February 14, 1994

MEMORANDUM TO: Gerald Cranford, Director
Office of Information Resources Management

FROM: Lloyd J. Donnelly, LSS Administrator

SUBJECT: LSSA TEST AND EVALUATION SYSTEM, RFPA LSS-92-296

Please provide your concurrence on the attached request for procurement action as soon as possible. The request is for a task order contract to implement a small turnkey system that will be used by LSSA to: (1) test and evaluate processes and technologies related to the search and retrieval performance of the LSS and the preparation of electronic material for loading into the LSS, and (2) demonstrate a user-friendly on-line full text and bibliographic data search and image retrieval system to potential LSS users and other interested parties using technology and databases similar in nature to those envisioned for the LSS.

The contract will be funded by LSSA using FY 1992/1993 program support funds.

Please contact me or Jim Shields of my staff if you have any questions.

Attachment: As stated

DISTRIBUTION w/o enclosure:
Central File
LSS Subject
LSS Chron
JShields

OLSSA	OLSSA
LDonnelly	JShields
07/ /92	07/ /92

LSSA Test and Evaluation System

Preliminary System Requirements

1. Document Creation and Storage

a. The system must be capable of receiving documents in paper, ASCII and WordPerfect formats as well as electronic text, bibliographic data and image files.

b. They system must provide for the conversion of documents received in paper form to bit-mapped images using an optical scanner.

c. The system must provide for the conversion of text in bit-mapped images to ASCII text using optical character recognition (OCR) and the online editing and quality assurance of this OCR'd text.

d. The system must provide for the creation of document bibliographic data records with up to 50 fields, with fields having single or multiple values.

e. The system must store bibliographic data, full text and bit-mapped images generated using the system and by transfer of the LSS material previously captured by SAIC. Each bit-mapped image must be linked to its corresponding text page and bibliographic data record to support retrieval.

f. During document processing, the system must prompt the operator for relevant information that facilitates identification, cross-indexing, tracking and reporting. Two specific needs are:

   1) The system must provide for the automatic creation of document identification numbers.

   2) The system must use an online thesaurus as the controlled vocabulary for terms describing the content of each record.

g. The system must support the management of documents that are in revision as well as in final form.

2. Document Search and Retrieval

a. The system must provide for the searching of a single, multiple or all bibliographic data fields and text and any combination of bibliographic fields as specified.

b. A wild card capability must be available in all query construction modes.

c. The use of Boolean operators must be supported.

d. Full text searching, including proximity and phrase searching must be available for both bibliographic data and full text.

e. The system must permit searching using natural language.

f. The system must permit users to create, edit, save and later re-use queries.

g. The system must permit the user to terminate a query and examine the result set.

h. The system must permit users to save result sets for later examination and use.

i. The system must permit users to narrow or broaden search criteria in combination with one or more result sets saved in the current or a previous search session.

j. The system must provide for the easy retrieval of the bit-mapped image associated with each retrieved full text page or bibliographic data record.

3. Document Display

a. The system must support the display of retrieval results in descending order of relevancy to the subject being searched.

b. The system must permit the user to display all bibliographic data fields for selected documents and/or select specific bibliographic fields to be displayed from a result set, sorted on the values in the specified field values.

c. The system must highlight the items found as the result of a full text search.

d. The system must support the viewing of a full page of text and its associated bit-mapped image by itself or side by side on the display screen.

e. The system must provide the ability to print all or selected portions of document text, bibliographic data and bit-mapped images.

4. Document Management

a. The system must provide the ability to track the life cycle of documents including creation, revision, archiving and destruction.

b. The system must support the generation of standard and ad hoc reports on the life cycle activities of documents entered into the system.

c. The system must support the generation of standard and ad hoc reports on document search activity.

5. System Security, Backup, and Recovery

   a. The system must maintain information pertaining to the sensitivity of documents in the system and prevent unauthorized access to documents.

   b. The system must maintain security for documents in the database and control access for creation, revision, archiving and destruction.

   c. The system must provide for the backup and recovery of databases and system software and data.

6. Interfaces

   a. The system must provide a user-friendly graphical user interface for the integrated search and display of full text and bibliographic data and the display of associated bit-mapped images.

   b. The system must provide an application programming language interface to permit system enhancements and the development of more sophisticated types of information access.

7. Standards

   a. The system must to the extent possible be composed of off-the-shelf components that comply with open systems architecture as specified by the National Institute of Standards and Technology's Applications Portability Profile. This includes compliance with the Posix operating system services standard in order to assure that the system will support the straightforward addition of other information management tools and utilities as needed from the array of products available for Posix-compliant systems.

   b. The system must be capable of expansion to provide user access via PC workstations connected to a Novell Netware, Version 3 Token-Ring LAN.

8. Capacity and Performance

   a. The system must provide for the storage and retrieval of 50,000 bibliographic data records, 200,000 pages of full text and 100,000 pages of bit-mapped images.

   b. The system must provide for the scanning, compressed storage and printing of bit-mapped images at 300 dots per inch.

   c. The system must provide user access from the system console and provide for expansion (without replacing hardware) to support access by ten simultaneous users.

   d. The system must be able to complete a search for all occurrences of a word in the text database within 15 seconds.

e. The system must display a page of document text within 5 seconds of the selection of the document from a search result set.

f. The system must display a bit-mapped image within 15 seconds of its selection.

SECTION C - DESCRIPTION/SPECIFICATION/WORK STATEMENT

C.1. STATEMENT OF WORK

C.1.1. Background

Under Section 114(d) of the Nuclear Waste Policy Act (NWPA), the U.S. Nuclear Regulatory Commission (NRC) is required to review the U.S. Department of Energy (DOE) license application for construction of a high-level waste (HLW) repository within a three year time period. To assist in meeting this schedule, the NRC has revised the Commission's Rule of Practice in 10 CFR Part 2 to incorporate the use of an electronic information management system (the Licensing Support System or LSS) into the HLW licensing proceeding. See "Submission and Management of Records and Documents Related to the Licensing of a Geologic Repository for the Disposal of High-Level Radioactive Wastes" 54 FR 14925, April 14, 1989, and "Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository" 56 FR 7787, February 26,1991, hereafter referred to as the "LSS Rule."

The LSS Rule sets forth the rules and policies for the development and use of the LSS. Section 2.1011(b) of the LSS Rule tasks DOE with the responsibility to design, develop, and procure the LSS. Section 2.1001(a) establishes the Office of the LSS Administrator (LSSA) within the NRC to oversee LSS design and development and to be responsible for the management and operation of the LSS. In order to implement these responsibilities the LSSA needs to examine, test, and demonstrate database creation/maintenance and search and retrieval technologies similar to those envisioned for use in the LSS. LSSA will run search and retrieval tests against a database with characteristics similar to that of the LSS (i.e. large, homogeneous and technical in nature). LSSA also needs to gain experience and knowledge of database preparation and maintenance over a full range of activities including document capture, storage, search and retrieval, and database revisions/maintenance.

C.1.2. Work Done to Date

In 1987 Science Applications International Corporation (SAIC) developed a small Transitional Licensing Support System (TLSS) for NRC's Office of Nuclear Material Safety and Safeguards (NMSS). In 1989, as a part of its contract with DOE to design the LSS, SAIC captured 100,000 pages of LSS material and used it to study the search and retrieval strategies and behaviors of 44 users over a two week period. SAIC completed a functional design for the LSS in December 1990; however, DOE has done no LSS development work since then.

C.1.3. Statement of the Problem

Under the LSS Rule, LSSA is responsible for the oversight of LSS design and development and administration of the system after it is implemented. To carry out these responsibilities, LSSA needs to implement a test and evaluation system that it can use to:

- Examine/analyze performance issues directly related to the eventual design of the LSS and cost effective methods that LSS participants (other than DOE) can use to prepare their LSS material. Areas to be examined/analyzed are document scanning, cataloging, and indexing, concept searching employing natural language query capability, intelligent retrieval aids, retrieval strategies for large volumes of homogeneous text data similar to that to be stored in the LSS, integration of text and image retrieval, and graphical user interfaces.

- Demonstrate an effective user-friendly, on-line full text and bibliographic data search and image retrieval system to potential LSS users and other interested parties using technology and databases similar in nature to those envisioned for the LSS.

The system is to be implemented making maximum use of commercially available off-the-shelf (COTS) equipment and software.

LSSA had hoped to meet some of these needs using equipment and software from the now-retired TLSS. (NMSS now uses NUDOCS/AD for holding the text of some of its HLW materials; however, NUDOCS/AD does not support advanced query capabilities or online images). LSSA has determined that the capacity and performance of the TLSS is totally inadequate to support the SAIC database and/or a user friendly full text and bibliographic data search and image retrieval system. Moreover, major TLSS system components (high-resolution display controller, hard disk, optical disk and printer) are inoperative and cannot be reliably maintained because of age and/or because their manufacturers are no longer in business.

C.1.4. Project Task Areas

The contractor shall provide all required personnel, materials, and support services and resources to implement, test and operate the system to meet final requirements agreed to by the contractor and LSSA. A preliminary statement of requirements is attached.

C.1.5. Project Personnel

The personnel designated to perform under this contract are considered critical to the successful development of the test and evaluation system. The contractor's proposed personnel shall consist of a team of knowledgeable and trained professionals with

experience in the following areas:

- Records management and document storage in an automated environment
- Automated bibliographic, image, and full-text retrieval systems in a litigation support environment
- Analysis of computer systems equipment and software
- Integration of equipment and software components in a multi-vendor environment
- Development of records management documentation and procedures
- Knowledge of intelligent retrieval aids and concept searching of full text databases using natural language

The distribution of level of effort and number of personnel required shall be determined by the contractor.

C.1.6. Estimated Hours of Effort by Labor Category:

1.	Senior Project Management	200
2.	Senior Computer Analyst	600
4.	Computer Analyst/Programmer	500
5.	Document Management Specialist	600
6.	Word Processing Specialist	120

C.1.7. Equipment/Software to be Provided:

Selection, connection and integration of a number of system components is critical to the success of the LSSA test and evaluation system. The contractor shall provide a turnkey system, which will include the following types of components.

- Optical scanner
- Optical Character Recognition (OCR) hardware/software
- Document capture processor and storage
- High resolution display
- Text and image printer
- Cartridge tape drive

- Bibliographic and full text data loading, storage and search and retrieval software
- Bibliographic data, full text and image data processor and database storage
- Image loading, storage and retrieval software
- Optical storage subsystem
- Graphical user interface software
- Workstation and host communications interface software
- Communications adapters, interfaces and cables
- Operating system software, compilers and utilities
- Software developed as necessary for system integration and operation

Components to be used will be specified in the system implementation plan developed by the contractor and approved by LSSA.

LSSA Test and Evaluation System

Projected Tasks

1. Implement basic document management system

a. Refine system requirements based on discussions with LSSA and preliminary requirements already developed by LSSA;

b. Develop a system implementation plan including a cost/capability rationale for recommendations;

c. Survey and evaluate COTS hardware and software and recommend items that appear to best meet requirements and implementation plan, identify two alternatives for each major system component;

d. Procure commercially available equipment and Posix-compliant COTS software, perform software development, integration, installation and testing for standalone system;

e. Load and test LSS material previously captured by SAIC (100,000 pages of full text and associated images and bibliographic data);

f. Develop and provide documentation and procedures and train LSSA staff.

2. Enhance query/search capabilities

The contractor shall enhance query/search capabilities by upgrading/adding COTS Posix-compliant software to provide natural language and other advanced query capabilities as they become available.

3. Expand access to system

The contractor shall expand system to support access by LSSA staff via existing PC workstations and Novell Netware, Version 3 Token-Ring LAN.

4. Create LSSA database

The contractor shall develop and setup data structures and procedures and provide technical advice and assistance in loading LSSA documents into database.