This solution involves building in internal infrastructure for the management and distribution of video files to the public over the Internet. This infrastructure must accommodate a 21 x 7 operational window where the public can randomly access hearing video. This infrastructure requires a reliable web server, high-speed communication pipe to support multiple (thousands of) users, and the capacity to provide the expected performance characteristics of video streamed information. This solution can support real-time video streaming since the NRC is the source and distributor of the video information. Currently, the NRC has an in-house pilot on video streaming and is also developing architecture for web services. As these plans are still evolving, this report assumes the worst case scenario that this option requires building the entire infrastructure required and cannot use any existing in-house services.

Broadcast Alliance Model

This solution involves engaging a reputable broadcast house (e.g. C-SPAN) to provide live coverage of the HLW Hearing. Since this Hearing is a public interest story, it is conceivable that if invited one of the existing media houses could provide the service for dissemination of the video information. The obvious benefit to the NRC is that the service would be free.

The following table provides a comparison of the benefits or disadvantages for using the options described above.

Options	Advantage	Disadvantage	Prerequisite
ASP	• Web infrastructure is guaranteed and managed by a vendor specializing in this technology. • Economically priced, since multiple customers share vendor infrastructure cost.	• Delayed availability of video information. • Shared control of information distribution.	ASP Vendor
NRC Hosting	• **High cost for building and supporting infrastructure.** • **Available resources in-house to support this solution.**	• **Total control of distribution of video information.**	
Broadcaster	• Free distribution of video information	• Management of media accesses to Hearing.	Alliance or agreement with media.

The table below provides the cost for implementing each option. The highlighted, **bolded** row reflects the options used for costing the DDMS solution.

Options[6]		Unit Cost	Total Costs	Comments
ASP		■■■■■■	■■■■■■	Dedicated Server with T1 link for 24-months.
NRC Hosting	**Server**	■■■■■■	■■■■■■	**Assumes no existing infrastructure is available to support the HLW.**
	CODEC Client	■■■■■■		
	T1[7]	■■■■■■		
	Implementation	■■■■■■		
Broadcaster		■■■■■■	■■■■■■	

[6] **Note:** It is assumed that video-streaming will be performed for Rockville or Las Vegas, but not both sites concurrently. For the few times that both sites are conducting hearings concurrently, one site will be selected as the video-streaming site for public access (for that day).

[7] The Remote Web Access and Video Streaming solutions are assumed to share 1 T1 line for transmission to the Internet. Consequently, only 1 T1 line is price here, while the 2nd line is priced with the Web Access Server Configuration. If the Web Access Server is not implemented, an additional T1 line needs to be added here.

4.1.7.2 Remote DDMS Access

This solution provides attorneys and other hearing participants' access to the DDMS hearing information from a remote location like their hotel room. The two options considered to satisfy the requirement are described below.

Web Access Model

This solution involves providing web access to a copy of the DDMS database. In this approach, a mirror copy of the DDMS database used in the hearing would be maintained as a web accessible copy. The copy would be updated each day at the completion of the day's hearing. Only publicly available DDMS information would be published to the outside web copy. Hearing participants would access the web version by using a password supplied by the DDMS administration, limiting access to hearing participants only.

CD Copy Model

This solution involves creating a CD that contains a copy of each day's hearing transcript and documents for hearing participants. At the end of each hearing day, the court clerk would create the CDs and distribute a copy to each participant for use on their personal laptop or desktop computer.

Options	Advantage	Disadvantage	Prerequisite
Web Access	• **Access to the full DDMS database.** • **Use familiar search methods provided in Hearing room.** • **Accessible by supporting organizations not physically located at hearing site.**	• **Requires secure infrastructure to support users.** • **More costly to implement.**	**Could piggyback on Web Streaming solution discussed above. Share web server and distribution channel.**
CD	• Low cost approach. • Include daily real-time transcription file.	• Non-searchable access to information. • Management of increment of Hearing data; 150 CDs. • Requires physical proximity to hearing to get CD.	Real-time transcription.

The table below provides the cost for implementing each option. The highlighted, **bolded** row reflects the options used for costing the DDMS solution.

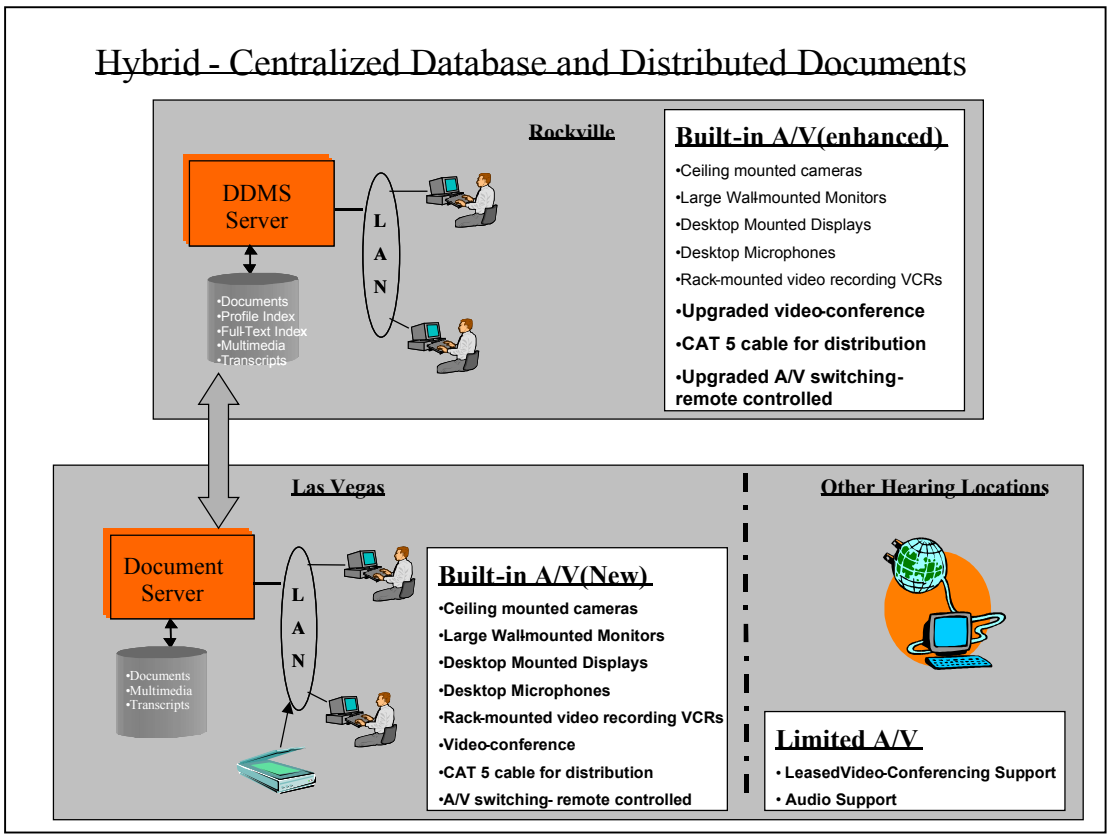
Options		**Unit Cost**	**Total Costs**	**Comments**
Web Access	**Server**	■■■■■■	■■■■■■	**Can be shared with video streaming.**
	T1	■■■■■■		
	Software	■■■■■■		**Panagon Publishing**
	Implementation	■■■■■■		
CD		■■■■■■	■■■■■■	CD duplicator, 36 CDs/hr.

4.2 FULL DDMS SOLUTION

4.2.1 Description

The Hybrid architecture is the foundation for the Full DDMS Solution. This solution represents a selection of options (previously discussed in section 4.2) required to implement the Hybrid solution. The figure below illustrates the Hybrid architecture that forms the basis for the Full DDMS Solution. In this solution, full functional capabilities for the DDMS are supported at both the Rockville and Las Vegas Area sites. A limited DDMS capability is also available for other hearing locations. These limitations include:

- Capability to electronically capture new exhibits during the hearing, and
- Full ADA support



This solution uses a Centralized database that houses all DDMS hearing indexing information. However, the electronic documents and exhibits are distributed on Document servers that are maintained near the actual hearing locations. This design ensures that electronic information can be quickly transferred to users in the hearing. The centralized index database is maintained in Rockville. Remote telecommunications links from Rockville will allow hearing users in Las Vegas to use the centralized index database located in Rockville.

The solution is intended to support the users identified in the following table:

DDMS Users	Location[8]		
	Rockville	Las Vegas Area	Other Remote
Judge 1	L, M	L,M	L,M
Judge 2	L,M	L,M	
Judge 3	L,M	L,M	
Witness Box 1	M	M	S
Witness Box 2	M	M	
NRC Attorney/Representative	W	W	S
Litigant 1	W	W	S
Litigant 2	W	W	
Litigant 3	W	W	
Litigant 4		W	
Litigant 5		W	
Litigant 6		W	
Litigant 7		W	
Litigant 8		W	
Litigant 9		W	
Litigant 10		W	
Conference Room 1	W	W	
Conference Room 2	W	W	
Conference Room 3	W	W	
Conference Room 4		W	
Conference Room 5		W	
Conference Room 6		W	
Judges Conference Room		W[9]	
Clerk	W	W	
Court Reporter	W	W	
Court Administrator	L	L	
IT Administrator	W		
Application Support	W		
TOTALS	**17**	**26**	**4**

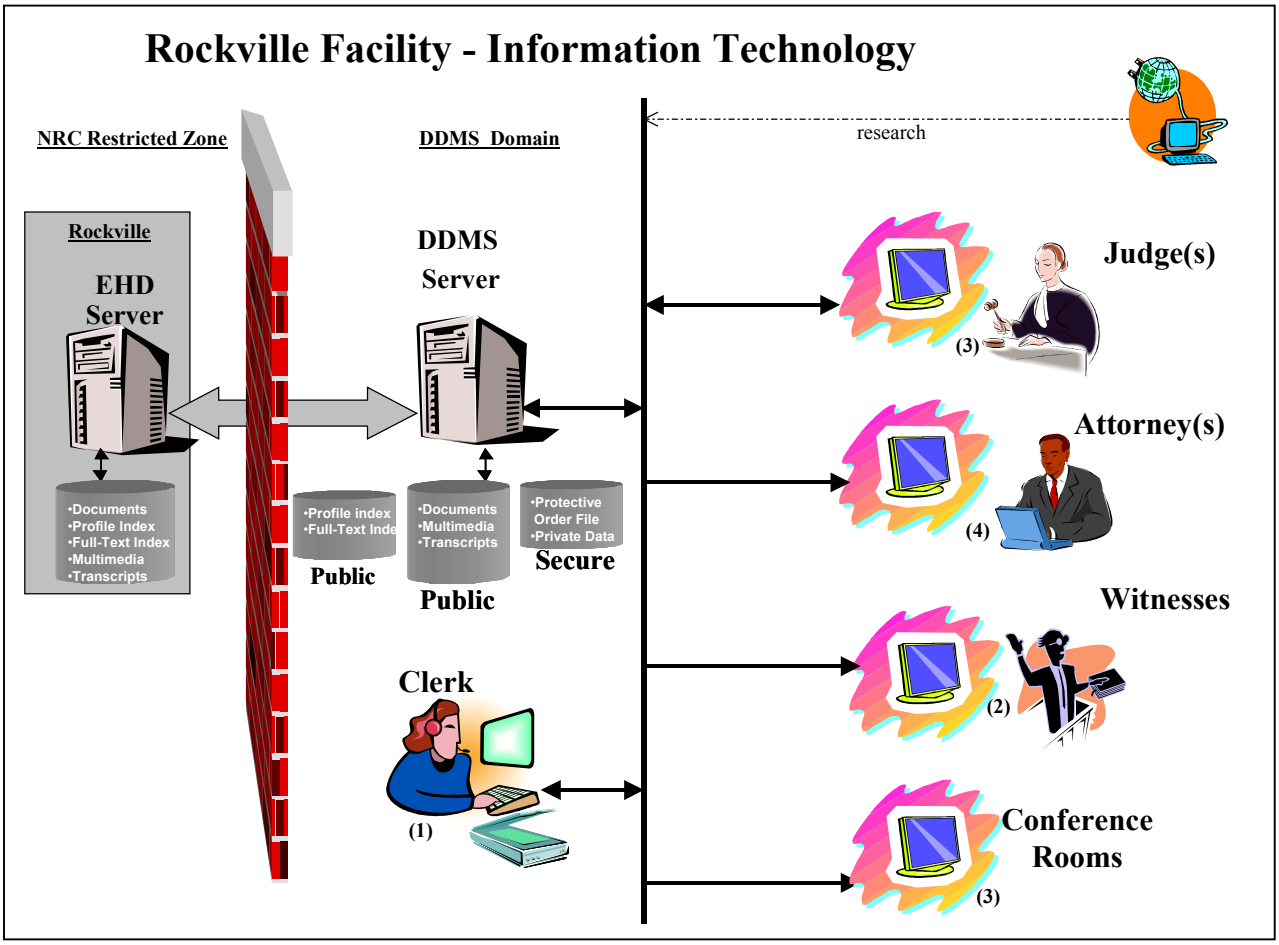
The remaining sections provide a detailed description of each of the major systems that make up the solution. The system descriptions are also categorized by the location they plan to support, i.e. Rockville, Las Vegas Area, and other hearing locations as a Portable system.

[8] L= Laptop; W= Workstation; M= Monitor only; S= projection Screen
[9] Includes 3 LAN connections for the judge's laptops also.

4.2.1.1 Rockville System

Information Technology (IT)

The IT system required to support Rockville is illustrated in the figure below.



In the diagram shown above, DDMS users will access a DDMS Server located in Rockville to conduct searches and updates to the DDMS indexing database. The DDMS Server contains a copy of the EHD docket information managed for the HLW, as well as other DDMS specific hearing information. The DDMS Server is required because the EHD Server is a secure server that is restricted to select NRC personnel only. The DDMS Server located in Rockville also contains a copy of the electronic documents and other exhibits. The local storage of the electronic exhibits will ensure that information can be quickly displayed on hearing room monitors located on a LAN. Secure exhibits are maintained in a secure file, Protective Order File, with restricted access to authorized DDMS users only.

The following table presents a list of the components required to support the Rockville IT facility.

Equipment Required	Qty	Cost ($)	Comment
Hardware – DDMS Document Server			
NT 2000 Server – Quad CPU	2	■■■■■■■	Get fastest Chips available at the time
- 4 GB RAM	2		
- 100 GB hard-drive	2		Use RAID technology to improve reliability
- DLT tape backup	2		Backup server support
- 10/100 Mbit LAN card	2		Operate at 100 Mbit speed
Subtotal		■■■■■■■	
Clients			
- Video Capture Workstation	1	■■■■■■	Support digitized video store and streaming
- Windows Workstation	11	■■■■■■	Use standard provided NRC configuration
- Laptop	4	■■■■■■	Included in Rockville count
Subtotal		■■■■■■	
Printer			
- Medium speed printer	2	■■■■■■	Support 1000 pages/day
Subtotal		■■■■■■	
Scanner			
- 50 PPM Scanner Workstation	1	■■■■■■	Medium Speed document scanner
Subtotal		■■■■■■	
DVD/CD			
-Jukebox	1	■■■■■■	
Subtotal		■■■■■■	
Software			
EDMS Product[10]		■■■■■■	Web Based client software.
Implementation		■■■■■■	Installation, Customization, and Integration
Integration		■■■■■■	Develop Custom Code to support import/export with EHD
Crystal Report	1	■■■■■■	Report Generation - One 5-user pack
Subtotal		■■■■■■	
Communications			
- T1 Lines	1	■■■■■■	Lease T1 infrastructure
- Category 5 cabling	1	■■■■■■	Wire Rockville Facility to support LAN
Subtotal		■■■■■■	
Real-time Transcription			
- Services		■■■■■■	■■■■■/day times 150 hearing days
- LiveNote software	10	■■■■■■	
Subtotal		■■■■■■	
Video Indexing			
- Indexing software	1	■■■■■■	

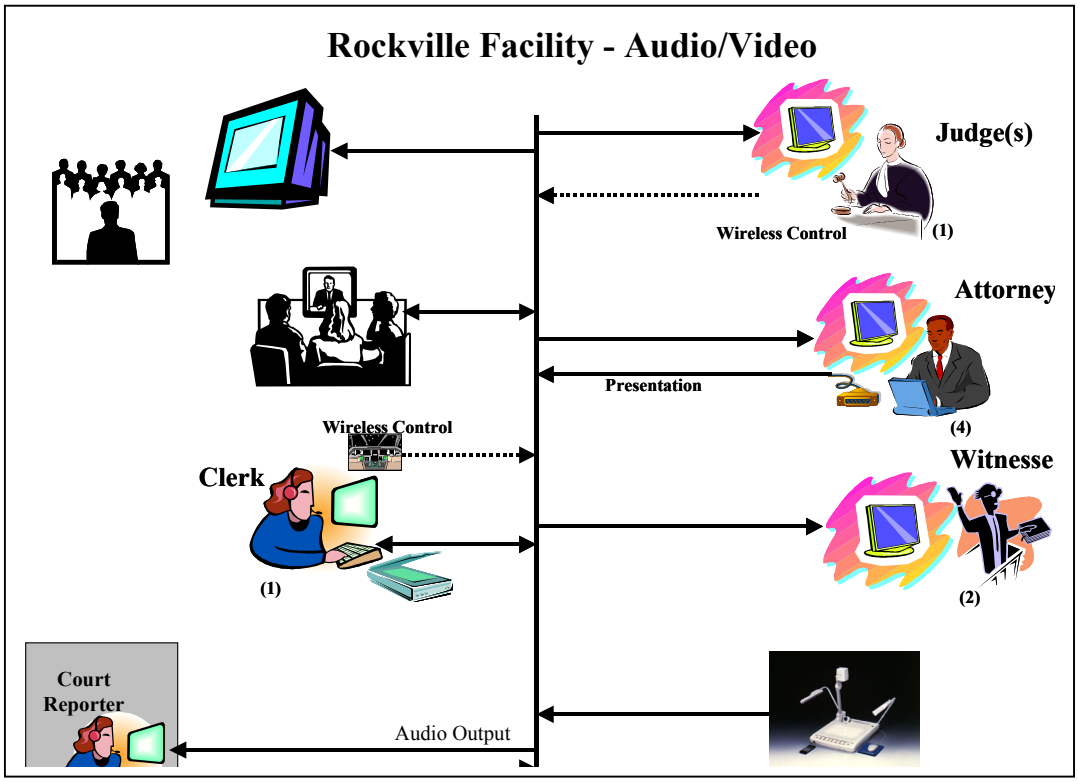
[10] The Panagon software is used as a representative EDMS solution for pricing the DDMS. The major advantage to Panagon is the integration with the EHD, but other EDMS solutions are also viable.

Audio/Video (A/V)

The A/V system for Rockville will be enhanced to provide the following capabilities:

- A new remote control A/V switching interface that is consistent with the new system being proposed for Las Vegas Area. This will include the A/V switching system that controls all of the cameras, audio, VCRs, etc. This is required to ensure that the Judges and Clerk can use a common interface whether in Rockville or Las Vegas Area to manage the hearing.
- A newly integrated Category 5 LAN operating at speeds up to 100 Mbit/second. This is required to support the transmission of electronic information between the DDMS server in addition to the transmission of A/V data.

An illustration of the Rockville A/V system is presented in the diagram presented below. The existing cameras, microphones, and VCRs will be retained for use during the hearing, and replaced by the newly purchased counterparts from the Las Vegas Area facility post-hearing.



The table below provides a list of the components required to support the enhancement of the Rockville A/V system.

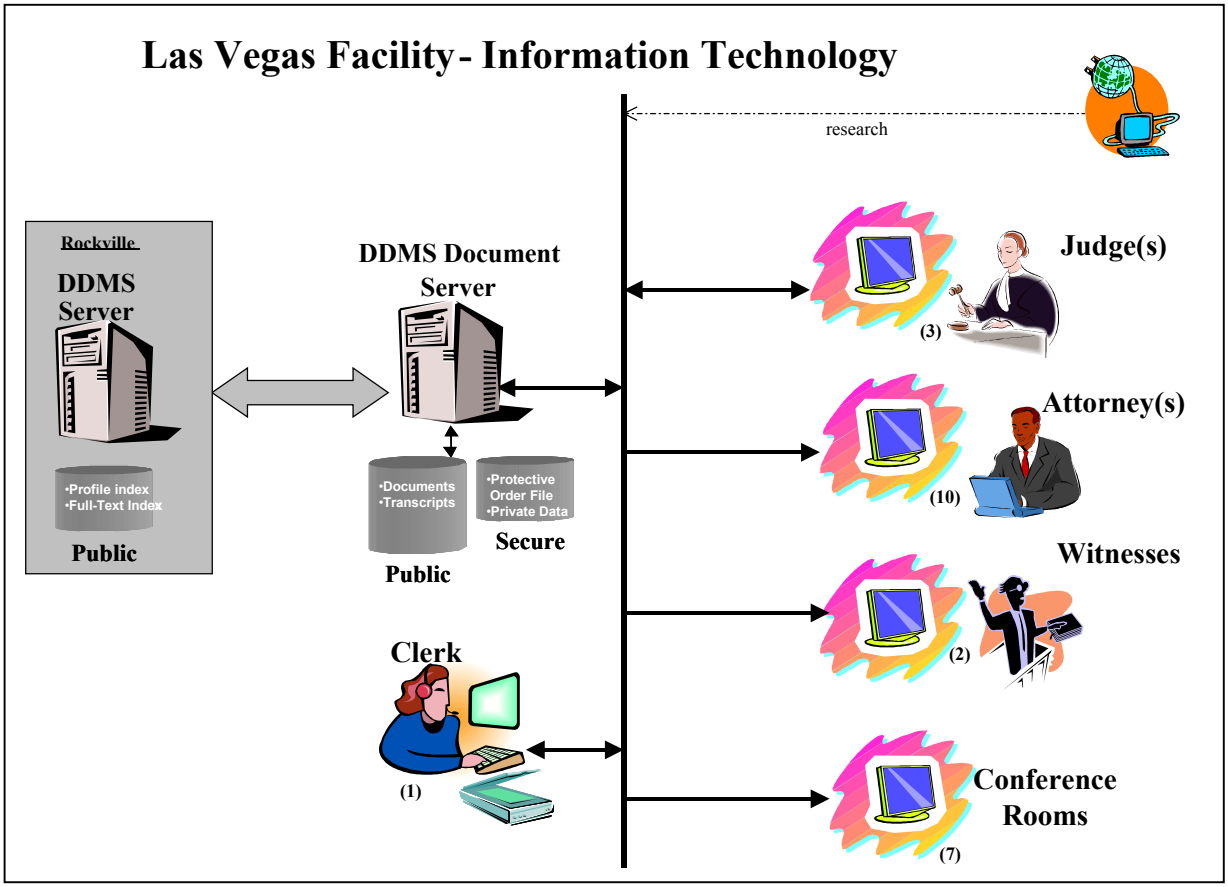
DESCRIPTION	QTY	EXTENDED PRICE
Rockville A/V Upgrade Option		
Audio Visual Control System/Room Design/Integration and Installation • All A/V wiring • All A/V patch/switches • Two flat panel color LCD touch control panels one at the judges bench one at the clerks.	1	■■■■■■■■
Videoconferencing System Upgrade	1	■■■■■■
Monitors	5	■■■■■
Video mark up system	1	■■■■■
TOTAL		■■■■■■■■

This upgrade will retain much of the existing technology and equipment. The upgrades are required to provide a consistent solution for both the Rockville and Las Vegas Area facilities. This will allow the judges and other hearing participants to have a seamless or transparent use of technology between both locations.

4.2.1.2 Las Vegas Area System

Information Technology (IT)

The IT system required to support Las Vegas Area is illustrated in the figure below.



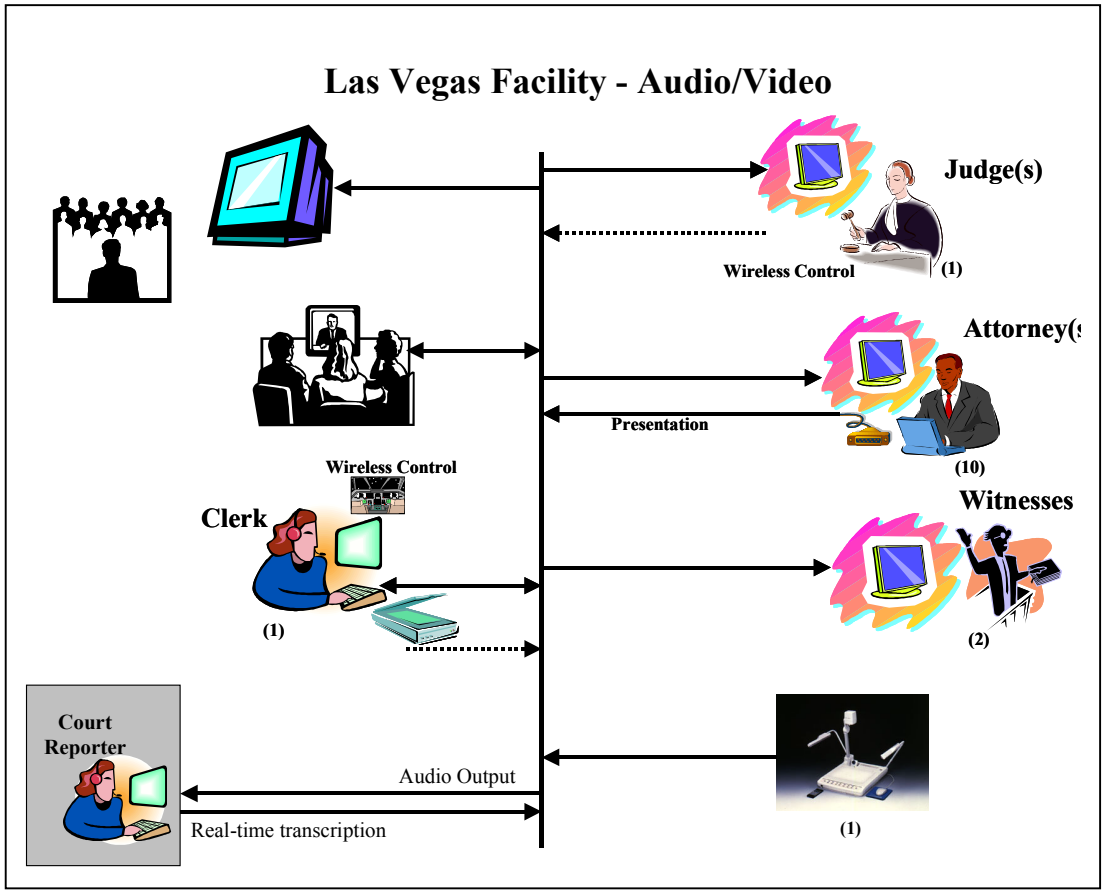
In the diagram shown above, DDMS users will access a DDMS Server located in Rockville to conduct searches and updates to the DDMS indexing database. The DDMS Document Server located in Las Vegas Area contains a copy of the electronic exhibits. The local storage of the electronic exhibits will ensure that information can be quickly displayed on hearing room monitors located on a LAN. Secure exhibits are maintained in a secure file, Protective Order File, with restricted access to authorized DDMS users only.

The following table presents a list of the components required to support the Las Vegas Area IT facility.

Equipment Required	Qty	Cost ($)	Comment
Hardware – DDMS Document Server			
NT 2000 Server – Quad CPU	2	■■■■■■■	Get fastest Chips available at the time
- 4 GB RAM	2		
- 100 GB hard-drive	2		Use RAID technology to improve reliability
- DLT tape backup	2		Backup server support
- 10/100 Mbit LAN card	2		Operate at 100 Mbit speed
Subtotal		■■■■■■■	
Clients			
- Video Capture Workstation	1	■■■■■■■	Support digitized video store and streaming
- Windows Workstation	20	■■■■■■■	Use standard provided NRC configuration
- Laptop	0	0	Included in Rockville count
Subtotal		■■■■■■■	
Printer			
- Medium speed printer	2	■■■■■■	Support 1000 pages/day
Subtotal		■■■■■■	
Scanner			
- 50 PPM Scanner Workstation	1	■■■■■■	Medium Speed document scanner
Subtotal		■■■■■■	
DVD/CD			
-Jukebox	1	■■■■■■	
Subtotal		■■■■■■	
Software			
EDMS Product			Included in Rockville configuration
Implementation			Included in Rockville configuration
Integration			Included in Rockville configuration
Crystal Report	1	■■■■■	Report Generation - One 5-user pack
Subtotal		■■■■■	
Communications			
- T1 Lines	1	■■■■■■■	Lease T1 infrastructure
- Category 5 cabling	1	■■■■■■■	Wire Rockville Facility to support LAN
Subtotal		■■■■■■■	
Real-time Transcription			
- Services			Included in Rockville table Included in Rockville table
- LiveNote software	15	■■■■■	
Subtotal		■■■■■	
Video Indexing			
- Indexing software	1	■■■■■■	

Audio/Video

The A/V system for Las Vegas Area will be a duplicate of the functional capabilities available at the Rockville facility, but will have capacity to support the additional users expected. This system is illustrated in the following diagram.



The integrated audiovisual system for Las Vegas Area will provide the following features:

- A state-or-the-art control system installed, which will coordinate control of the system, VCRs, projectors, monitors, sound system, and virtually any other electronic additions to the room.
- Sixteen- (16) voice activated cameras and microphones with two pan zoom cameras.
- Video and audio matrix switchers – These devices accept all video, audio and computer outputs, and control which sources are sent to which devices. They will allow video, computer or audio sources to be routed to the output devices (e.g. monitors, speakers, and screens) at any time. Includes media feeds for direct press access to video or audio sources.

- Touch panel controls – There will be convenient touch panel color displays, which will control the system and all other room media systems. These panels will be custom programmed for the NRC, using powerful one-touch macros to set the rooms up into various operational modes. For example, if videotape needs to be viewed, one or two touches on the screen will turn on and off all the proper devices to make this happen. Additional touch screens may be added to the system in various locations.
- Data projector and motorized screen – To allow any selected video source to be seen in the courtroom.
- Digital presenter camera – State of the Art unit with shadow free illumination allows photos, 3-dimensional objects, books, transparencies, slides, etc. to be displayed live on any screen or recorded and processed by VCRs, video printers or computers.

The table below provides a list of the components required to support the Las Vegas Area A/V system.

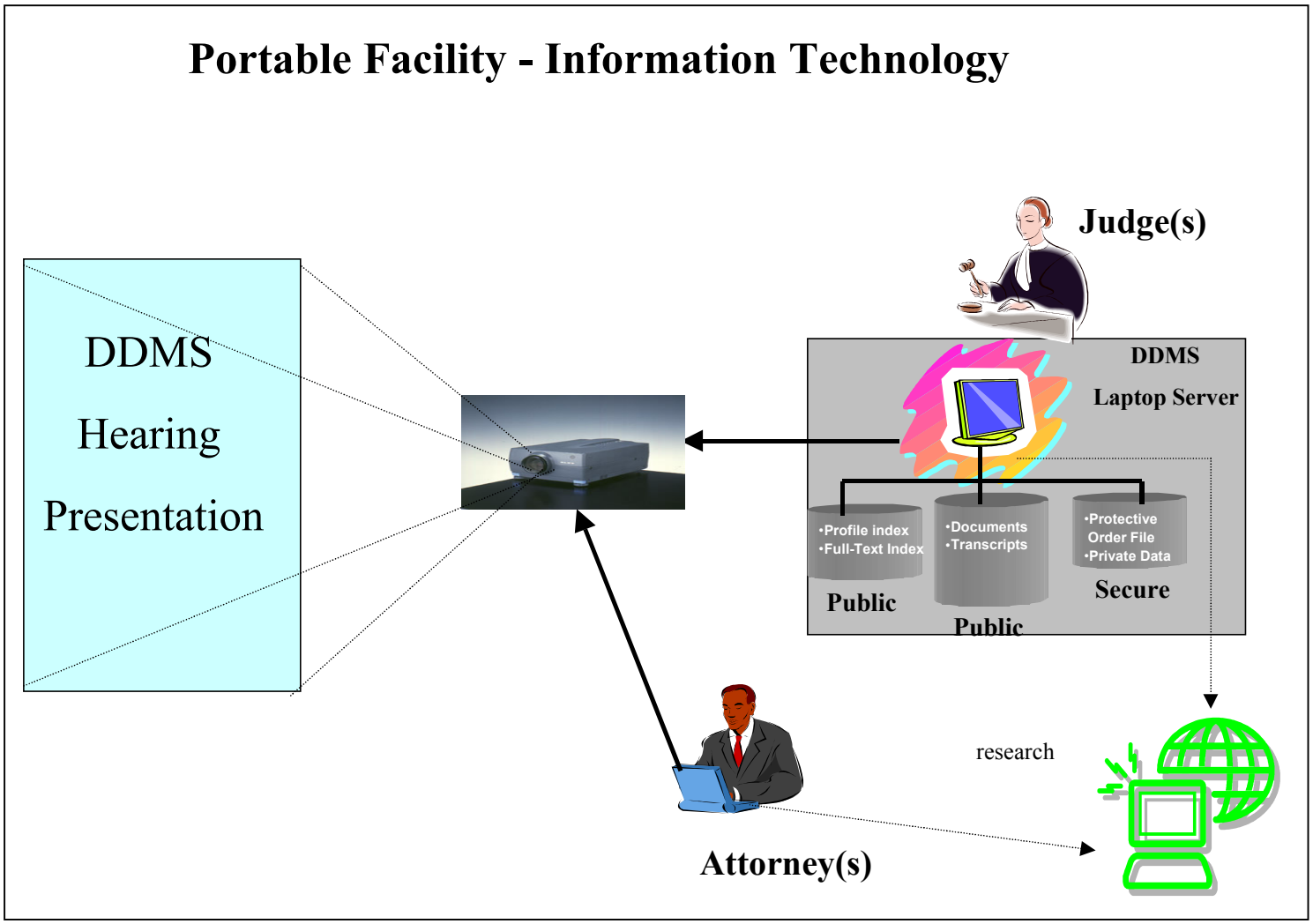
DESCRIPTION	QTY	EXTENDED PRICE
Audio Visual Control System/Room Design/Integration and Installation • All A/V wiring • All A/V patch/switches • Two flat panel color LCD touch control panels one at the judges bench one at the clerks. • 4-channel hearing and translation support system • Speakers • Lighting	1	■■■■■■■■
Pan tilt zoom general wide coverage cameras	2	■■■■■■■■
Videoconference System one in Las Vegas Area	1	■■■■■■■■
VCR decks	12	■■■■■■■■
Video mark up system	1	■■■■■■■■
One microphone per position	16	■■■■■■■■
One fixed camera per position	16	■■■■■■■■
Monitors (for positions that do not have workstation displays)	5	■■■■■■■■
Gas Plasma Monitors (two for gallery one for outside hearing room)	3	■■■■■■■■
Projector	1	■■■■■■■■
Document Camera	1	■■■■■■■■
Motorized projection screen	1	■■■■■■■■
TOTAL		■■■■■■■■

4.2.1.3 Other Hearing Locations System

A Portable IT system is required to support the small remote hearings that will occur in locations other than Rockville or Las Vegas Area. The judges and hearing participants will require access to DDMS information to conduct the hearing. Some of these remote hearing sites will not have reliable telecommunications infrastructure, and therefore this system has been designed to not depend on long distance communications.

Information Technology (IT)

The IT system required to support a Portable System is illustrated in the figure below.



In the diagram shown above, a laptop computer fully equipped with a copy of the DDMS database and documents will be the core system used at the remote hearings. The DDMS databases will represent the most recent copy available to be duplicated prior to the trip to the

remote hearing site. This will allow the judges and local hearing participants to search and display pre-filed exhibits. The DDMS on the laptop will also support the marking of evidence at the remote site, but will not support the capture of new electronic or paper information. In addition, the DDMS at other hearing locations will not support remote web access or provide a video streaming capability.

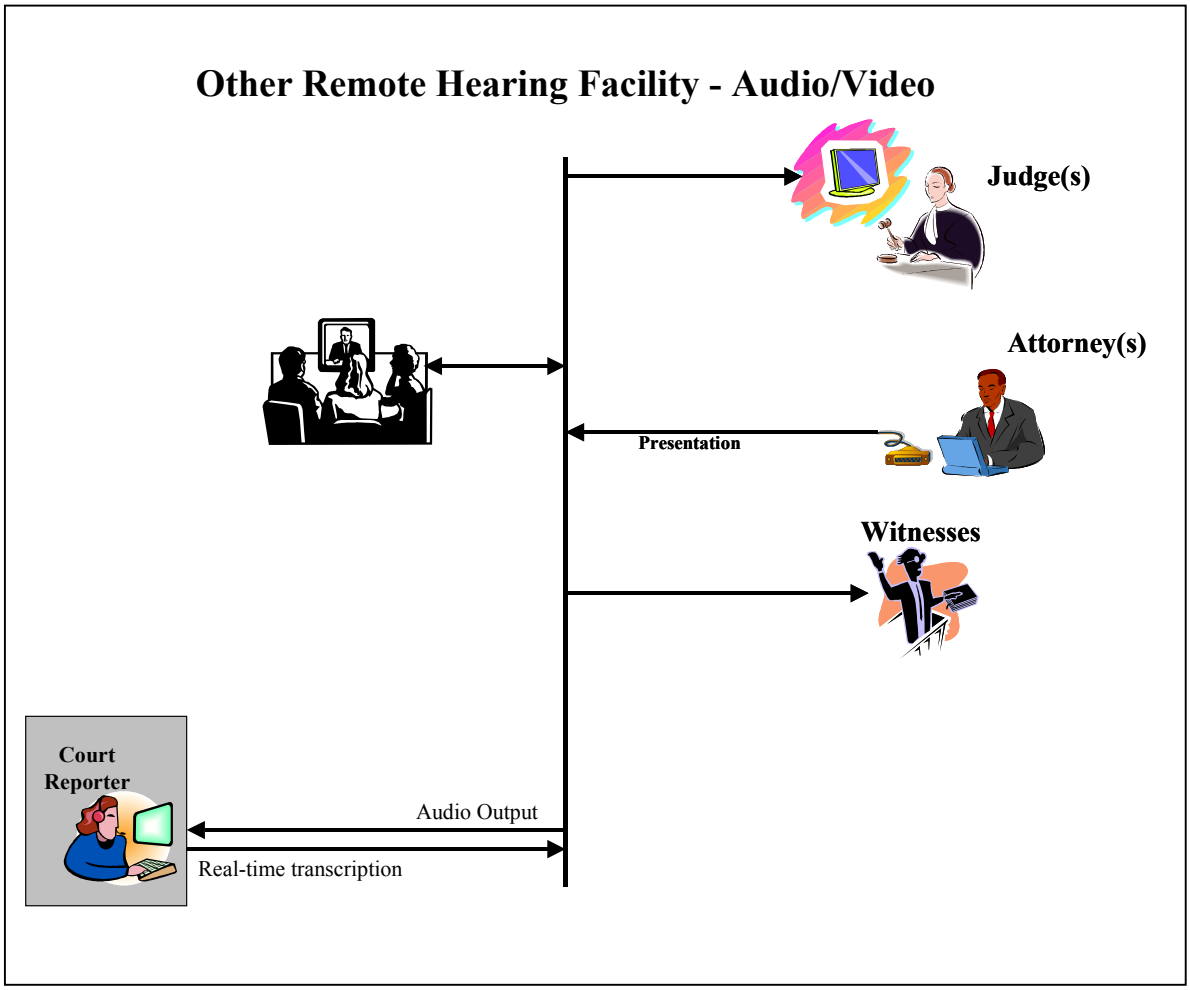
No LAN support will be provided to the users. Consequently, DDMS information will be displayed to hearing participants by projecting the DDMS search results screens onto a large screen. In addition, litigants will be permitted to display their evidence by sharing the projector used with the DDMS system. The Portable system can also be used as a backup facility to both the Rockville and Las Vegas Area systems, when no remote hearings are in progress.

The following table presents a list of the components required to support the Portable IT facility.

Equipment Required	**Qty**	**Cost ($)**	**Comment**
Hardware – DDMS Server			
NT 2000 Server – Laptop Based	1	■■■■■■■	Get fastest Chips available at the time
- 2 GB RAM			
- 100 GB hard-drive			
- 5-user License			Support for a maximum of 5 users.
Software			
EDMS Product	0	0	Included in Rockville software
Custom Software	0	0	Develop Custom Code to support integration of updates (evidence markings) with core DDMS system. Included in Rockville estimates.

Audio/Video

The A/V system for Portable system will be a limited set of the functional capabilities available at the Rockville and Las Vegas Area facilities. This system is illustrated in the following diagram.

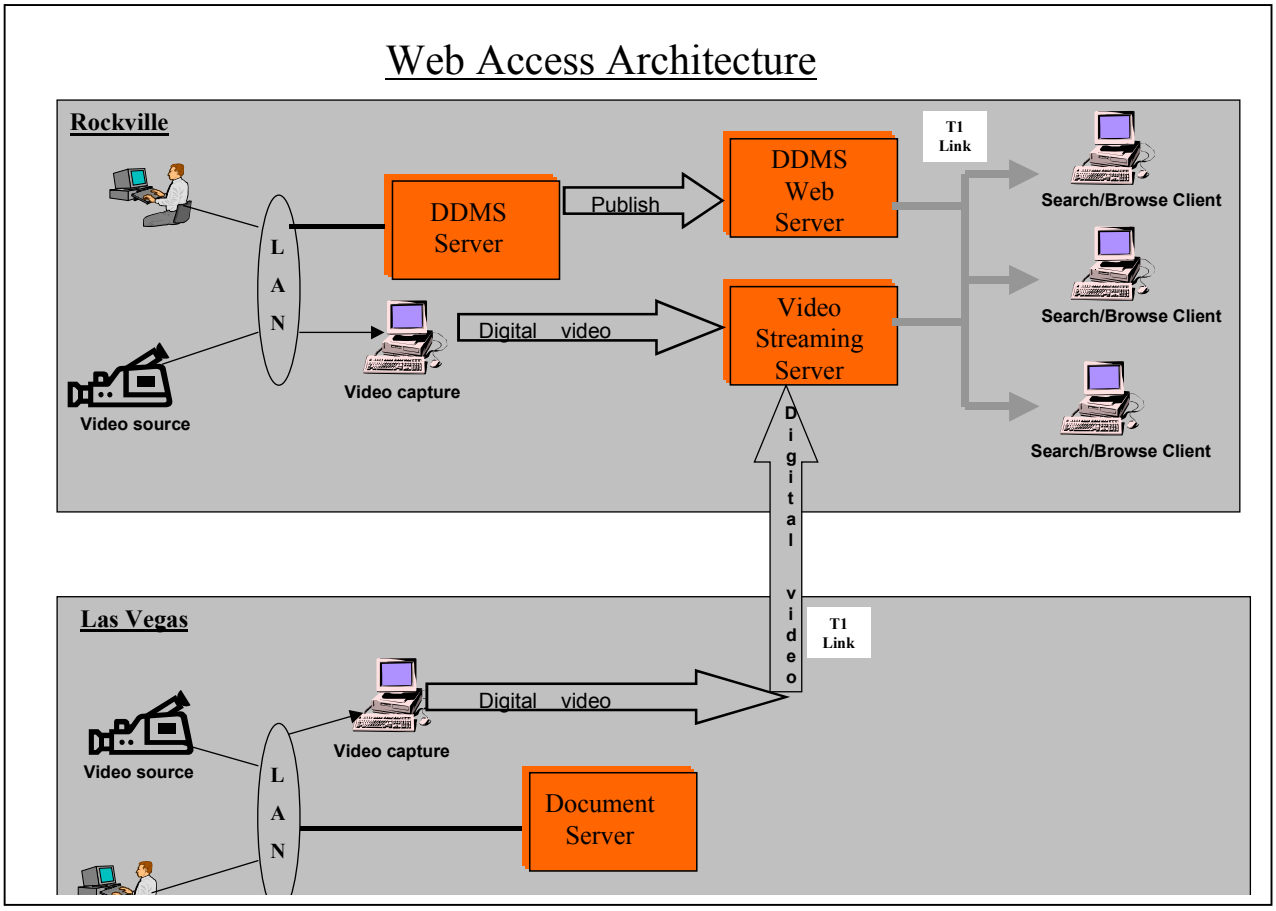


The table below provides a list of the components required to support the Other Hearing Location A/V system.

Equipment Required	Qty	Cost ($)	Comment
Video-Conferencing	1		This equipment will be leased as needed to support the other Hearing locations.
Audio	1		
Projector	1		
Screen	1		

4.2.1.4 Web Access

Web access is comprised of two solutions, one for video streaming and the second for remote access to the DDMS for hearing participants. These solutions are presented together because they share some common components. The figure below presents an illustration of how both solutions will work. As demonstrated in the illustration, both solutions share a single T1 communication link for communications with the Internet users. Two (2) separate web servers located in Rockville, a Video Streaming Server and a DDMS Web Server will share the T1 link. In addition, another T1 link is required to support transmission of web streaming information between the Las Vegas Area Hearing site and the Video Streaming Server in Rockville.



The following table presents a list of the components required to support web access to the DDMS system.

Remote Web Access Configuration			
Equipment Required	**Qty**	**Cost ($)**	**Comment**
Hardware – Web Access Server			
NT 2000 Server – Quad CPU	1	■■■■■■■	Get fastest Chips available at the time
- 4 GB RAM	1		
- 100 GB hard-drive	1		Use RAID technology to improve reliability
- DLT tape backup	1		Backup server support
- 10/100 Mbit LAN card	1		Operate at 100 Mbit speed
Subtotal		■■■■■■■	
Software			
EDMS Product	1	■■■■■■■	Panagon Publish Module assumed
Implementation		■■■■■■■	Installation, Customization, and Integration
Subtotal		■■■■■■■	
Communications			
- T1 Lines	1	■■■■■■■	Lease T1 infrastructure
Subtotal		■■■■■■■	
TOTALS		■■■■■■■	

The following table presents a list of the components required to support the Video Streaming of the HLW over the web.

Video Streaming Server Configuration			
Equipment Required	**Qty**	**Cost ($)**	**Comment**
Hardware – Video Streaming Server			
NT 2000 Server – Quad CPU	1	■■■■■■■	Get fastest Chips available at the time
- 4 GB RAM	1		
- 100 GB hard-drive	1		Use RAID technology to improve reliability
- DLT tape backup	1		
- 10/100 Mbit LAN card			
Subtotal		■■■■■■■	
Implementation			
Implementation		■■■■■■■	Installation, Customization and Integration
Subtotal		■■■■■■■	
Communications			
- T1 Lines	2	■■■■■■■[11]	Lease T1 infrastructure
Subtotal		■■■■■■■	
Video Compression Workstation			
- Osprey Codec Card	2	■■■■■■■	Includes workstation
Subtotal		■■■■■■■	
TOTALS		■■■■■■■	

[11] The Remote Web Access and Video Streaming solutions are assumed to share 1 T1 line for transmission to the Internet. Consequently, only 1 T1 line is price here, while the 2nd line is priced with the Web Access Server Configuration. If the Web Access Server is not implemented, an additional T1 line needs to be added here.

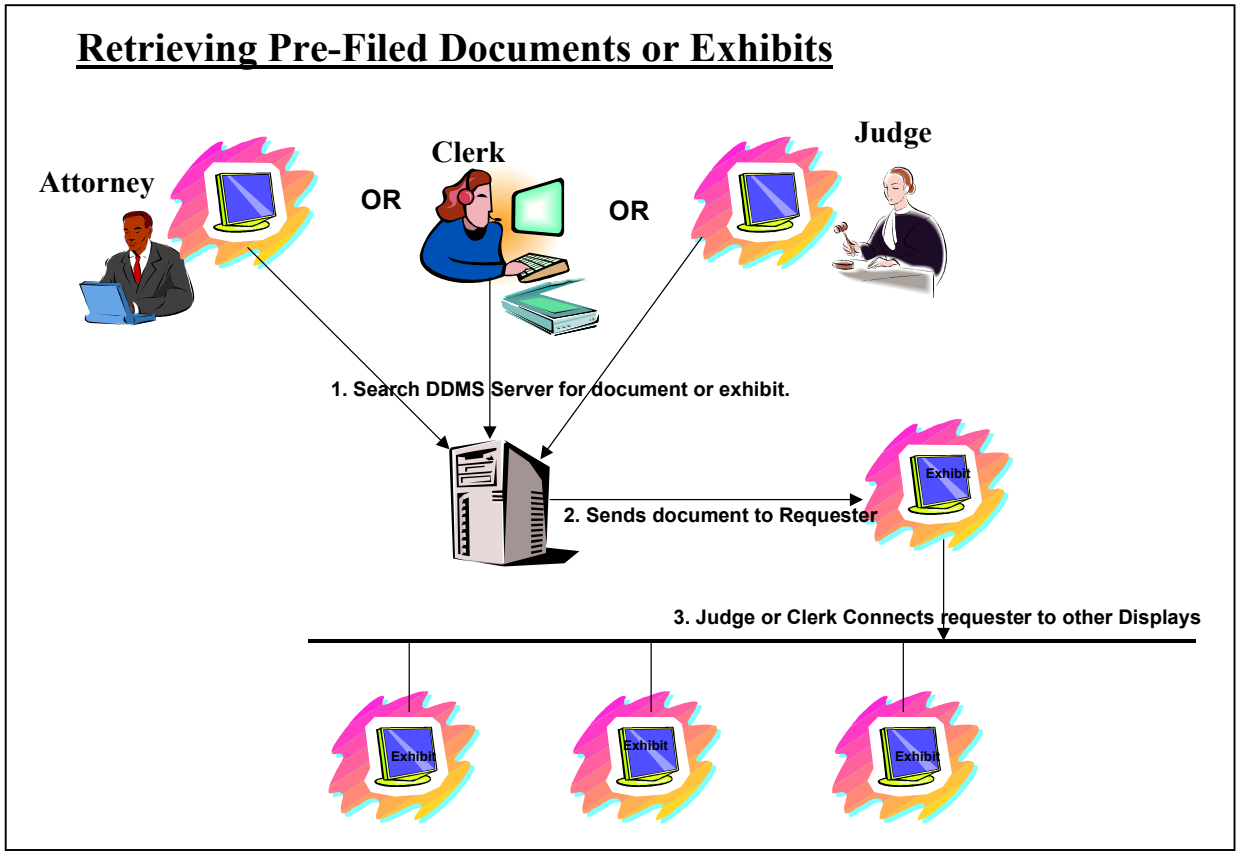
4.2.2 Process Impacts

The impact of the Full DDMS Solution on the business associated with conducting an electronic hearing is demonstrated by looking at the following sets of processes:

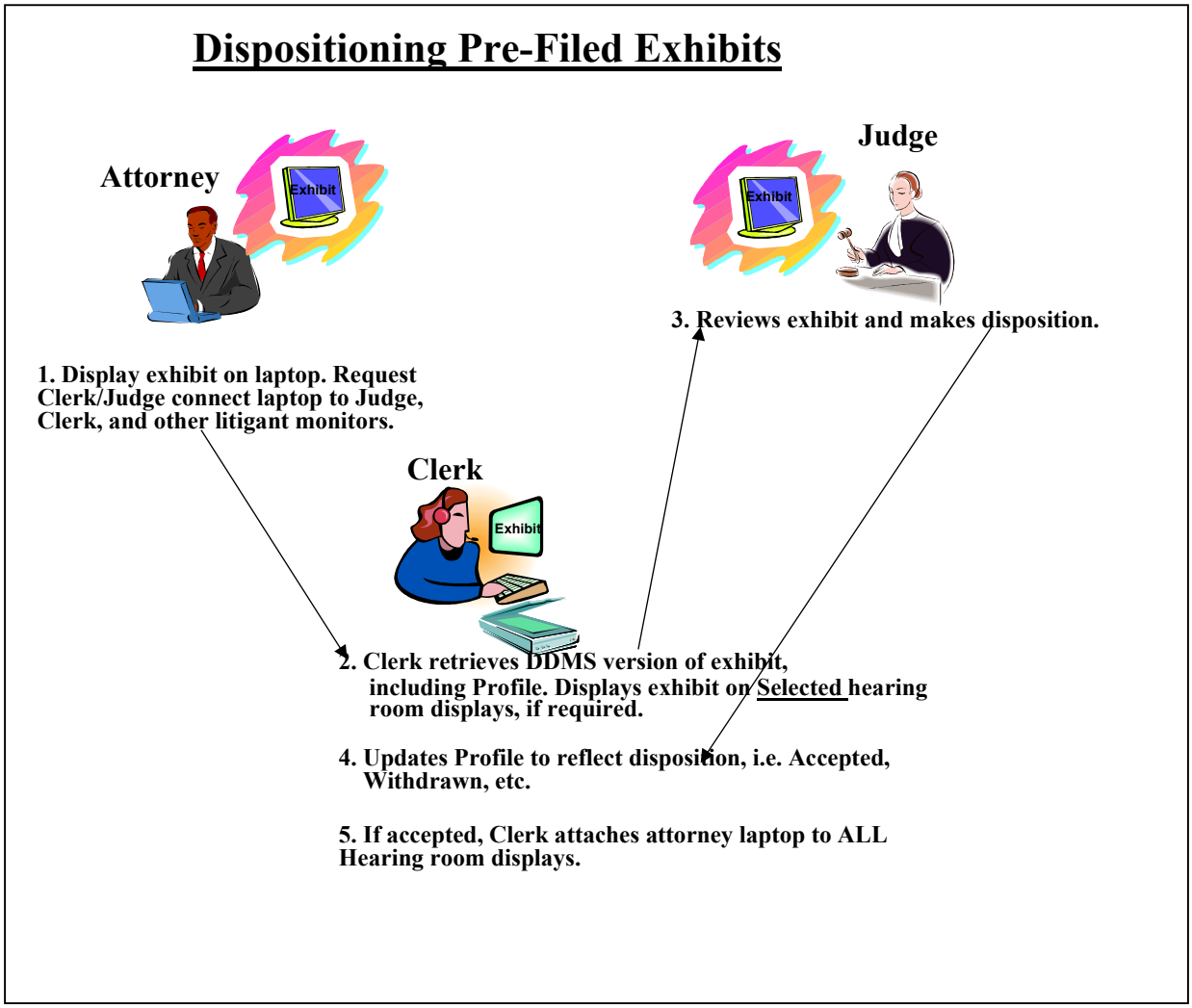
- Retrieving Pre-Filed Exhibits
- Dispositioning Pre-Filed Exhibits
- Capturing New Electronic Exhibits
- Capturing New Paper Exhibits
- Real-Time Transcription

These processes are described in the following sections.

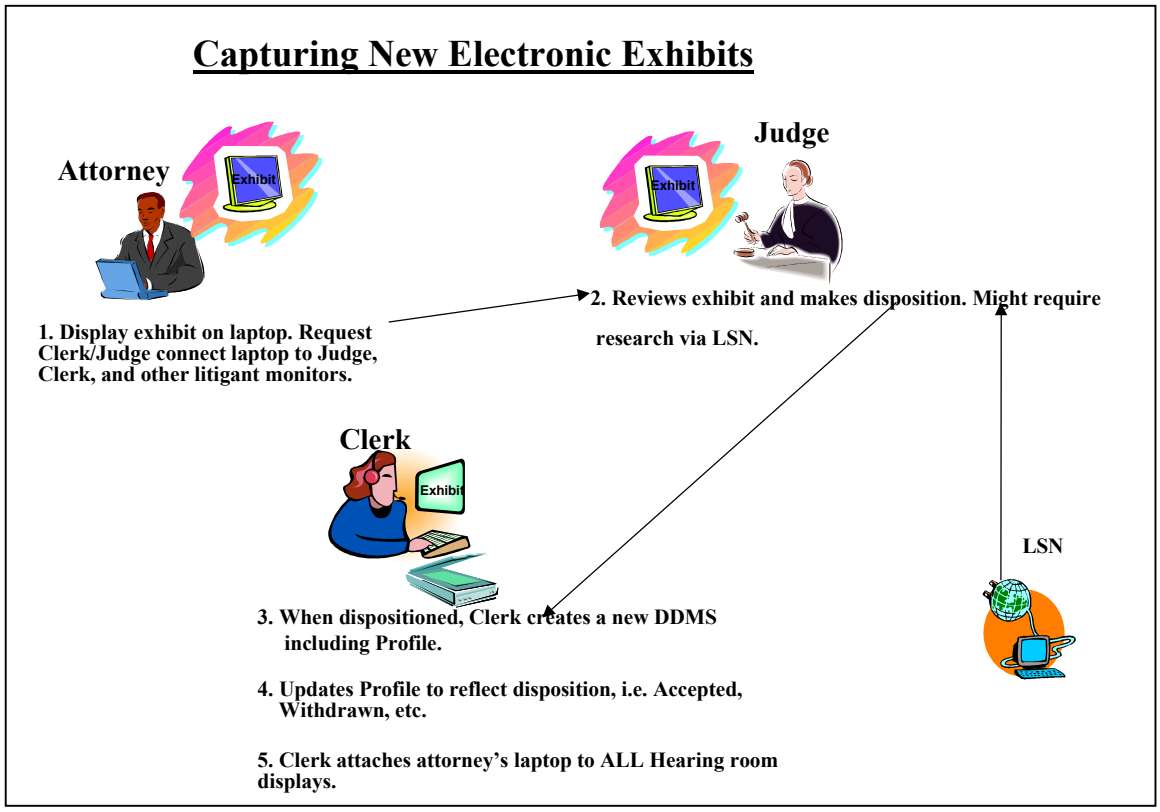
Retrieving Pre-Filed Exhibits



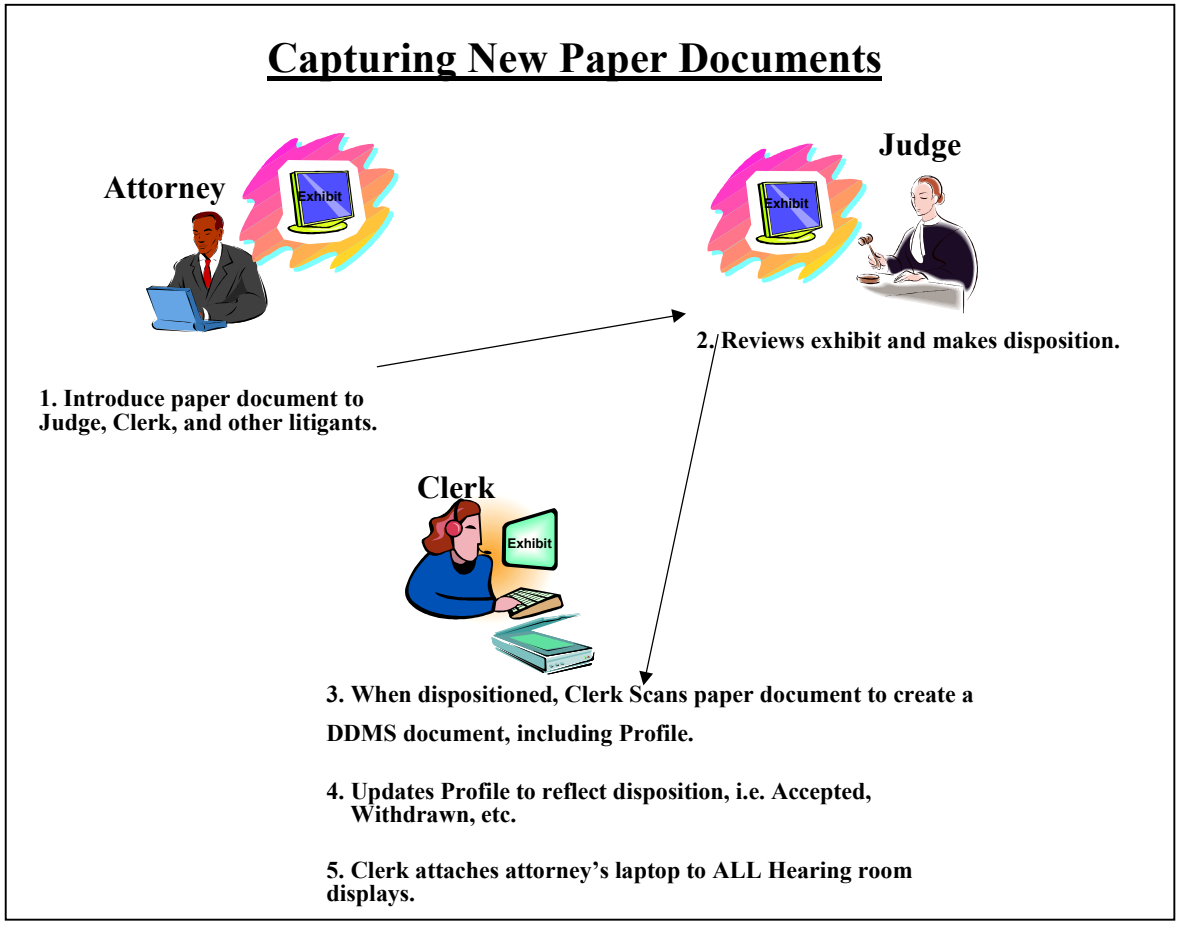
Dispositioning Pre-Filed Exhibits



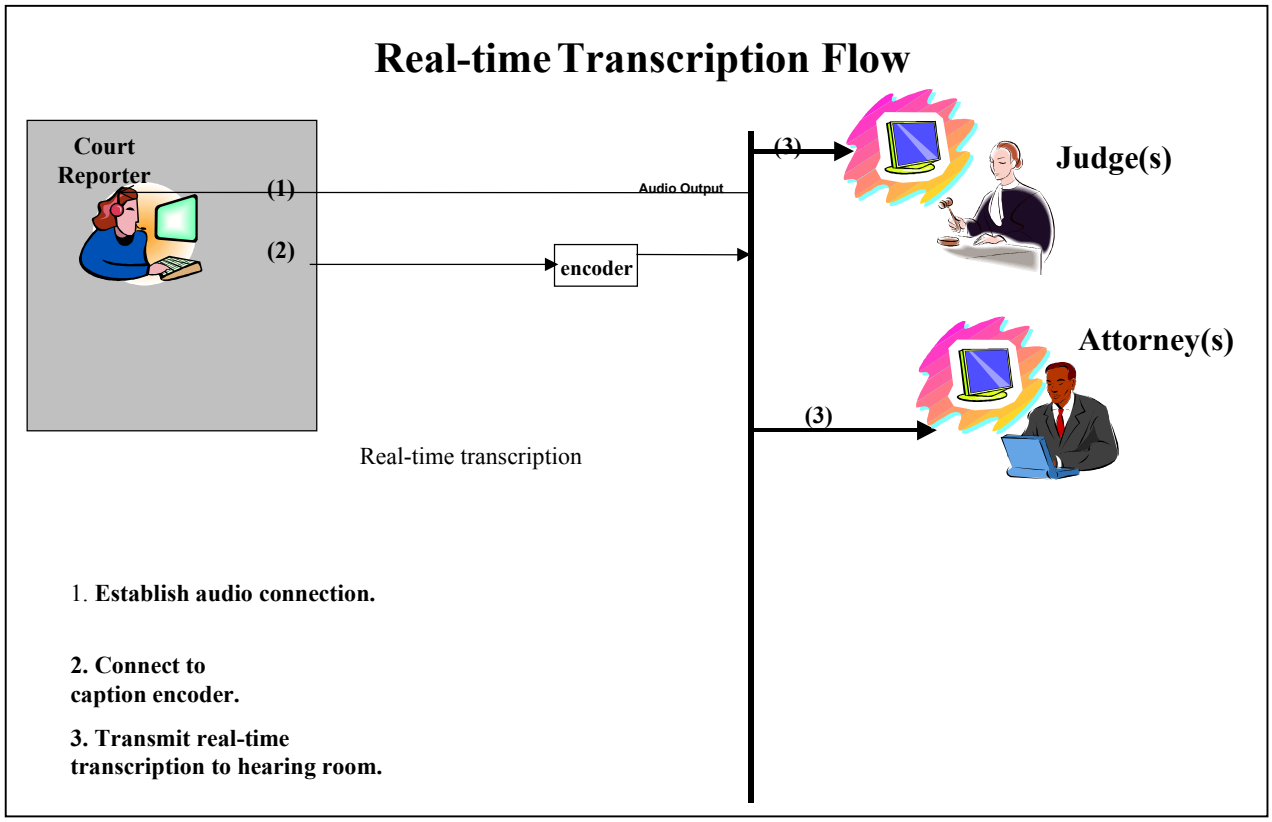
Capturing New Electronic Exhibits



Capturing New Paper Exhibits



Real-Time Transcription



4.2.3 Full DDMS Solution Cost Profile Summary

The information technology (IT) capability presented below includes Document Management, Hearing Management, Multimedia Management, Communications, and Data Storage component costs. These components use similar technology to enable their functions, therefore, the equipment, software and services required to implement these capabilities are very similar. Audio/Video components generally are much different from IT components and are presented separately. Standard cost elements are summarized in this section to document the life-cycle costs estimated to conduct ASLBP hearings, especially for the HLW repository proceedings using the DDMS Recommended Alternative as the Full DDMS Solution. Appropriate cost estimates have been extracted from Section 4.3.1 or computed from information as detailed in Appendix 2.

These cost elements cover all efforts for the NRC to develop, implement, operate and maintain the Full DDMS Solution to conduct the HLW repository proceedings over the six calendar years presented. Constant dollars are used in this summary. This means that the purchasing power of the dollar is unchanged throughout the lifecycle forecast.

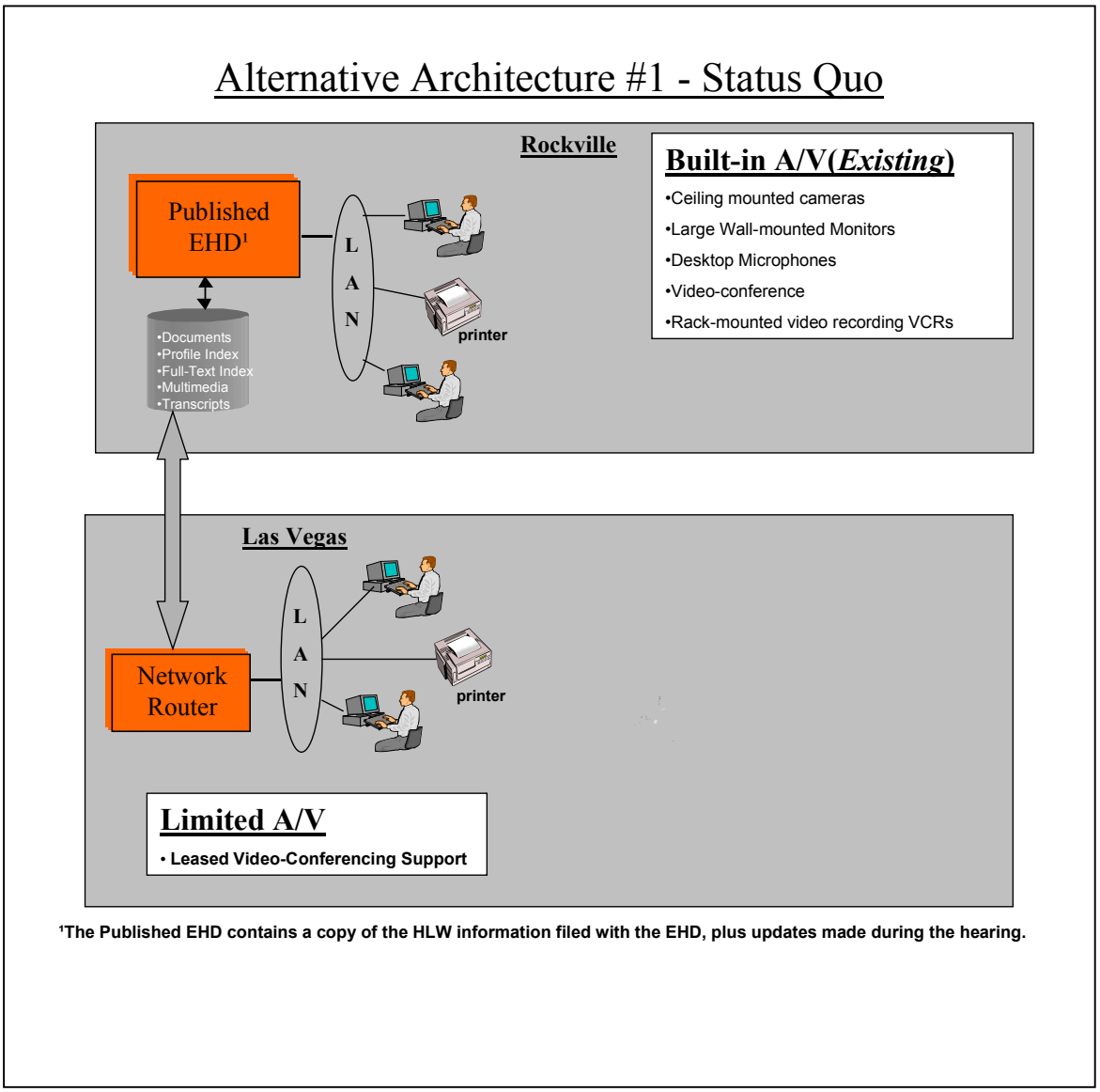
Full DDMS Solution Cost							
	Fiscal Year						
Cost Elements	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**Totals**
Hardware Acquisition	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Software Acquisition	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Installation/Implementation	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Documentation	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
COTS Customization	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Development/Integration	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Data Conversion/Loading	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Testing	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Infrastructure Upgrades	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Training	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Travel (NRC)	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Security Plan/Implement	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Policy/Procedures Development/Implement	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Contractor Support Services	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Non-Recurring Cost Total	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Hardware Maintenance	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Software Maintenance	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Infrastructure Support	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Application Operations/Maintenance	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Hearing Room Operations	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Recurring Costs Total	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Total Solution Costs	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Cumulative Costs	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■

4.3 HLW Status Quo

The HLW Status Quo Alternative is presented in order to provide a baseline for cost and benefit comparisons.

4.3.1 Description

Existing and planned ADAMS database management capabilities for the EHD will be utilized to the maximum practical extent. Minimal audio-visual capabilities will be employed at sites other than Rockville. The diagram below summarizes the HLW Status Quo Alternative.



4.3.1.1 Rockville Facility

Under the HLW Status Quo Alternative, the Rockville hearing room will have the capabilities available as summarized in the following table:

Component	Description
Document Management	The ASLBP would utilize the expected capability to be provided by ADAMS to publish the entire EHD for the HLW repository hearings to a server outside the NRC firewall. This server would store all HLW repository hearing docket entries. Read only access, granted by the presiding officer, would be available by hearing participants only from within the hearing room via a LAN.
Audio Video	The existing A/V capabilities at the Rockville hearing room are available to support the multimedia requirements of HLW repository proceedings. Existing audio capabilities can be utilized and a video record of the proceedings can be recorded.

The table below provides the IT components required to support the Rockville facility.

Equipment Required	Qty	Cost ($)	Comment
Hardware – DDMS Document Server			
NT 2000 Server – Quad CPU	1	■■■■■■	Get fastest Chips available at the time
- 4 GB RAM	1		
- 100 GB hard-drive	1		Use RAID technology to improve reliability
- DLT tape backup	1		Backup server support
- 10/100 Mbit LAN card	1		Operate at 100 Mbit speed
Subtotal		■■■■■■	
Clients			
- Windows Workstation	11	■■■■■■	Use standard provided NRC configuration
- Laptop	4	■■■■■■	Included in Rockville count
Subtotal		■■■■■■	
Printer			
- Medium speed printer	2	■■■■■■	Support 1000 pages/day
Subtotal		■■■■■■	
Software			
Panagon EDMS Product		■■■■■■	Publish Module
Implementation		■■■■■■	Implement Publish capability with ADAMS
Integration		■■■■■■	Customizations to meet HLW requirements
Subtotal		■■■■■■	
Communications			
- T1 Line	1	■■■■■■	Lease T1 infrastructure
- Category 5 cabling	1	■■■■■■	Wire Rockville Facility to support LAN
Subtotal		■■■■■■	
Real-time Transcription			
- Services		■■■■■■	■■■■■/day times 150 hearing days
- LiveNote Software	1	■■■■■■	
Subtotal		■■■■■■	

4.3.1.2 Las Vegas Area Facility

Under the HLW Status Quo Alternative, the Las Vegas Area hearing room facility will have the capabilities available as summarized in the following table:

Component	Description
Document Management	The ASLBP would utilize the expected capability to be provided by ADAMS to publish the HLW docket from the EHD to a server outside the NRC firewall. This server would store all HLW repository hearing docket entries. Read only access, granted by the presiding officer, would be available by hearing participants only from within the hearing room via ASLBP provided high-speed T1 communication links.
Audio Video	Audio, videoconferencing will be leased to support the hearing, as is done for remote hearings. A LCD projector and screen will be purchased to support shared viewing of electronic information.

The table below provides the IT components required to support the Las Vegas Area facility.

Equipment Required	Qty	Cost ($)	Comment
Clients			
- Windows Workstation	20	■■■■■■	Use standard provided NRC configuration
- Laptop	0	0	Included in Rockville count
Subtotal		■■■■■■	
Printer			
- Medium speed printer	2	■■■■■■	Support 1000 pages/day
Subtotal		■■■■■■	
Software			
Panagon EDMS Product			Included in Rockville configuration
Implementation			Included in Rockville configuration
Communications			
- T1 Lines	1	■■■■■■	Lease T1 infrastructure
- Category 5 cabling	1	■■■■■■	Wire Rockville Facility to support LAN
Subtotal		■■■■■■	
A/V			
LCD Projector & Screen	1	■■■■■■	
Subtotal		■■■■■■	
Real-time Transcription			
- Services			Included in Rockville table Included in Rockville table
- LiveNote software	15	■■■■■■	
Subtotal		■■■■■■	

4.3.1.4 Other Hearing Locations

Under the HLW Status Quo Alternative, other hearing locations will have the capabilities available as summarized in the following table:

Component	Description
Document Management	No Document Management services will be provided.
Audio Video	Audio, videoconferencing will be leased to support the hearing. A LCD projector and screen will be purchased to support shared viewing of electronic information.

4.3.1.5 Web Access

The HLW Status Quo solution will support the Web Access to the EHD electronic docket by publishing the docket to a publicly accessible server outside of the NRC firewall. The publicly available server will not be dedicated to the HLW, but shared by all EHD published dockets. Searching using the docket number assigned to the HLW will allow users to access HLW information only.

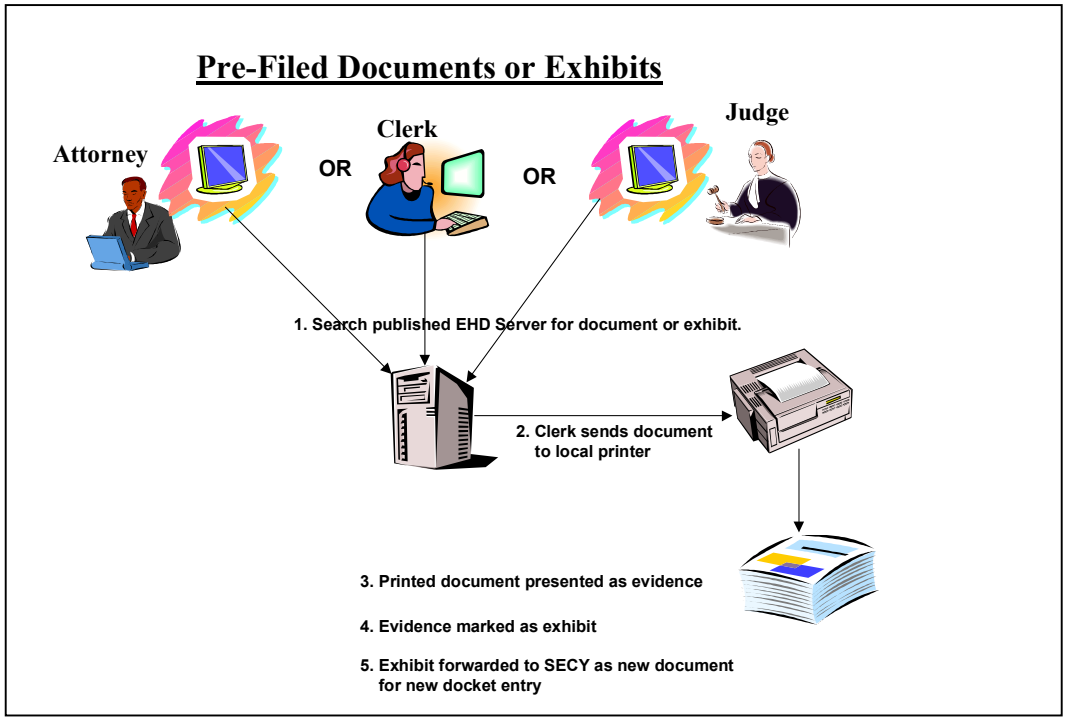
The HLW Status Quo solution will not support the Video Streaming requirement.

4.3.2 Processes Impacts

Regardless of hearing location, documents will be processed in the HLW Status Quo Alternative as presented below.

4.3.2.1 Pre-Filed Documents

Basically, pre-filed documents will be printed, marked, and forwarded to SECY as new documents to be memorialized in the official record. The diagram summarizes how pre-filed documents will be handled in the HLW Status Quo Alternative.



4.3.2.2 New and Modified Pre-Filed Documents

Basically, new documents (not pre-filed) and modified pre-filed documents will handled as paper or physical evidence, marked, and forwarded to SECY as new documents to be memorialized in the official record. There are no electronic information flows with new or modified documents. Attorney's introducing new or modified pre-filed documents must provide the following:

- Two hardcopies for the hearing, and
- One copy for each litigant at the hearing.

The hearing copies will be marked, one will be retained for the hearing and the other forwarded to SECY to be stored in the EHD. All changes or updates related the EHD related to the HLW will be published to the EHD Copy server on a regular scheduled timeframe.

4.3.3 HLW Status Quo Cost Profile Summary

Standard cost elements are summarized in this section to document the life-cycle costs estimated to conduct ASLBP hearings, especially for the HLW repository proceedings using the HLW Status Quo Alternative. Appropriate cost estimates have been extracted from Section 4.3.1 or computed from information as detailed in Appendix 2.

These cost elements cover all efforts for the NRC to develop, implement, operate and maintain the technical solution to conduct the HLW repository proceedings over the six calendar years presented. Constant dollars are used in this summary. This means that the purchasing power of the dollar is unchanged throughout the lifecycle forecast.

HLW Status Quo Solution Cost							
	Fiscal Year						
Cost Elements	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**Totals**
Hardware Acquisition	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Software Acquisition	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Installation/Implementation	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Documentation	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
COTS Customization	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Development/Integration	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Data Conversion/Loading	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Testing	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Infrastructure Upgrades	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Training	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Travel (NRC)	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Security Plan/Implement	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Policy/Procedures Development/Implement	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Contractor Support Services	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Non-Recurring Cost Total	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Hardware Maintenance	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Software Maintenance	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Infrastructure Support	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Application Operations/Maintenance	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Hearing Room Operations	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Recurring Costs Total	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Total Solution Costs	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■
Cumulative Costs	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■■■■

4.4 COST-BENEFIT ANALYSIS

4.4.1 Cost Comparison

The total estimated costs to implement the alternative solutions are presented in this section. Section 4.4.1.1 presents the investment totals for the two alternatives. Section 4.4.1.2 presents the life cycle cost summary for the two alternatives. Section 4.4.1.3 presents that total cost summary for the two alternatives.

4.4.1.1 Investment Cost Comparison

The following table presents the non-recurring cost estimates for NRC investment into the capabilities required to conduct the HLW repository proceedings in accordance with the Rules currently imposed upon the ASLBP.

Investment Cost Comparison		
Cost Elements	**HLW Status Quo Solution**	**Full DDMS Solution Total**
IT Hardware Acquisition	■■■■■■	■■■■■■
A/V Hardware Acquisition	■■■■■■	■■■■■■
IT Software Acquisition	■■■■■■	■■■■■■
A/V Software Acquisition	■■■■■■	■■■■■■
IT Installation/Implementation	■■■■■■	■■■■■■
A/V Installation/Implementation	■■■■■■	■■■■■■
IT Documentation	■■■■■■	■■■■■■
A/V Documentation	■■■■■■	■■■■■■
IT COTS Customization	■■■■■■	■■■■■■
A/V COTS Customization	■■■■■■	■■■■■■
IT Development/Integration	■■■■■■	■■■■■■
A/V Development/Integration	■■■■■■	■■■■■■
IT Data Conversion/Loading	■■■■■■	■■■■■■
A/V Data Conversion/Loading	■■■■■■	■■■■■■
IT Testing	■■■■■■	■■■■■■
A/V Testing	■■■■■■	■■■■■■
IT Infrastructure Upgrades	■■■■■■	■■■■■■
A/V Infrastructure Upgrades	■■■■■■	■■■■■■
IT Training	■■■■■■	■■■■■■
A/V Training	■■■■■■	■■■■■■
IT Travel (NRC)	■■■■■■	■■■■■■
A/V Travel (NRC)	■■■■■■	■■■■■■
IT Security Plan/Implement	■■■■■■	■■■■■■
A/V Security Plan/Implement	■■■■■■	■■■■■■
IT Policy/Procedures Develop/Implement	■■■■■■	■■■■■■
A/V Policy/Procedures Develop/Implement	■■■■■■	■■■■■■
IT Contractor Support Services	■■■■■■	■■■■■■
A/V Contractor Support Services	■■■■■■	■■■■■■
Non-Recurring Cost Total	■■■■■■	■■■■■■

Based on the above estimates, is projected that the costs to implement the Full DDMS Solution will require approximately ■■■■■■■■■■ more than that required to upgrade the existing system to minimally meet functional requirements to conduct the HLW repository hearings as proscribed.

4.4.1.2 Life Cycle Cost Comparison

The following table presents the recurring cost estimates for NRC life cycle funding to support the capabilities required to conduct the HLW repository proceedings in accordance with the Rules currently imposed upon the ASLBP.

Life Cycle Cost Comparison		
Cost Elements	**HLW Status Quo Solution**	**Full DDMS Solution Total**
IT Hardware Maintenance	■■■■■■	■■■■■■
A/V Hardware Maintenance	■■■■■■	■■■■■■
IT Software Maintenance	■■■■■■	■■■■■■
A/V Software Maintenance	■■■■■■	■■■■■■
IT Infrastructure Op/Maintenance	■■■■■■	■■■■■■
A/V Infrastructure Op/Maintenance	■■■■■■	■■■■■■
IT Application Op/Maintenance	■■■■■■	■■■■■■
A/V Application Op/Maintenance	■■■■■■	■■■■■■
IT Hearing Room Op/Support	■■■■■■	■■■■■■
A/V Hearing Room Op/Support	■■■■■■	■■■■■■
Non-Recurring Cost Total	■■■■■■	■■■■■■

Based on the above estimates, is projected that the costs to operate the HLW Status Quo Solution will require approximately ■■■■■■■ more than that required to operate the Full DDMS Solution to minimally meet functional requirements to conduct the HLW repository hearings as proscribed.

4.4.1.3 Total Cost Comparison

The following table presents the total cost estimates for NRC life cycle funding to support the capabilities required to conduct the HLW repository proceedings in accordance with the Rules currently imposed upon the ASLBP.

Cost Comparisons		
Cost Elements	**HLW Status Quo Solution**	**Full DDMS Solution**
Hardware Acquisition	■■■■■■	■■■■■■
Software Acquisition	■■■■■■	■■■■■■
Installation/Implementation	■■■■■■	■■■■■■
Documentation	■■■■■■	■■■■■■
COTS Customization	■■■■■■	■■■■■■
Development/Integration	■■■■■■	■■■■■■
Data Conversion/Loading	■■■■■■	■■■■■■
Testing	■■■■■■	■■■■■■
Infrastructure Upgrades	■■■■■■	■■■■■■
Training	■■■■■■	■■■■■■
Travel (NRC)	■■■■■■	■■■■■■
Security Plan/Implement	■■■■■■	■■■■■■
Policy/Procedures Develop/Implement	■■■■■■	■■■■■■
Contractor Support Services	■■■■■■	■■■■■■
Non-Recurring Cost Total	■■■■■■	■■■■■■
Hardware Maintenance	■■■■■■	■■■■■■
Software Maintenance	■■■■■■	■■■■■■
Infrastructure Support	■■■■■■	■■■■■■
Application Operations/Maintenance	■■■■■■	■■■■■■
Hearing Room Operations	■■■■■■	■■■■■■
Recurring Costs Total	■■■■■■	■■■■■■
Total Solution Costs	■■■■■■	■■■■■■

Based on the above estimates, is projected that the total costs to implement the Full DDMS Solution over the 6 year time frame will require approximately ■■■■■■■■■ 8 more than that required to upgrade and operate the existing system to minimally meet functional requirements to conduct the HLW repository hearings as proscribed. These are preliminary estimates of the costs that accrue to each alternative.

4.4.2 Benefits Comparison

Quantitative Benefits (FTE) Estimates		
Benefit	**HLW Status Quo Solution**	**Full DDMS Solution**
ASLBP IT Training	■■■■■■	■■■■■■
ASLBP A/V Training	■■■■■■	■■■■■■
ASLBP IT Project Support	■■■■■■	■■■■■■
ASLBP A/V Project Support	■■■■■■	■■■■■■
ASLBP IT Operation Support	■■■■■■	■■■■■■
ASLBP A/V Operation Support	■■■■■■	■■■■■■
Total ASLBP Estimates	■■■■■■	■■■■■■
Other NRC IT Operation Support	■■■■■■	■■■■■■
Other NRC A/V Operation Support	■■■■■■	■■■■■■
Total NRC Estimates	■■■■■■	■■■■■■
Other Party IT Operation Support	■■■■■■	■■■■■■
Other Party A/V Operation Support	■■■■■■	■■■■■■
Total FTE Estimates	■■■■■■	■■■■■■

The above computations are preliminary estimates of labor required to implement each alternative and to conduct the HLW hearings under current rules. These are preliminary estimates of the FTEs that accrue to each alternative.

The non-quantitative benefits comparisons are provided in the following table. A detailed discussion of the benefit for both solutions is provided in Sections 3.3.1 and 3.3.4.

Non-Quantitative Benefits			
Benefit	**HLW Status Quo Solution**	**Full DDMS Solution**	**Comments**
Ease of Use	3	1	
Performance	3	1	
Flexibility or Scalability	3	1	
Implementation Complexity	1	1	
System Availability	2	2	
Level of Control	3	2	
Infrastructure Impact	1	2	
Business Resource Impact	1	1	
Total Scores	17	11	
Average Score per Criteria	**2.12**	**1.38**	

The comparison illustrates that the Full DDMS solution provides more benefits in comparison to the HLW Status Quo solution. These are preliminary estimates of the non-quantitative benefits that accrue to each alternative.

4.4.3 Risk Comparison

The non-quantitative risks associated with both the HLW Status Quo and Full DDMS solution are illustrated in the following table.

Non- Quantitative Risks			
Rating: **1 – High level of risk** **2 – Medium level of risk** **3 – Low to no level of risk**	**HLW Status Quo**	**Full DDMS Solution**	**Comments/Notes**
Volatility/stability of Requirements	2	3	The Status Quo does not meet all of the requirements defined for the DDMS. This study assumes that only a subset of the DDMS requirements need to be addressed by the Status Quo. This assumption could be revised to reflect additional HLW hearing considerations.
Scope of Proposed Project (ability to accommodate change)	1	3	The current ADAMS system is being stabilized to support the planned updates required by the agency users. Consequently, there is a high risk associated in adapting the schedule to accommodate unknown requirements that might come up.
Technical Risk (unproven vs. proven technology)	3	3	No new technology is being introduced to support the HLW. Both alternatives use proven IT and A/V technologies.
Management Consensus (related to number of organizations involved)	3	3	
Resource commitments (FTEs, $)	1	2	The continued operation of the ADAMS system requires updates and new functional enhancements. NRC has plans to utilize existing staff to support this system through 2004. Support for the HLW by existing NRC personnel cannot be assumed.
Potential resistance	1	3	The current ADAMS system, basis for the Status Quo, has a poor reputation among the intended users of the DDMS. There are also reservations in regards to the ability to fix the performance and usability issues identified. Consequently, any plan to use the current or enhanced ADAMS for HLW will be met with much resistance.

Non- Quantitative Risks			
Rating: **1 – High level of risk** **2 – Medium level of risk** **3 – Low to no level of risk**	**HLW Status Quo**	**Full DDMS Solution**	**Comments/Notes**
Procurement/vendor risk	3	3	
Sponsor organizations' IT project management experience	3	2	The OCIO is the sponsoring organization for the Status Quo. This organization has been involved in implementing major IT projects. The ASLBP, sponsoring organization for the Full DDMS Solution, has less experience in IT project management. However, the ASLBP is coordinating this study with the OCIO's involvement, and is expected to utilize OCIO experience in future project-planning activities.
Average Risk	**2.125**	**2.75**	

The table above demonstrates that the Full DDMS Solution (Alternative Solution #4) provides a less riskier implementation scenario. There are no high-risk element identified with the Full DDMS Solution. However, the HLW Status Quo contains three high-risk elements, which is reflected in a higher risk profile. These are preliminary estimates of the non-quantitative risks that accrue to each alternative.

4.5 PROJECT MANAGEMENT PLANNING

The following DDMS Project Schedule documents the major milestones associated with the implementation and operation of the recommended DDMS solution in support of the HLW repository proceedings. Duration entries are in working days.

ID		Task Name	Duration	Start	Finish
1		Preliminary Planning	22 days	Thu 3/1/01	Fri 3/30/01
2		CPIC Review Process	66 days	Mon 4/2/01	Mon 7/2/01
3		Authorization to Proceed	0 days	Mon 7/2/01	Mon 7/2/01
4		Prepare Project Plans	64 days	Tue 7/3/01	Fri 9/28/01
5		**Conduct Procurements**	**262 days**	**Mon 10/1/01**	**Tue 10/1/02**
10		**Design/Develop Rockville DDMS**	**120 days**	**Wed 10/2/02**	**Tue 3/18/03**
13		**Implement Rockville System**	**105 days**	**Wed 3/19/03**	**Tue 8/12/03**
18		Build EHD Interface	170 days	Wed 10/2/02	Tue 5/27/03
19		Conduct Training	35 days	Wed 8/13/03	Tue 9/30/03
20		Rockville Initial Operations	0 days	Tue 10/7/03	Tue 10/7/03
21		Refresh EHD Information	5 days	Wed 10/1/03	Tue 10/7/03
22		Conduct Rockville HLW Hearings	561 days	Wed 10/8/03	Wed 11/30/05
23		**Design/Develop Las Vegas DDMS**	**50 days**	**Wed 8/13/03**	**Tue 10/21/03**
26		**Implement Las Vegas System**	**45 days**	**Wed 10/22/03**	**Tue 12/23/03**
31		Conduct Training	15 days	Wed 12/24/03	Tue 1/13/04
32		Conduct Las Vegas HLW Hearings	491 days	Wed 1/14/04	Wed 11/30/05
33		Dismantle Las Vegas Hearing Room	22 days	Thu 12/1/05	Fri 12/30/05
34		Lease Las Vegas Courtroom	697 days	Thu 5/1/03	Fri 12/30/05
35		Lease Communication Lines	588 days	Wed 10/1/03	Fri 12/30/05
36		Conduct Post-Hearing Support at Rockville	217 days	Thu 12/1/05	Fri 9/29/06

The Gantt chart that appears on the next page illustrates the DDMS Project Schedule.

DDMS Project Schedule

Appendix 1 – JAD Attendee List

This appendix documents the attendees present at the various Joint Application Design (JAD) sessions conducted for this study.

JAD Session October 13, 2000

Attendees:

ASLBP

Aspen

JAD Session October 19, 2000

Attendees:

ASLBP

OCIO

SECY

Aspen

JAD Session October 23, 2000

Attendees:

Aspen

JAD Session October 24, 2000

Attendees:

ASLBP

OCAA

SECY

OCM/EXM **OCM/JSM**

OCM/GJD **OCM/RAM**

Aspen

JAD Session November 1, 2000, Las Vegas Area, NV

Attendees:
Winston & Strawn
Eureka County, NV
White Pine County, NV
Landor & Churchill Cos.
Clark County, NV
Department of Energy
Booz, Allen & Hamilton
Clark County DA's Office
Esmeralda County, NV
State of Nevada Attorney General
Stone & Webster
State of Nevada
Nye, County, NV (via telephone)

Nuclear Regulatory Commission

Aspen

JAD Session November 21, 2000

Attendees:

ASLBP

Aspen

Appendix 2 – Life Cycle Details

This appendix documents the details supporting the Life Cycle Cost Profile Summaries presented in Section 4.2.3 for the Full DDMS Solution and Section 4.3.3 for the HLW Status Quo Alternative and the Cost-Benefit information summarized in Section 4.4.

Full DDMS Solution Cost Profile

Standard cost elements are presented in this section to identify the costs estimated for the Full DDMS Solution. Hardware and software costs are based on a sampling of industry solutions. Services cost estimates and other cost element estimates are based on vendor estimates, industry experience and detailed analyses of possible implementation scenarios. Costs expressed as Full Time Equivalent (FTE) units are based on 1,800 hours for the standard work year.

These cost elements cover all efforts for the NRC to develop, implement, operate and maintain the DDMS in order to support the HLW repository hearings planned to begin in the Fiscal Year (FY) 2004 timeframe. Costs are also estimated for those impacts upon other participants where the NRC is responsible for making suitable accommodations or arrangements in order to facilitate the conduct of hearings.

The information technology (IT) capability presented below includes Document Management, Hearing Management, Multimedia Management, Communications (including Web Access and Video Streaming), and Data Storage component costs. These components use similar technology to enable their functions, therefore, the equipment, software and services required to implement these capabilities are very similar. Audio/Video components generally are much different from IT components and are presented separately.

Constant dollars are used throughout this analysis. This means that the purchasing power of the dollar is unchanged throughout the lifecycle forecast. Estimated dollar values for each alternative are summarized in the Cost Benefit Analysis presented in section 4.4.

Information for each significant cost element is presented as follows:

- Description - Each cost element is identified with a brief description provided.
- Table - A table summarizing the estimated costs for the six-year time frame is provided for each element.

The cost profile documents cost estimates for both Non-Recurring and Recurring cost elements.

Full DDMS Solution Non-Recurring Cost Elements

The following Non-Recurring Cost Elements are anticipated when implementing the Full DDMS Solution:

- Hardware Acquisition
- Software Acquisition
- Installation/Implementation
- Documentation
- COTS Customization
- Development/Integration
- Data Conversion/Loading
- Testing
- Infrastructure Upgrades
- Training
- NRC Travel
- Security Plan/Implementation
- Policy/Procedures Development/Implementation
- NRC Project Support
- Contractor Support Services

Hardware Acquisition

The Full DDMS Solution requires hardware to enable information technology and audio/video functions of the DDMS.

Information Technology (IT) Capability

The information technology capability includes the costs to acquire servers, scanners, workstations, printers, storage devices, communications, and necessary cabling to implement the Full DDMS Solution. IT acquisition cost estimates are summarized as follows:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The A/V component includes costs to acquire cameras, videoconferencing units, presentation systems, data projectors, screens/monitors, audio equipment, system control units and necessary cabling to implement the Full DDMS Solution. A/V acquisition cost estimates are summarized as follows:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
A/V Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Software Acquisition

The Full DDMS Solution requires application software to enable information technology and audio/video functions of the DDMS.

Information Technology (IT) Capability

The information technology capability includes the costs to acquire application software to operate servers, scanners, workstations, printers, storage devices, communications, and necessary cabling to implement the Full DDMS Solution. IT acquisition cost estimates are summarized as follows:

Software Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V application software is required for the DDMS.

Installation/Implementation

Vendor personnel are required to design, install, customize, and integrate the COTS product required to build the Full DDMS Solution. These service costs are included as an integral part of the contract. Rough Order of Magnitude (ROM) cost estimates were solicited from several major vendors and used as the basis for cost estimates in this document.

Information Technology (IT) Capability

IT vendor Full DDMS Solution installation/implementation cost estimates are summarized as follows:

Installation/Implementation	2001	2002	2003	2004	2005	2006
IT Installation/ Implementation Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

A/V vendor Full DDMS Solution installation/implementation cost estimates are summarized as follows:

Installation/Implementation	2001	2002	2003	2004	2005	2006
A/V Installation/ Implementation Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Documentation

The system vendor(s) will be tasked to provide detailed user and system administration documentation tailored to the ASLBP implementation. All documentation is to be delivered upon Rockville system acceptance. The costs to prepare this documentation are an integral part of the vendor contract(s). It is estimated that this documentation costs ■■■■■■■. The costs are shared equally between the DDMS components.

Information Technology (IT) Capability

The IT capability documentation must support all administrator and user functions. IT documentation cost estimates for the Full DDMS Solution are summarized as follows:

Documentation	2001	2002	2003	2004	2005	2006
IT Documentation Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The A/V capability documentation must support all administrator and user functions. A/V documentation cost estimates for the Full DDMS Solution are summarized as follows:

Documentation	2001	2002	2003	2004	2005	2006
A/V Documentation Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

COTS Customization

The Full DDMS Solution will not require modifications to COTS software. Any costs associated with the tailoring of COTS software is included in the Installation/ Implementation cost category.

Development/Integration

Three levels of integration must be addressed in this study:

- IT COTS product integration;
- A/V product integration; and
- DDMS interface with other systems including the EHD.

IT component internal integration is the responsibility of the vendor and the costs to provide internal component integration are part of vendor Installation/ Implementation services and included in those cost estimates.

The integration of A/V with IT monitors and screens is the responsibility of the A/V vendor and the costs to provide internal component integration are part of vendor Installation/ Implementation services and included in those cost estimates.

The DDMS must integrate with other systems, including the EHD, in order to provide requisite information exchanges. It is also expected that the NRC will contract separately for these services as well (as a separate line item with the IT vendor at an estimated cost of ■■■■■■■■). The estimated costs for this integration effort are included in the table below.

Information Technology (IT) Capability

The information technology capability must be able to store, retrieve, and support the presentation and transfer of required data and video information. IT Full DDMS Solution development/integration cost estimates are summarized as follows:

Development/Integration	2001	2002	2003	2004	2005	2006
IT Development/Integration Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V integration with other systems is required for the Full DDMS Solution.

Data Conversion/Loading

Legacy data will need to be incorporated into the Full DDMS Solution. The HLW repository information residing in the EHD will need to migrate to the DDMS. An estimated 750,000 pages in approximately 25,000 documents will be migrated. Estimates in this category reflect that approximately ■■■■■■■■■ hours are required to manage and to validate the accuracy and completeness of the migrated data to the DDMS from the EHD. It is expected that the ASLBP will contract for this service at ■■■■ per hour from a support contractor. These costs are included as part of the Contractor Support Services estimates documented later.

Testing

Vendor personnel are required to provide component testing and acceptance support as part of vendor installation/implementation services. Vendor participation in system testing is estimated to cost ■■■■■■■.

The Full DDMS Solution also requires the participation of the DDMS Program Manager (PM) and ASLBP judges. The estimated effort for these personnel to participate in system testing and acceptance is included in the calculations presented for NRC Project Support that appears later in this report.

For planning purposes, the cost estimates for vendor testing are shared equally between the DDMS components.

Information Technology (IT) Capability

The IT capability must tested to ensure proper operation during the conduct of hearings. IT test cost estimates for the Full DDMS Solution are summarized as follows:

Test	2001	2002	2003	2004	2005	2006
IT Test Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The A/V capability must tested to ensure proper operation during the conduct of hearings. A/V test cost estimates for the Full DDMS Solution are summarized as follows:

Test	2001	2002	2003	2004	2005	2006
A/V Test Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Infrastructure Upgrades

Infrastructure refers to the underlying capabilities necessary for an application to function. In this study, infrastructure relates to:

- Existing and planned hearing rooms and their ability to support future operations; and
- Communication capabilities necessary to enable the hearings to occur and the exchange of information within and between the Rockville and Las Vegas area facilities.

The estimated costs to upgrade the Rockville Hearing Room for the Full DDMS Solution are included in the Installation/Implementation element presented earlier.

The estimated costs to acquire and outfit a suitable hearing room in the Las Vegas area are handled separately from the technology implementation costs and are not presented here. This element includes efforts to ensure that the courtroom facility has sufficient attributes to accommodate all aspects of the planned hearings including size, power, heating, ventilation, air conditioning, public access, etc. The actual size of the facility to conduct the HLW repository hearing room varies according to the technology solution implemented. For planning purposes, the Las Vegas facility for the Full DDMS Solution should be approximately 4,000 square feet for the hearing area with an additional 1,400 square feet to accommodate seven conference rooms. All other considerations remain unchanged regardless of the solution selected.

Communications includes both internal and external communications capabilities. These capabilities are accomplished by enabling:

- Local Area Networks (LANs) at both sites that support data and video formats; and
- Long distance leased lines that support the exchange of information between Rockville and the Las Vegas area.

The LAN installed at the Rockville Hearing Room is a permanent modification for that facility. Upgrades to that capability, as well as the costs to implement a LAN for the Las Vegas area Hearing Room are estimated to cost ■■■■■■■ per facility.

The costs to enable temporary long distance leased lines between Rockville and the Las Vegas area are estimated to be ■■■■■■. Virtually all information to be sent between the sites is the exchange of IT data.

The ASLBP may also be responsible for the acquisition of long distance communication lines to support off-site, real-time transcription services and subsequent distribution of transcribed data. However, it is currently envisioned that the costs to establish these communication lines are included in the service charges of the transcription service supplier.

No other infrastructure changes are envisioned.

Information Technology (IT) Capability

The IT capability must support all communication costs between Rockville and the Las Vegas area facility to support the exchange of information during the conduct of hearings. IT infrastructure upgrade cost estimates for the Full DDMS Solution long distance communications between Rockville and the Las Vegas area are summarized as follows:

Infrastructure Upgrade	2001	2002	2003	2004	2005	2006
IT Infrastructure Upgrade Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The A/V capability supports communication costs within the Rockville and the Las Vegas area facilities to support the interchange of information during the conduct of hearings. A/V infrastructure upgrade cost estimates to enable communications within the Rockville and the Las Vegas facilities for the Full DDMS Solution are summarized as follows:

Infrastructure Upgrade	2001	2002	2003	2004	2005	2006
A/V Infrastructure Upgrade Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Training

Training is required for all of the Full DDMS Solution components. Formal user training will be provided by the solution vendor(s). It is estimated that the Vendor will provide two people to support training at ■■■■ per hour. It is expected to require two weeks (160 hours) to provide Rockville training and one week (80 hours) to provide training to support the Las Vegas area implementation.

Estimated costs for training are shared equally between the IT and A/V components.

Information Technology (IT) Capability

IT users must be trained on the Full DDMS Solution by Vendor personnel. IT training cost estimates are summarized as follows:

Training	2001	2002	2003	2004	2005	2006
IT Training Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

A/V users must be trained on the Full DDMS Solution by Vendor personnel. A/V training cost estimates are summarized as follows:

Training	2001	2002	2003	2004	2005	2006
A/V Training Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

The costs cited below are the FTE estimates for NRC personnel to attend appropriate formal training classes provided by the Vendor(s). It is expected that initial formal training will be at Rockville and not require separate travel. All ASLBP personnel require training.

Training in the Las Vegas area will be available following acceptance of that installation. The system Vendor(s) will provide classroom type instruction on-site for any other hearing participants that wish to attend at their own cost. The ASLBP PM will assist with this training for a one week period. Such efforts should occur immediately prior to the initiation of HLW repository hearings in the Las Vegas area. The ASLBP PM FTE estimate to assist with training is included in the NRC Project Support Cost Element.

For planning purposes, the FTE estimates for ASLBP personnel to attend training classes are shared equally between the DDMS components.

Information Technology (IT) Capability

User training is required to operate and support the IT capability for the Full DDMS Solution. Formal IT training cost estimates are based on the following:

Trainees	# Trainees	Training Hours	Total Hours
User (scanner, indexer)	■	■	■
User (search, retrieve)	■	■	■

IT training FTE estimates are summarized as follows:

Training	2001	2002	2003	2004	2005	2006
IT Training Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

User training is required to operate and support the A/V capability for the Full DDMS Solution. Formal A/V training cost estimates are based on the following:

Trainees	# Trainees	Training Hours	Total Hours
User	■	■	■

A/V training FTE estimates are summarized as follows:

Training	2001	2002	2003	2004	2005	2006
A/V Training Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

NRC Travel

NRC personnel are required to travel to the implementation site to support the installation of the Full DDMS Solution in the Las Vegas area. FTE calculations related to personnel in travel status are included in the FTE estimates in the NRC Project Support Cost Element. This cost category reflects cost estimates for:

- Round trip air fare (estimated at ■■■■■■ per ticket);
- Lodging (estimated at ■■■■ per day – including taxes); and
- Per diem costs (estimated at ■■■ per day).

The estimated number of trips and their duration required to support the Las Vegas area implementation are as follows:

Reason	Judges	PM	Clerk	Totals
System Design	■	■	■	■
System Installation	■	■	■	■
Acceptance	■	■	■	■
Training	■	■	■	■
Totals	■	■	■	■

Cost calculations are as follows:

Cost Item	Quantity	Estimated Cost	Extended Cost

Air Fare	12	■	■
Lodging	58	■	■
Per Diem	58	■	■
Totals	-	■	■

For planning purposes, the estimated costs for ASLBP travel associated with the Full DDMS Solution are shared equally between the components.

Information Technology (IT) Capability

ASLBP travel cost estimates to support implementation of the IT components of the Full DDMS Solution are summarized as follows:

Travel	2001	2002	2003	2004	2005	2006
IT Travel Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

ASLBP travel cost estimates to support implementation of the A/V components of the Full DDMS Solution are summarized as follows:

Travel	2001	2002	2003	2004	2005	2006
A/V Travel Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Security Plan/Implementation

As an integral part of system design, the system vendor(s) will coordinate with the PM to develop a Security Plan that meets the NRC requirements for the Full DDMS Solution. Estimated costs are ■■■■■■■ and are allocated to the IT component.

Information Technology (IT) Capability

Vendor cost estimates to develop a Security Plan for the Full DDMS Solution are summarized as follows:

Security Plan	2001	2002	2003	2004	2005	2006
IT Security Plan Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No Security Plan development costs are allocated to the A/V component.

Policy/Procedures Development/Implementation

As an integral part of system design, the system vendor(s) will coordinate with the ASLBP PM to develop a Policies and procedures that meet the NRC requirements for the Full DDMS Solution. Estimated costs are ■■■■■■■ and are allocated to the IT component.

Information Technology (IT) Capability

Vendor cost estimates to develop and to assist ASLBP with implementing Policies and Procedures for the Full DDMS Solution are summarized as follows:

Policy/Procedures	2001	2002	2003	2004	2005	2006
IT Policy/Procedures Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No Policies and Procedures development and implementation costs are allocated to the A/V component.

NRC Project Support

ASLBP personnel are expected to provide management oversight and control of the Full DDMS Solution implementation including directing and managing efforts for Security planning, implementation planning and the development and implementation of policies and procedures. This includes coordinating ASLBP and support contractor efforts to prepare plans, select vendors, manage vendors during the implementation process and to prepare and execute procurement planning, project management, change management, system testing, acceptance, quality control programs, etc. One new ASLBP position for the DDMS Program Manager (PM) is projected. This PM is dedicated to the DDMS program. ASLBP project support also requires the participation of Judges to support all aspects of DDMS acquisition.

It is estimated that one full time PM is required from the receipt of the authorization to proceed through acceptance of the Rockville installation. For non-recurring cost accounting purposes, this effort will reduce to one half FTE during the period from acceptance of the Rockville installation to acceptance of the Las Vegas area installation.

It is estimated that the participation of two ASLBP Judges at half time each (one FTE) are required from the receipt of the authorization to proceed through acceptance of the Rockville installation. For non-recurring cost accounting purposes, this effort will reduce to one half FTE during the period from acceptance of the Rockville installation to acceptance of the Las Vegas area installation.

Project support personnel labor hours required for the Full DDMS Solution are summarized as follows:

NRC Project Support	2001	2002	2003	2004	2005	2006
Project Support Total Hours	■	■	■	■	■	■
Project Manager	■	■	■	■	■	■
Judges (2)	■	■	■	■	■	■

The non-recurring FTE estimates for ASLBP project support associated with the Full DDMS Solution are summarized here. These FTE estimates are allocated across the individual cost elements presented below, including System Procurement Planning and execution, Testing/Acceptance, Installation/Implementation, Training, Security Plan/Implementation and Policy/Procedures Development/Implementation.

NRC Project Support	2001	2002	2003	2004	2005	2006
Project Support Total FTE	■	■	■	■	■	■
Project Manager	■	■	■	■	■	■
Judges (2)	■	■	■	■	■	■

For planning purposes, the estimated FTE for ASLBP project support associated with the Full DDMS Solution are shared equally between the components.

Information Technology (IT) Capability

ASLBP Full DDMS Solution related project support FTE estimates for IT components are summarized as follows:

Project Support	2001	2002	2003	2004	2005	2006
IT Project Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

ASLBP Full DDMS Solution related project support FTE estimates for A/V components are summarized as follows:

Project Support	2001	2002	2003	2004	2005	2006
A/V Project Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Contractor Support Services

The ASLBP has determined that the addition of more ASLBP positions for a temporary program such as the Full DDMS Solution is not practical. Therefore, the ASLBP expects to supplement its personnel with support contractor personnel.

The ASLBP plans to acquire contractor support services to support the management, oversight and control of the Full DDMS Solution implementation. These costs include contractor efforts to prepare project plans, support vendors selection, manage vendors during the implementation process and to help execute procurement planning, project management, change management, and quality control programs. It also covers efforts to oversee vendor performance and assist with Testing/Acceptance, Installation/Implementation, Training, Security Plan/Implementation and Policy/ Procedures Development/Implementation. Labor costs are estimated at ■■■■ per hour.

Support contractor project labor hours required are summarized as follows:

Support Contractor	2001	2002	2003	2004	2005	2006
Project Support Total Hours	■	■	■	■	■	■
Project Manager Support	■	■	■	■	■	■
System Analyst Support	■	■	■	■	■	■

The estimated non-recurring costs for contractor support services associated with the Full DDMS Solution are summarized below.

Support Contractor	2001	2002	2003	2004	2005	2006
Support Contractor Total	■	■	■	■	■	■
Project Manager Support	■	■	■	■	■	■
System Analyst Support	■	■	■	■	■	■

For planning purposes, the estimated costs for contractor support services associated with the Full DDMS Solution are shared equally between the components.

Information Technology (IT) Capability

Full DDMS Solution related contractor support services cost estimates for IT components are summarized as follows:

Support Contractor	2001	2002	2003	2004	2005	2006
IT Support Contractor Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

Full DDMS Solution related contractor support services cost estimates for A/V components are summarized as follows:

Support Contractor	2001	2002	2003	2004	2005	2006
A/V Support Contractor Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Full DDMS Solution Recurring Cost Elements

The following Recurring Cost Elements are presented:

- Hardware Maintenance
- Software Maintenance
- Infrastructure Operation and Maintenance
- Application Operations and Maintenance
- Hearing Room Operation and Support

Hardware Maintenance

System maintenance services will be procured from the component vendor. It is expected that maintenance services coverage begin immediately after the Warranty period expires. Current plans call for Warranty coverage to extend through the first three months following acceptance of the component. Contract maintenance commences immediately thereafter and continues until the HLW repository hearings are concluded.

Information Technology (IT) Capability

The cost of maintenance for IT hardware is estimated at 18% of the acquisition costs per year. The NRC may be able to negotiate a more favorable rate.

The Full DDMS Solution hardware acquisition costs totals from the earlier table are:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

The Full DDMS Solution related hardware maintenance cost estimates for IT components are summarized as follows:

Hardware Maintenance	2001	2002	2003	2004	2005	2006
IT Hardware Maintenance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The cost of maintenance for A/V hardware is estimated at 12% of the acquisition costs per year. The NRC may be able to negotiate a more favorable rate.

Full DDMS Solution A/V hardware acquisition costs totals from the earlier table are:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
A/V Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Full DDMS Solution related hardware maintenance cost estimates for A/V components are summarized as follows:

Hardware Maintenance	2001	2002	2003	2004	2005	2006
A/V Hardware Maintenance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Software Maintenance

Software maintenance services will be procured from the component vendor. It is expected that maintenance services coverage begin immediately after the Warranty period expires. Current plans call for Warranty coverage to extend through the first three months following acceptance of the component. Contract maintenance commences immediately thereafter and continues until the component is retired from NRC use. The cost of maintenance for IT software is estimated at ■■■of the acquisition costs per year. The NRC may be able to negotiate a more favorable rate.

Full DDMS Solution A/V hardware acquisition costs totals from the earlier table are:

Software Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

Full DDMS Solution related software maintenance cost estimates for IT components are summarized as follows:

Software Maintenance	2001	2002	2003	2004	2005	2006
IT Software Maintenance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V application software is required for the Full DDMS Solution.

Infrastructure Operation and Maintenance

Infrastructure refers to the underlying capabilities necessary for an application to function. In this study, infrastructure relates to:

- Existing and planned hearing rooms and their ability to support future operations; and
- Communication capabilities necessary to enable the hearings to occur and the exchange of information within and between the Rockville and Las Vegas area facilities.

The estimated costs to lease a suitable hearing room in the Las Vegas area are part of the infrastructure costs considered. For this study, only those facility cost estimates that vary by the solution implemented are cited. The size of the facility obtained for the HLW repository hearing room is dependent upon the technology solution implemented. For planning purposes, the Las Vegas area facility for the Full DDMS Solution requires 4,000 square feet for the hearing area and 1,400 additional square feet to accommodate seven conference rooms. The estimated cost to lease this space is $40.00 per square foot per year. All other space considerations remain constant regardless of the technology alternative selected and are NOT reflected in the cost estimates documented below. The cost estimates to lease the facility are allocated equally to each component.

Facility Lease Costs	2001	2002	2003	2004	2005	2006
Facility Lease Costs Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Support and maintenance of communication channel capabilities within and between the Rockville and Las Vegas facilities allows the exchange of information during the conduct of HLW repository hearings. Long distance communications capabilities must operate and be maintained between these sites in order for the hearings to occur.

The costs estimated below include supporting and maintaining long distance communications capabilities at ■■■■■■ dollars per month for a T1 line between the Las Vegas area and Rockville. These costs are allocated equally to each component.

Leased Line Costs	2001	2002	2003	2004	2005	2006
Leased Line Costs Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

No other infrastructure cost estimates are considered.

Information Technology (IT) Capability

The IT capability must support and maintain communication costs within and between Rockville and the Las Vegas area to ensure the conduct of efficient hearings. IT infrastructure support and maintenance cost estimates are summarized as follows:

Infrastructure Support	2001	2002	2003	2004	2005	2006
IT Infrastructure Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

A/V infrastructure support and maintenance cost estimates are summarized as follows:

Infrastructure Support	2001	2002	2003	2004	2005	2006
A/V Infrastructure Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Application Operation and Maintenance

The ASLBP intends to acquire the services of system administrators from the system vendor on an as required basis to provide on-site support preparing for and conducting hearings. Two experienced administrators are required at an hourly rate of ■■■■ to support each hearing day. An additional ■■■■■■■ of services per administrator are required to support the requirements to prepare for each hearing day. Additionally, one system administrator is required to support post hearing functions during FY 2006. An estimated one half day per week (for a total of ■■■■■■■■■) is programmed for this effort. These costs are allocated to the IT component.

Application Operation and Maintenance	2001	2002	2003	2004	2005	2006

IT Application Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Hearing Room Operation and Support

The HLW repository proceedings are estimated to require 150 hearing days which are projected to begin in FY 2004 and end in FY 2005. A total of 36 hearing days are planned for the Rockville Hearing Room and 114 hearing days in the Las Vegas area. The Rockville Hearing Room is scheduled to conduct 18 hearing days in FY 2004 and 18 hearing days in FY 2005. The Las Vegas area Hearing Room is scheduled to conduct 52 hearing days in FY 2004 and 62 hearing days in FY 2005,

The ASLBP has computed that approximately 5,000 documents comprising an estimated 150,000 pages will be presented during the hearing. This results in an average of 33 documents and 1,000 pages to be "handled" each hearing day. A real time transcript will also be provided for each hearing day. A total of 34 documents per hearing day will be forwarded to SECY for processing into the EHD.

In order to meet operational requirements, the ASLBP needs to ensure that the proper resources are in place conduct the hearings. This cost category covers three important elements necessary to conduct the hearings:

- The costs of supporting services required by the NRC to conduct the HLW repository hearing;
- The ASLBP staff required to conduct the hearings using the Full DDMS solution; and
- The other hearing parties estimated staff to participate in the hearings using the Full DDMS solution.

Supporting services that are to be procured by the ASLBP in order to conduct the hearings with the recommended DDMS solution include:

- On-site, real time, on-line transcription services at ■■■■■■ per hearing day;
- On-site translation services at ■■■■■■ per hearing day; and
- SECY costs to input electronically transmitted documents and transcripts into the EHD at ■■■ per document and transcript (all documents presented at the hearing will be sent at the conclusion of every hearing day as well as one electronic transcript for every hearing day).

Transcription costs are allocated to the IT component. Estimated costs to provide on-site, real time, on-line transcription services are computed as follows:

Hearing Operation Support	2001	2002	2003	2004	2005	2006

Transcription Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Translation costs are allocated to the A/V component. Estimated costs to provide on-site translation services for 50% of the hearing days are computed as follows:

Hearing Operation Support	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Translation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

EHD processing costs are allocated to the IT component. Estimated costs for SECY to process hearing day documents and transcriptions into the EHD at $16 per document/transcript are computed as follows:

Hearing Operation Support	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
EHD Processing Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Supporting services costs are summarized as follows:

Information Technology (IT) Capability

The NRC must operate and support the conduct of hearings for the HLW repository proceeding. Full DDMS Solution IT hearing operation and support cost estimates are summarized as follows:

NRC Operation Support	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
IT Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

Full DDMS Solution A/V hearing operation and support cost estimates are summarized as follows:

NRC Operation Support	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
A/V Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

ASLBP staff system operation and support of the Full DDMS Solution begins at system acceptance and includes all efforts to manage, administer, and use the DDMS to conduct HLW repository hearings. The following ASLBP personnel are required:

- Project Manager;
- Judges;
- Clerk of Court;
- Law Clerks
- Paralegal Clerks

A Project Manager within ASLBP will be assigned to manage and support all DDMS operations. Activities include overall project management and control, executing user training plans, establishing and managing the technical support infrastructure, interfacing with other hearing participants regarding DDMS operations, and managing the support and operation of the system. Project Manager costs in this category are estimated at .5 FTE beginning at Rockville system acceptance and increase to 1 FTE upon the Las Vegas area system acceptance. This level will continue until the end of FY 2006.

Several ASLBP users are expected to operate the Full DDMS Solution during the HLW repository proceedings. The ASLBP personnel complement to conduct a hearing using the DDMS includes three judges, one clerk of court, two law clerks and two paralegal clerks per hearing day.

It is estimated that three judges, two law clerks and two paralegal clerks will be required to support post-hearing functions following completion of the hearings. Each judge is projected to dedicate an average of ■■■■■■■■■■■■■■■■ for post-hearing functions, supported by a two full time law clerks and two paralegal clerks for the remainder of FY 2006.

ASLBP labor hours required to manage and operate the Full DDMS Solution to conduct required hearings are summarized as follows:

Hearing/DDMS Support	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
ASLBP Total Hours	■	■	■	■	■	■
Project Manager	■	■	■	■	■	■
Judges (3)	■	■	■	■	■	■
Clerk of Court	■	■	■	■	■	■
Law Clerk	■	■	■	■	■	■
Paralegal Clerks (2)	■	■	■	■	■	■

The labor estimates for NRC hearing operation and support are allocated equally to each component as shown in the following tables:

Information Technology (IT) Capability

The ASLBP must operate and support the conduct of hearings for the HLW repository proceeding using the Full DDMS Solution. ASLBP IT operation and support labor hour estimates are summarized as follows:

ASLBP Operation Support	2001	2002	2003	2004	2005	2006
ASLBP IT Hours Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

ASLBP A/V operation and support labor hour estimates are as follows:

ASLBP Operation Support	2001	2002	2003	2004	2005	2006
A/V Hours Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

ASLBP IT operation and support labor hour estimated convert to FTE estimates as follows:

ASLBP Operation Support	2001	2002	2003	2004	2005	2006
IT Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

ASLBP A/V operation and support labor hour FTE estimates follow:

ASLBP Operation Support	2001	2002	2003	2004	2005	2006
A/V Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

It is expected that all hearing participants will utilize the Full DDMS Solution during the HLW repository proceedings. Up to twelve other hearing participants are expected in each of the proceedings, regardless of location. The other hearing participant personnel complements to participate in a hearing using the Full DDMS Solution to manage hearing information are expected to average:

- two attorneys per participating party; and
- two clerks per participating party.

This average complement of personnel is expected to be constant over the entire span of the HLW repository proceedings, at all of the planned hearing sites and days. For planning purposes, ■■■■■■■ per day are allocated to each participant per hearing day.

Hearing/DDMS Support	2001	2002	2003	2004	2005	2006
Other Party Labor Total	■	■	■	■	■	■
Attorneys (24)	■	■	■	■	■	■
Clerks (24)	■	■	■	■	■	■

The labor estimates for other party hearing participation are allocated equally to each component as shown in the following tables:

Information Technology (IT) Capability

IT other party operation and support labor hour estimates are summarized as follows:

Other Party Operation Support	2001	2002	2003	2004	2005	2006
IT Other Party Total Hours	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

A/V other party operation and support labor hour estimates are summarized as follows:

Other Party Operation Support	2001	2002	2003	2004	2005	2006
A/V Other Party Total Hours	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

IT other party operation and support labor hour estimated convert to FTE estimates (based on 1,800 hours) as follows:

Other Party Operation Support	2001	2002	2003	2004	2005	2006
IT Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

A/V other party operation and support labor hour estimated convert to FTE estimates (based on 1,800 hours) as follows:

Other Party Operation Support	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
A/V Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

One of the other parties at the HLW hearings is NRC as a litigant. Assuming an average participation, the NRC litigant participation is projected as follows:

Information Technology (IT) Capability

NRC Litigant IT operation and support labor hour estimates are as follows:

Other Party Operation Support (NRC Litigant)	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
IT Operation Support Total Hours (NRC Litigant)	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

NRC Litigant A/V operation and support labor hour estimates are as follows:

Other Party Operation Support (NRC Litigant)	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
A/V Operation Support Total Hours (NRC Litigant)	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

NRC Litigant IT operation and support labor hour estimate converts to FTE estimates (based on 1,800 hours) as follows:

Other Party Operation Support (NRC Litigant)	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
IT Operation Support Total (NRC Litigant)	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

NRC Litigant A/V operation and support labor hour estimate converts to FTE estimates (based on 1,800 hours) as follows:

Other Party Operation Support (NRC Litigant)	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
A/V Operation Support Total (NRC Litigant)	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

HLW Status Quo Alternative Cost Profile

The cost profiles for the HLW Status Quo solution are presented in the following sections. Note that, for planning purposes, the DDMS schedule presented in Section 4.5 is also applicable to the HLW Status Quo solution.

Standard cost elements are presented in this section to identify the costs estimated to conduct ASLBP hearings, especially for the HLW repository proceedings. Hardware and software costs are based on sampling of industry solutions. Services cost estimates are based on vendor estimates, NRC and industry experience, and detailed analysis of possible implementation scenarios. Costs expressed as Full Time Equivalent (FTE) units are based on 1,800 hours for the standard work year.

These cost elements cover all efforts for the NRC to develop, implement, operate and maintain the solutions. Note that all cost elements are presented for each alternative, regardless of whether or not a particular cost element is applicable to the alternative. Costs are estimated for those impacts upon other participants where the NRC is responsible for making suitable accommodations or arrangements in order to facilitate the conduct of hearings.

The information technology (IT) capability presented below includes appropriate Document Management, Hearing Management, Multimedia Management, Communications, and Data Storage component costs. These components use similar technology to enable their functions, therefore, the equipment, software and services required to implement these capabilities are very similar. Audio/Video components generally are much different from IT components and are presented separately.

Constant dollars are used throughout this analysis. This means that the purchasing power of the dollar is unchanged throughout the lifecycle forecast. Estimated dollar values for each alternative are summarized in the Cost Benefit Analysis presented in section 4.4 below.

Information for each significant cost element is presented as follows:

- Description - Each cost element is identified with a brief description provided.
- Table - A table summarizing the estimated costs for the six-year time frame is provided for each element.

The HLW cost profile documents cost estimates for both Non-Recurring and Recurring cost elements.

HLW Status Quo Non-Recurring Cost Elements

The following Non-Recurring Cost Elements are addressed regarding the implementation of the HLW Status Quo solution:

- Hardware Acquisition
- Software Acquisition
- Installation/Implementation
- Documentation
- COTS Customization
- Development/Integration
- Data Conversion/Loading
- Testing
- Infrastructure Upgrades
- Training
- NRC Travel
- Security Plan/Implementation
- Policy/Procedures Development/Implementation
- NRC Project Support
- Contractor Support Services

Hardware Acquisition

The HLW Status Quo solution requires hardware to enable information technology and audio/video functions in support of hearings, particularly the HLW repository proceeding.

Information Technology (IT) Capability

The information technology capability includes the costs to acquire server, workstations, printers and cabling to implement the HLW Status Quo solution. IT estimated costs identified in section 4.3 are summarized as follows:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The A/V component includes costs to acquire an LCD projector and screen necessary for the HLW Status Quo solution. A/V acquisition cost estimates are summarized as follows:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
A/V Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Software Acquisition

The HLW Status Quo solution requires software to enable information technology and audio/video functions in support of hearings.

Information Technology (IT) Capability

The information technology capability includes the costs to acquire Panagon Publish Module software to operate the HLW Status Quo solution. IT software acquisition cost estimates are summarized as follows:

Software Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V software acquisitions are planned.

Installation/Implementation

Vendor personnel are required to design, install, customize, and integrate the COTS product required to build the HLW Status Quo solution. These service costs are included as an integral part of the contract. Rough Order of Magnitude (ROM) cost estimates solicited from several major vendors are the basis for cost estimates in this document.

Information Technology (IT) Capability

IT installation/implementation cost estimates for the HLW Status Quo solution are summarized as follows:

Vendor Implementation	2001	2002	2003	2004	2005	2006
IT Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V components are planned.

Documentation

The system vendor will be tasked to provide detailed user documentation tailored to the ASLBP implementation. All documentation is to be delivered upon Rockville system acceptance. The costs to prepare this documentation are an integral part of the vendor contract. It is estimated that this documentation costs ■■■■■■■.

Information Technology (IT) Capability

The IT capability documentation must support minimum user functions as specified by rules established for conducting the HLW repository hearings. IT documentation cost estimates for the HLW Status Quo solution are summarized as follows:

Documentation	2001	2002	2003	2004	2005	2006
IT Documentation Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V component documentation is required for the HLW Status Quo solution.

COTS Customization

The HLW Status Quo solution will not require modifications to COTS software. Any costs associated with the tailoring of COTS software is included in the Installation/ Implementation cost category.

Development/Integration

The HLW Status Quo solution will require the development and integration of an interface between the published EHD and the existing EHD component of the ADAMS document management system to support the HLW repository hearing. It is estimated that the costs to implement this interface is ■■■■■■■■.

Information Technology (IT) Capability

The IT capability documentation must support minimum user functions. IT development/integration cost estimates for the HLW Status Quo solution are summarized as follows:

Development/Integration	2001	2002	2003	2004	2005	2006
IT Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V component documentation is required for the HLW Status Quo solution.

Data Conversion/Loading

The HLW Status Quo solution will not require any data conversion or loading efforts to support the HLW repository hearing.

The HLW repository information residing in the EHD will need to be published to a server for subsequent use for the HLW repository hearing. An estimated 750,000 pages in approximately 25,000 documents will be published. Estimates in this category reflect that approximately ■■■ labor hours are required to manage and to validate the accuracy and completeness of the published EHD data. It is expected that the ASLBP will contract for this service at ■■■■■■■■■■■■■ from a support contractor. These costs are included as part of the Contractor Support Services estimates documented later.

Testing

Vendor personnel are required to provide component testing and acceptance support as part of vendor implementation services. Vendor participation in system testing is estimated to cost ■■■■■■■.

The HLW Status Quo solution also requires the efforts of ASLBP to support the testing and acceptance of the solution. ASLBP system testing requires the participation of the DDMS Program Manager (PM) and ASLBP judges. The estimated effort for these personnel to perform system testing is included in the calculations presented for NRC Project Support that appears later in this report.

For planning purposes, these cost estimates are shared equally between the components.

Information Technology (IT) Capability

The IT capability must tested to ensure proper operation during the conduct of hearings. IT test/acceptance cost estimates are summarized as follows:

Test	2001	2002	2003	2004	2005	2006
IT Test/Acceptance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The A/V capability must tested to ensure proper operation during the conduct of hearings. Rockville A/V testing is to ensure that the existing A/V capabilities are operational. A/V test/acceptance cost estimates are summarized as follows:

Test/Acceptance	2001	2002	2003	2004	2005	2006
A/V Test/Acceptance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Infrastructure Upgrades

Infrastructure refers to the underlying capabilities necessary for an application to function. In this study, infrastructure relates to:

- Existing and planned hearing rooms and their ability to support future operations; and
- Communication capabilities necessary to enable the hearings to occur and the exchange of information within and between the Rockville and Las Vegas area facilities.

The estimated costs to upgrade the Rockville Hearing Room for the HLW Status Quo solution are included in the Vendor Installation/Implementation cost element presented earlier.

The estimated costs to acquire and outfit a suitable hearing room in the Las Vegas area are handled separately from the technology implementation costs and are not presented here. This element includes efforts to ensure that the courtroom facility has sufficient attributes to accommodate all aspects of the planned hearings including size, power, heating, ventilation, air conditioning, public access, etc. The actual size of the facility to conduct the HLW repository hearing room varies according to the technology solution implemented. For planning purposes, the Las Vegas facility for the HLW Status Quo solution should be approximately 6,000 square feet for the hearing area with an additional 2,100 square feet to accommodate seven conference rooms. All other considerations remain unchanged regardless of the solution selected.

Communications includes both internal and external communications capabilities. These capabilities are accomplished by enabling:

- Local Area Networks (LANs) at both sites that support data and video formats; and
- Long distance leased lines that support the receipt of EHD information from Rockville in the Las Vegas area.

The LAN installed at the Rockville Hearing Room is a permanent modification for that facility. Upgrades to that capability, as well as the costs to implement a LAN for the Las Vegas area Hearing Room are estimated to cost ■■■■■■■ per facility.

The costs to enable temporary long distance leased lines between Rockville and the Las Vegas area are estimated to be ■■■■■■. Virtually all information to be sent between the sites is the exchange of IT data.

The ASLBP may also be responsible for the acquisition of long distance communication lines to support off-site, real-time transcription services and subsequent distribution of transcribed data. However, it is currently envisioned that the costs to establish these communication lines are included in the service charges of the transcription service supplier.

No other infrastructure changes are envisioned.

Information Technology (IT) Capability

The IT capability must support all communication costs within and between Rockville and the Las Vegas facility to support the exchange of information during the conduct of hearings. IT infrastructure upgrade cost estimates for the HLW Status Quo solution long distance communications between Rockville and the Las Vegas area are summarized as follows:

Infrastructure Upgrade	2001	2002	2003	2004	2005	2006
IT Infrastructure Upgrade Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The A/V capability supports communication costs within the Rockville and the Las Vegas area facilities to support the interchange of information during the conduct of hearings. A/V infrastructure upgrade cost estimates to enable communications within the Rockville and the Las Vegas facilities for the HLW Status Quo solution are summarized as follows:

Infrastructure Upgrade	2001	2002	2003	2004	2005	2006
A/V Infrastructure Upgrade Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Training

Training is required for all new HLW Status Quo solution components. Formal user training will be provided by the solution vendor. It is estimated that the vendor will provide two people to support training at ■■■■ per hour. It is expected to require one week (80 hours) to provide Rockville training and one week (80 hours) to provide training to support the Las Vegas area operations. Vendor training cost estimates are allocated to the IT Capability.

Information Technology (IT) Capability

IT users must be trained on the HLW Status Quo solution by Vendor personnel. IT training cost estimates are summarized as follows:

Training	2001	2002	2003	2004	2005	2006
IT Training Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

The costs cited below are the FTE estimates for NRC personnel to attend appropriate formal training classes provided by the Vendor. It is expected that initial formal training will be at Rockville and not require separate travel. All ASLBP personnel require training.

HLW Status Quo solution training in the Las Vegas area will be available following acceptance of that installation. The system Vendor will provide classroom type instruction on-site for any other hearing participants that wish to attend at their own cost. The ASLBP Project Manager will assist with this training for a one week period. Such efforts should occur immediately prior to the initiation of HLW repository hearings in the Las Vegas area. For planning purposes, the ASLBP PM FTE estimate to assist with training is included in the NRC Project Support Cost Element.

The FTE estimates for ASLBP personnel to attend training classes are applied to the IT Capability. Formal IT training cost estimates are based on the following:

Trainees	# Trainees	Training Hours	Total Hours
User	■	■	■

Information Technology (IT) Capability

User training is required to operate and support the IT capability for the HLW Status Quo solution. IT training FTE estimates are summarized as follows:

Training	2001	2002	2003	2004	2005	2006
IT Training Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component
No A/V training is planned for the HLW Status Quo solution.

NRC Travel

NRC personnel are required to travel to the implementation sites to support the installation of the HLW Status Quo solution in the Las Vegas area. ASLBP personnel are required to travel to the implementation sites to support the installation of the HLW Status Quo solution. FTE calculations related to personnel in travel status are included in the FTE estimates for the activity being performed. This cost category reflects cost estimates for:

- Round trip air fare (estimated at ■■■■■■ per ticket);
- Lodging (estimated at ■■■■ per day – including taxes); and
- Per diem costs (estimated at ■■■ per day).

The estimated number of trips and their duration required to support the Las Vegas area HLW Status Quo solution implementation are as follows:

Reason	Judges	PM	Clerk	Totals
System Installation	■	■	■	■
Acceptance	■	■	■	■
Training	■	■	■	■
Totals	■	■	■	■

Cost calculations are as follows:

Cost Item	Quantity	Estimated Cost	Extended Cost
Air Fare	■	■	■
Lodging	■	■	■
Per Diem	■	■	■
Totals	■	■	■

For planning purposes, the estimated costs for ASLBP travel associated with the HLW Status Quo solution are applied to the IT Capability.

Information Technology (IT) Capability
ASLBP DDMS related travel cost estimates for IT components are summarized as follows:

NRC Travel	2001	2002	2003	2004	2005	2006
IT Travel Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■

Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Security Plan/Implementation

As an integral part of system design, the system vendor(s) will coordinate with the PM to develop a Security Plan that meets the NRC requirements for the HLW Status Quo solution. Estimated costs are ■■■■■■■ and are allocated to the IT component.

Security Plan	2001	2002	2003	2004	2005	2006
IT Security Plan Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No Security Plan development costs are allocated to the A/V component.

Policy/Procedures Development/Implementation

As an integral part of system design, the system vendor(s) will coordinate with the PM to develop a Policies and procedures that meet the NRC requirements for the HLW Status Quo solution. Estimated costs are ■■■■■■■ and are allocated to the IT component.

Policy/Procedures	2001	2002	2003	2004	2005	2006
IT Policy/Procedures Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No Policies and Procedures development and implementation costs are allocated to the A/V component.

NRC Project Support

NRC personnel are required to provide management oversight and control of the HLW Status Quo solution implementation including directing and managing efforts for Security planning, implementation planning and the development and implementation of policies and procedures. This includes coordinating ASLBP and support contractor efforts to prepare plans, manage vendors during the implementation process and to prepare and execute procurement planning, project management, change management, system testing, acceptance, quality control programs, etc.

ASLBP project support requires the participation of a Project Manager (PM) and judges. ASLBP project support also requires the participation of Judges to support all aspects of the HLW Status Quo solution implementation.

It is estimated that one half time Project Manager is required from the receipt of the authorization to proceed through acceptance of the Las Vegas area installation.

It is estimated that the participation of ■■■ ASLBP Judges at ■■■■■■■■■■■■■■■■■ each (■■■■■■■■■■■■■) are required from the receipt of the authorization to proceed through acceptance of the Las Vegas area installation.

Project support personnel labor hours required are summarized as follows:

Project Support	2001	2002	2003	2004	2005	2006
Project Support Total	■	■	■	■	■	■
Project Manager	■	■	■	■	■	■
Judges (2)	■	■	■	■	■	■

For planning purposes, the estimated FTE for ASLBP project support associated with the HLW Status Quo solution are allocated to the IT Capability.

Information Technology (IT) Capability

ASLBP HLW Status Quo solution related project support FTE estimates for IT components are summarized as follows:

Project Support	2001	2002	2003	2004	2005	2006
IT Project Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

Minimal ASLBP HLW Status Quo solution related project support FTE estimates for A/V components are required.

Contractor Support Services

■■■■■■■■■■■■■■■■■

■■■

Hardware Maintenance

System maintenance services will be procured from the component vendor. It is expected that maintenance services coverage begin immediately after the Warranty period expires. Current plans call for Warranty coverage to extend through the first three months following acceptance of the component. Contract maintenance commences immediately thereafter and continues until the HLW repository hearings are concluded.

Information Technology (IT) Capability

The cost of maintenance for IT hardware is estimated at ■■■ of the acquisition costs per year. The NRC may be able to negotiate a more favorable rate.

HLW Status Quo solution hardware acquisition costs totals from the earlier table are:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

HLW Status Quo solution related hardware maintenance cost estimates for IT components are summarized as follows:

Hardware Maintenance	2001	2002	2003	2004	2005	2006
IT Hardware Maintenance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

The cost of maintenance for A/V hardware is estimated at ■■■ of the acquisition costs per year. The NRC may be able to negotiate a more favorable rate.

HLW Status Quo solution A/V hardware acquisition costs totals from the earlier table are:

Hardware Acquisition	2001	2002	2003	2004	2005	2006
A/V Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

HLW Status Quo solution related hardware maintenance cost estimates for A/V components are summarized as follows:

Hardware Maintenance	2001	2002	2003	2004	2005	2006

A/V Hardware Maintenance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Software Maintenance

System maintenance services will be procured from the component vendor. It is expected that maintenance services coverage begin immediately after the Warranty period expires. Current plans call for Warranty coverage to extend through the first three months following acceptance of the component. Contract maintenance commences immediately thereafter and continues until the component is retired from NRC use. The cost of maintenance for software is estimated at ■■■ of the acquisition costs per year. The NRC may be able to negotiate a more favorable rate.

HLW Status Quo solution A/V hardware acquisition costs totals from the earlier table are:

Software Acquisition	2001	2002	2003	2004	2005	2006
IT Acquisition Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

HLW Status Quo solution related software maintenance cost estimates for IT components are summarized as follows:

Software Maintenance	2001	2002	2003	2004	2005	2006
IT Software Maintenance Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

No A/V application software is required for the HLW Status Quo solution.

Infrastructure Operation and Maintenance

Infrastructure refers to the underlying capabilities necessary for an application to function. In this study, infrastructure relates to:

- Existing and planned hearing rooms and their ability to support future operations; and

- Communication capabilities necessary to enable the hearings to occur and the exchange of information within and between the Rockville and Las Vegas area facilities.

The estimated costs to lease a suitable hearing room at Las Vegas are part of the infrastructure costs considered. For this study, only those facility cost estimates that vary by the solution implemented are cited. The size of the facility obtained for the HLW repository hearing room is dependent upon the technology solution implemented. For planning purposes, the Las Vegas area facility for the HLW Status Quo solution requires 6,000 square feet for the hearing area and 2,100 additional square feet to accommodate seven conference rooms. The estimated cost to lease this space is ■■■■■■ per square foot per year. All other space considerations remain constant regardless of the technology alternative selected and are NOT reflected in the cost estimates documented below. The cost estimates to lease the facility in the HLW Status Quo solution are allocated to the IT Capability component.

Facility Lease Costs	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Facility Lease Costs Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Support and maintenance of communication channel capabilities within and between the Rockville and Las Vegas facilities to support the availability of access to the published EHD information during the conduct of HLW repository hearings will result in recurring costs. Local Area Networks (LANs) and long distance communications capabilities must operate and be maintained within and between these sites in order for the hearings to occur. No costs are allocated for LAN maintenance.

The costs estimated below include supporting and maintaining long distance communications capabilities at ■■■■■■■■■■■■■■ per month for a T1 line between the Las Vegas area and Rockville. These costs are allocated to the IT component.

Leased Line Costs	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Leased Line Costs Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

The ASLBP requires minimal A/V support equipment (e.g. microphones, amplifiers, etc.) to enable satisfactory sound propagation throughout the hearing room. This temporary capability may leased for ■■■■ per day. Each hearing day will require this capability for the Las Vegas areas facility. These costs are allocated to the A/V component.

Leased Audio Costs	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Leased Audio Costs Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

No other infrastructure cost estimates are considered.

Information Technology (IT) Capability

The IT capability must support and maintain communication costs within and between Rockville and the Las Vegas area to ensure the conduct of efficient hearings. IT infrastructure support and maintenance cost estimates for the HLW Status Quo solution are summarized as follows:

Infrastructure Support	2001	2002	2003	2004	2005	2006
IT Infrastructure Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

A/V infrastructure support and maintenance cost estimates for the HLW Status Quo solution are summarized as follows:

Leased A/V Costs	2001	2002	2003	2004	2005	2006
Leased Audio Costs Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Application Operation and Maintenance

The ASLBP intends to acquire the services of system administrators from the system vendor on an as required basis to provide on-site support preparing for and conducting hearings. ■■■experienced administrators are required at an hourly rate of ■■■■ to support each hearing day. An additional ■■■■■■■■■■■■■■■■■■■■■ per administrator are required to support the requirements to prepare for each hearing day. additionally, one system administrator is required to support post hearing functions during FY 2006. An estimated ■■■■■■■■■■■■■■■■■■ (■■■■■■■■■■■■■■■■■■■■■■■) is programmed for this effort. These costs are allocated to the IT component.

Application Operation and Maintenance	2001	2002	2003	2004	2005	2006
IT Application Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Hearing Room Operation and Support

The HLW repository proceedings are estimated to require 150 hearing days which are projected to begin in 2004 and end in FY 2006. A total of 36 hearing days are planned for the Rockville Hearing Room and 114 hearing days in the Las Vegas area. The Rockville Hearing Room is scheduled to conduct 18 hearing days in FY 2004 and 18 hearing days in FY 2005. The Las Vegas area Hearing Room is scheduled to conduct 52 hearing days in FY 2004 and 62 hearing days in FY 2005.

The ASLBP has computed that approximately 5,000 documents comprising an estimated 150,000 pages will be presented during the hearing. This results in an average of 33 documents and 1,000 pages will be "handled" each hearing day. A real time transcript will also be provided for each hearing day. A total of 34 documents per hearing day will be forwarded to SECY for processing into the EHD.

In order to meet operational requirements, the ASLBP needs to ensure that the proper resources are in place conduct the hearings. This cost category covers three important elements necessary to conduct the hearings:

- The costs of supporting services required by the NRC to conduct the HLW repository hearing;
- The ASLBP staff required to conduct the hearings using the HLW Status Quo solution; and
- The other hearing parties estimated staff to participate in the hearings using the HLW Status Quo solution.

Supporting services that are to be procured by the ASLBP in order to conduct the hearings with the HLW Status Quo solution include:

- On-site, real time, on-line transcription services at ■■■■■■ per hearing day;
- On-site translation services at ■■■■■■ per hearing day; and
- SECY costs to input all transmitted documents and transcripts into the EHD at ■■ per page and ■■■ per document and transcript (all documents presented at the hearing will be sent at the conclusion of every hearing day as well as one electronic transcript for every hearing day).

Transcription costs are allocated to the IT component. Estimated costs to provide on-site, real time, on-line transcription services are computed as follows:

Hearing Operation Support	2001	2002	2003	2004	2005	2006
Transcription Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Translation costs are allocated to the A/V component. Estimated costs to provide on-site translation services for 50% of the hearing days are computed as follows:

Hearing Operation Support	2001	2002	2003	2004	2005	2006
Translation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

EHD processing costs are allocated to the IT component. Estimated costs for SECY to process hearing day documents and transcriptions into the EHD at ■■ per page and ■■■ per document/transcript are computed as follows:

Hearing Operation Support	2001	2002	2003	2004	2005	2006
EHD Processing Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

The NRC must operate and support the conduct of hearings for the HLW repository proceeding using the HLW Status Quo solution. IT hearing operation and support cost estimates are summarized as follows:

NRC Operation Support	2001	2002	2003	2004	2005	2006
IT Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Audio/Video (A/V) Component

A/V NRC operation and support cost estimates using the HLW Status Quo solution are summarized as follows:

NRC Operation Support	2001	2002	2003	2004	2005	2006
A/V Operation Support Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

ASLBP staff system operation and support of the HLW Status Quo solution begins at system acceptance and includes all efforts to manage and use the HLW Status Quo solution to conduct HLW repository hearings. The following ASLBP personnel are required:

- Project Manager;
- Judges;
- Clerk of Court;
- Law Clerks; and
- Paralegal Clerks.

A Project Manager within ASLBP will be assigned to manage and support all HLW Status Quo solution operations. Activities include overall project management and control, executing user training plans, establishing and managing the technical support infrastructure, interfacing with other hearing participants regarding HLW Status Quo solution operations, and managing the support and operation of the system. Project Manager costs in this category are estimated at ■■■■■■ upon Rockville system acceptance and increase to ■■■■■ after the Las Vegas area system acceptance. This level will continue until the end of FY 2006.

Several ASLBP users are expected to operate the system during the HLW repository proceedings. The ASLBP personnel complement to conduct a hearing using the HLW Status Quo solution includes■■■■■■

- ■■■■ clerks per participating party.

This average complement of personnel is expected to be constant over the entire span of the HLW repository proceedings, at all of the planned hearing sites and days. For planning purposes, 8 hours per day are allocated to each participant per hearing day.

Hearing Support	2001	2002	2003	2004	2005	2006
Other Party Labor Total	■	■	■	■	■	■
Attorneys (24)	■	■	■	■	■	■
Clerks (60)	■	■	■	■	■	■

The labor estimates for other party hearing participation are allocated to the IT Capability component as shown in the following table:

Information Technology (IT) Capability

IT other party operation and support labor hour estimates using the HLW Status Quo solution are summarized as follows:

Hearing Support	2001	2002	2003	2004	2005	2006
IT Other Party Labor Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

IT other party hearing support labor hour estimates using the HLW Status Quo solution convert to FTE estimates (based on 1,800 hours) as follows:

Hearing Support	2001	2002	2003	2004	2005	2006
IT Other Party Total	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

One of the other parties at the HLW hearings is NRC as a litigant. Assuming an average participation, the NRC litigant participation using the HLW Status Quo solution is projected as follows:

Hearing Support (NRC Litigant)	2001	2002	2003	2004	2005	2006
IT Other Party Total Hours (NRC Litigant)	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Information Technology (IT) Capability

NRC Litigant IT operation and support labor hour estimate converts to FTE estimates (based on 1,800 hours) as follows:

Hearing Support (NRC Litigant)	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
IT Other Party Total Hours (NRC Litigant)	■	■	■	■	■	■
Rockville Hearing Room	■	■	■	■	■	■
Las Vegas Hearing Room	■	■	■	■	■	■
Other Hearing Locations	■	■	■	■	■	■

Appendix 3 – Full DDMS Modular Roll-Out Plan

This Appendix contains a supplemental analysis conducted to modularize the implementation of the Full DDMS solution.