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**Civilian Radioactive Waste Management System  
Management & Operating Contractor**

**Licensing Support System  
Phase I Functional Requirements**

**Draft**

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## TABLE OF CONTENTS

	Page
1. INTRODUCTION .....	1
1.1 PURPOSE .....	1
1.2 BACKGROUND .....	1
2. LSS DEVELOPMENT CONSIDERATIONS .....	2
2.1 REQUIREMENTS DEFINITION PROCESS .....	2
2.2 DESIGN CONSIDERATIONS .....	3
2.3 REGULATORY ISSUES .....	5
3. REQUIREMENT DEFINITIONS .....	8
3.1 OVERVIEW OF APPLICABLE 10 CFR 2 SUBPART J CITATIONS .....	8
3.2 INTERPRETATION OF SUBPART J DESIGN REQUIREMENTS .....	10
4. REFERENCES .....	31

# 1. INTRODUCTION

## 1.1 PURPOSE

This document presents the first level of Licensing Support System (LSS) functional requirements from which more detailed requirements can be derived. LSS functional requirements are necessary to facilitate an Analysis of Benefits and Costs (ABC), as required by Department of Energy Orders 1330.1D and 1360.1B, and to support system design. All functional requirements presented in this document are derived from the regulations found in 10 CFR Part 2 Subpart J. The regulatory language found in Subpart J is cast into more precise statements that can be used as the basis for detailed specifications. The functional requirements consider only those Subpart J citations that specify or imply required LSS design features. Traceability is maintained between the applicable Subpart J citations and the functional requirements by means of a trace matrix which provides a side-by-side matching of requirements to the applicable regulations.

## 1.2 BACKGROUND

This document is not the first to present LSS functional requirements. LSS functional requirements are specified in a document entitled "Licensing Support System System-Level Requirements Document" (Reference 1). This document presents a listing of functional and performance requirements identified for the LSS through analysis, conceptual design, and prototyping efforts performed by Science Applications International Corporation (SAIC) during the 1988 - 1990 time frame. This document was evaluated as part of the LSS Working Group's efforts to identify an optimal LSS implementation strategy. The evaluation focused on determining if the document could be used to perform an ABC, and if it could be used as part of a Request for Proposal (RFP) if a buy decision is made, or as a requirements document if the LSS is developed internally.

The Working Group's evaluation (Reference 2, Section 3.4) suggested that as an overall specification, the requirements in 10 CFR Part 2, Subpart J are satisfied by the SAIC document. However, there are several deficiencies in the document, when viewed as a system-level or software requirements specification, that preclude its use in an ABC or in an RFP. In many instances, the document specified system design, included procedural requirements, and contained ambiguous and untestable requirements. In addition, there were many design requirements included in the document that were judged to exceed Subpart J requirements. In short, the document reflected the proposed LSS architecture at the time and the requirements that describe this design could exclude many potentially feasible LSS implementations. Based upon these observations, the LSS Working Group recommended that the LSS requirements document be revised to specify only system functionality. The LSS Phase I Functional Requirements document represents the first step in this effort--the coalescing of regulatory citations into more concise functional requirements. Detailed functionality will be developed in a separate LSS Phase II Functional Requirements document.

## 2. LSS DEVELOPMENT CONSIDERATIONS

Use of the LSS during the high-level waste hearings will represent the first time that an electronic document discovery system has been used during an NRC licensing hearing. Because the LSS is a first-of-a-kind system that is intended to support a first-of-a-kind licensing process, there is a certain degree of uncertainty that should be anticipated in designing and implementing the LSS. This section describes a process for developing LSS functional requirements that should minimize this uncertainty and maximize participation by interested parties. In addition, the LSS will pose unprecedented challenges to the information management community because of the projected size of the LSS database and longevity of the system. Several design and operation considerations are discussed in this section that could impact the specification of lower-level requirements. Finally, several regulatory issues are discussed that could ultimately impact how the LSS is implemented.

### 2.1 REQUIREMENTS DEFINITION PROCESS

The technical description of the LSS presented in 10 CFR Part 2 Subpart J is general in nature. It provides a framework for how the LSS should be structured and operated, but does not describe the intended LSS functionality in the detail necessary to purchase or develop the system. Therefore, the details of how the LSS will be implemented are not clearly defined and will most likely be a subject of discussion with interested parties. To facilitate this discussion, LSS functionality will be defined using a "level" concept where subsequently lower requirement levels provide increasingly detailed information on how the function will be implemented. The level concept is simply a method of decomposing the LSS system design requirements into finer and finer detail until sufficient information exists to either buy or build the system. This concept also supports LSS requirements discussions with interested parties who want to understand the LSS design, but do not wish to delve into the details of the design. The individual reviewer may focus on the level that presents LSS functionality at the granularity that he/she is most comfortable.

Before the LSS system design can be decomposed into finer detail, it is necessary to provide a starting point. The LSS Phase I LSS Functional Requirements document represents this starting point. The LSS design requirements and implied functionality contained in Subpart J have been analyzed and coalesced in this document into a set of requirements definitions that represent the first level of LSS requirements. In several instances, this activity required interpretation of the Subpart J requirements. Comments are included in the requirement definition to explain these interpretations. The LSS Phase II Functional Requirements document will contain all subsequent requirement levels.

The LSS directly supports the high-level waste repository licensing process and is therefore considered a tool of licensing. Consequently, defining the general nature of the electronic information management system required in Subpart J is the responsibility of the Regulatory and

Licensing organization within the Office of Radioactive Waste Management (OCRWM). The LSS Phase I Functional Requirements document was prepared by the Regulatory and Licensing organization to provide this general description and facilitate a "hand off" to the OCRWM Information Resources Management (IRM) organization. The LSS Phase II Functional Requirements document will be prepared by the OCRWM IRM organization to define LSS functionality in sufficient detail to support the ABC and support LSS evaluation and acceptance testing.

## 2.2 DESIGN CONSIDERATIONS

The LSS is described in Subpart J as an electronic records management system containing the documentary material of all parties to the high-level waste licensing hearing (§2.1002). Although the LSS is effectively a large database management system, it is unique because the volume of information expected to be processed and stored in the system is enormous. This volume has been estimated through the year 2010 in Reference 2 and is shown in Table 1. From this table it is apparent that the manner in which the LSS data is stored must be flexible enough to accommodate the projected volume. It must also be flexible enough to adapt to the varying rates at which data is added to the system, particularly if these rates are significantly different than estimated.

Processing this large volume of data will also represent a unique challenge. The sheer volume demands that an efficient information processing procedure be identified and implemented. Studies performed by the LSS Working Group indicate that the cost of processing documents (e.g. indexing), and hence the cost of operating the LSS, is very sensitive to the time necessary for humans to participate in the processing procedure. Therefore, to minimize LSS operating costs, the LSS design should attempt, to the greatest extent possible, to incorporate automation technologies that eliminate document processing tasks currently performed by humans.

As part of its charter, the LSS Working Group was asked to recommend a preferred option for implementing the LSS. The Working Group identified and evaluated seven implementation options. A description of these options is found in Section 4 of the LSS Working Group report (Reference 2), and is summarized in Table 2. The LSS Working Group recommended that DOE implement Option 6, although Options 5, 6, and 8 were all considered viable implementation options. It is expected that the LSS Phase II Functional Requirements document will describe a concept of operation for the LSS based upon the option chosen by DOE.

Table 1. Estimated LSS Page Volume

Year	OCRWM Pages/Year	OCRWM Cumulative	NRC Pages/Year	NRC Cumulative	Others Pages/Year	Others Cumulative	Total Pages Added Yearly	90% Relevant Cumulative
1994	580,000	6,905,000	59,000	550,000	18,000	18,000	657,000	6,782,000
1995	750,000	7,655,000	59,000	654,000	23,000	41,000	832,000	7,584,000
1996	1,351,000	9,005,000	65,000	760,000	42,000	82,000	1,457,000	8,947,000
1997	1,682,000	10,687,000	71,000	891,000	52,000	134,000	1,804,000	10,644,000
1998	1,970,000	12,657,000	78,000	1,046,000	61,000	195,000	2,109,000	12,632,000
1999	2,013,000	14,670,000	86,000	1,203,000	62,000	257,000	2,161,000	14,663,000
2000	2,276,000	16,946,000	95,000	1,381,000	70,000	327,000	2,440,000	16,959,000
2001	2,371,000	19,317,000	104,000	1,567,000	73,000	400,000	2,548,000	19,351,000
2002	1,628,000	20,945,000	114,000	1,694,000	50,000	450,000	1,793,000	20,994,000
2003	1,584,000	22,529,000	126,000	1,818,000	49,000	498,000	1,759,000	22,593,000
2004	1,756,000	24,285,000	139,000	1,956,000	54,000	552,000	1,949,000	24,365,000
2005	1,708,000	25,993,000	152,000	2,089,000	53,000	605,000	1,913,000	26,088,000
2006	1,514,000	27,506,000	168,000	2,208,000	47,000	652,000	1,728,000	27,615,000
2007	1,674,000	29,181,000	184,000	2,339,000	52,000	703,000	1,910,000	29,305,000
2008	1,756,000	30,937,000	203,000	2,476,000	54,000	757,000	2,013,000	31,077,000
2009	1,247,000	32,184,000	223,000	2,574,000	38,000	795,000	1,509,000	32,335,000
2010	1,124,000	33,308,000	245,000	2,662,000	35,000	830,000	1,404,000	33,469,000

Note: The number of bibliographic headers can be approximated by dividing total page counts by 13, the nominal number of pages per document.

Table 2. LSS Option Features

Licensing Support System Features	Option						
	2	3	4	5	6	7	8
Microfilm based system	No	No	No	No	No	No	No
Electronic images based system	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electronic image on-line (electronic dissemination)	No	No	No	Yes	Yes	No	Yes
Image disseminated on CD-ROM library <sup>1</sup>	No	Yes	No	No	No	Yes	Yes <sup>2</sup>
Image available as hard copy from central site (mail/fax)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Text on-line (electronic dissemination, including full text search)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Human verified and corrected text	Yes	Yes	No	Yes	No	No	No
Bibliographic header on-line (electronic dissemination)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

<sup>1</sup> The CD-ROM library contains all LSS holdings, and is not generated as a response to particular queries. The CD-ROM contains image, text and text search index of the documents held on each individual CD.

<sup>2</sup> Electronic images will be provided via on-line transmission between CD-ROM distributions.

## 2.3 REGULATORY ISSUES

### *Technology-specific Language*

Even with the general technical description of the LSS presented in Subpart J, there are several instances where the rule includes technology-specific language which could unnecessarily constrain LSS design options. These instances are identified in this section along with the language introduced in this document for dealing with these instances.

The most apparent instance of technology-specific language in Subpart J is the requirement for LSS participants to submit a document as an ASCII file. The intent of the ASCII file is to

facilitate full-text search and retrieval of information. However, there are other text formats that preserve the ability to perform these functions with the added benefit of retaining other potentially useful information (e.g. formatting and linkage information). A more neutral wording of Subpart J would use a term such as "standard text file" as opposed to "ASCII file" since the latter is a more specific version of the former.

Another instance of technology-specific language is use of the term "dial-up access". This term suggests access must be provided to the LSS via telephone lines and modems when in fact the intent of the rule is actually to access the LSS from remote sites. Dial-up access is simply one method of accessing any system remotely. A more generalized wording of Subpart J would replace the term "dial-up access" with "remote access."

Use of the term "bit-mapped image" is another instance of technology-specific language found in Subpart J. Once again, the intent of the rule is to store a retrievable digital likeness of a document. A more appropriate term for "bit-mapped image" could be "digital image" which includes the more specific bit-mapped digital image format.

Finally, Subpart J uses the term "terminal" without specifically defining it in §2.1002. The word terminal has the connotation to information management professionals of a terminal without intelligence or a "dumb-terminal." A more fitting term today for terminal would be "workstation" since workstations are common today much like terminals were common when Subpart J was promulgated.

Subpart J is NRC's rule and it is incumbent upon NRC to re-write the rule to eliminate technology-specific language. These technology issues have been brought to NRC's attention and efforts are currently underway to eliminate technology-specific language from Subpart J. In anticipation of a technology independent clarification to the rule, this document has been written under the assumption that the technology-specific terminology identified previously will be replaced with the more general terms suggested.

### *LSS Search Modes*

Section 2.1007 of Subpart J provides two modes of searching for material within the LSS database depending upon whether a notice of hearing on the high-level waste license application has been issued. Prior to the notice, members of the public are allowed access to bibliographic headers only to search for information. Full-text search of the document text file is not required for the public until after the hearing notice is issued. This dual search mode reflects a position that the DOE successfully negotiated during the rulemaking process to effectively restrict document discovery for the public to only header searches until after the hearing notice is issued, or until the interested public entity chooses to become a potential party to the hearings. Although this strategy does have merit, it unintentionally introduces inefficiencies in document indexing process which could have a profound impact on the cost of operating the LSS.

The LSS Advisory Review Panel (ARP) chartered a working group to examine the header fields required for each document entered into the LSS. This working group proposed a fairly large set of fields primarily to offer the public, who cannot initially perform full-text document searches, a reasonable chance at finding information within the database. Members of the LSS Working Group have recommended reducing the number of required header fields under the assumption that the document text would be available to search. Minimizing the required header fields will reduce the labor required to generate the headers thereby resulting in significant cost savings. However, it is unlikely that the LSS ARP would be willing to reduce the number of required header fields unless the DOE agreed to provide only one mode of access to the LSS--document full-text search. As the requirement is written in this document, DOE can continue to support dual access modes, or could adopt a single access mode. This issue should be carefully considered and specific guidance should be provided in the LSS Phase II Functional Requirements document.

### 3. REQUIREMENT DEFINITIONS

This section presents an overview of the requirements included in Subpart J that specify or imply system design and presents the detailed trace matrices that link Level 1 requirements to the applicable Subpart J citations. The requirements derived from Subpart J are termed Level 1 requirements because they are at the root of the LSS requirements hierarchy and thus form the requirements foundation from which more detailed requirement levels will be derived in the LSS Phase II Functional Requirements document.

#### 3.1 OVERVIEW OF APPLICABLE 10 CFR 2 SUBPART J CITATIONS

Requirements that impact system design directly or imply system functionality are included in seven sections of Subpart J. These requirements are summarized below.

##### *10 CFR 2.1002, High-level waste Licensing Support System*

- The LSS is an electronic information management system containing the documentary material of the DOE and its contractors, and the documentary material of all other parties, interested governmental participants and potential parties and their contractors.
- Access to the LSS by the parties, interested governmental participants, and potential parties provides the document discovery in the proceeding.
- The LSS provides for the electronic transmission of filings by the parties during the high-level waste proceeding, and orders and decision of the Commission and Commission adjudicatory boards related to the proceeding.

##### *10 CFR 2.1003, Submission of material to the LSS*

- Submission of material to the LSS shall be accomplished by submitting an ASCII file, an image, and a bibliographic header for all material to be included in the LSS.

##### *10 CFR 2.1004, Amendments and additions*

- A document submitter shall make a reasonable effort to verify that documents have been entered correctly into the LSS.
- The LSS Administrator shall ensure that the bibliographic header for the original document specifies that revisions have been entered into the system.

*10 CFR 2.1007, Access*

- Access to the LSS for potential parties, interested governmental participants, and parties will be provided by full text search capability through dial-up access from remote sites, image access at remote locations, and the capability to electronically request a paper copy of a document at the time of search.
- During the pre-license application phase, terminal for access to full headers and access to images will be provided at DOE Headquarters, NRC Headquarters, and at all NRC and DOE public reading rooms in the vicinity of the candidate site for a geologic repository. Additionally, terminals will be provided at the Uranium Recovery Field Office in Denver, Colorado, and at Las Vegas, Nevada; Reno, Nevada; Carson City, Nevada; Nye County, Nevada; and Lincoln County, Nevada. After the license application is docketed, access is to include searchable full text at the identified sites.

*10 CFR 2.1011, LSS Management and administration*

- The LSS Administrator shall ensure availability and integrity of the LSS database, maintain security for the LSS database including assigning user password security codes and maintain the thesaurus and authority tables for the LSS.

*10 CFR 2.1013, Use of LSS during the adjudicatory proceeding*

- The LSS Administrator shall establish a file within the LSS to contain the official record materials of the proceeding in searchable full text, or for material that is not suitable for entry in searchable full text, by header and image, as appropriate.
- All filings in the adjudicatory proceeding shall be transmitted electronically. Parties and interested governmental participants will be required to use a password for electronic transmission of documents.

*10 CFR 2.1017, Computation of time*

- If the LSS is unavailable for more than four hours of any day that would be counted in the computation of time, that day will not be counted in the computation of time.

The details of how the LSS is to be designed, constructed, and operated to meet these objectives are not identified in Subpart J. The above requirements are re-cast into functional requirements in Section 3.2.

### 3.2 INTERPRETATION OF SUBPART J DESIGN REQUIREMENTS

This section presents the Level 1 requirements that are derived from Subpart J citations. These requirements are presented in the form of trace matrices where the applicable Subpart J citations are listed next to the associated Level 1 requirement. A comment column is included within each matrix to allow for discussions of how a particular requirement is interpreted or the presentation of issues to be considered when deriving lower-level requirements. Each requirement is labeled with a unique identifier indicating the level and the requirement number within the level. For example, [LSS1-003] is the third in a series of Level 1 requirements. The requirements are ordered based upon the order of their associated Subpart J sections (e.g. 2.1002(a), 2.1003(a)(1), 2.1003(b)(1),...).

DRAFT

11

2/28/95

Applicable 10 CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1002(a) The Licensing Support System is an electronic information management system containing the documentary material of the DOE and its contractors, and the documentary material of all other parties, interested governmental participants and potential parties and their contractors. Access to the Licensing Support System by the parties, interested governmental participants, and potential parties provides the document discovery in the proceeding. The Licensing Support System provides for the electronic transmission of filings by the parties during the high-level waste proceeding, and orders and decisions of the Commission and Commission adjudicatory boards related to the proceeding.</p>	<p>[LSS1-001] The LSS shall be designed in a modular fashion to allow for the integration of functional components.</p>	<p>The LSS must be available to support the licensing proceedings from the pre-license phase, through the amendment to receive and possess waste, and until the license is amended for permanent closure. It is reasonable to expect that during this time frame, technology associated with the various LSS functional components will advance to the point where they are obsolete. To take advantage of inevitable improvements in technology, the LSS should be constructed in a modular fashion. By adhering to this strategy, obsolete hardware and software components can be replaced without adversely impacting the overall operation of the system.</p>

DRAFT

12

2/28/95

Applicable 10,CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1002(a) The Licensing Support System is an electronic information management system containing the documentary material of the DOE and its contractors, and the documentary material of all other parties, interested governmental participants and potential parties and their contractors. Access to the Licensing Support System by the parties, interested governmental participants, and potential parties provides the document discovery in the proceeding. The Licensing Support System provides for the electronic transmission of filings by the parties during the high-level waste proceeding, and orders and decisions of the Commission and Commission adjudicatory boards related to the proceeding.</p>	<p>[LSS1-002] The LSS shall adhere to established government and/or industry hardware and software standards.</p>	<p>As discussed previously, the LSS will be in operation for a considerable period of time. This time frame is on the order of 100 years based upon the current program approach. It is obvious with the current rate of change in technology, that no computer application can be designed to operate effectively over such a long life-cycle. Both hardware and software advancements will render any existing system obsolete on the order of every 5-10 years. To ensure that the LSS remains compatible and reasonably consistent with the technology of the time, it is essential that the LSS design adhere to open hardware and software standards.</p>

Applicable 10 CFR Part 2 Subpart J Citations	Level 1 Requirement	Comments
<p data-bbox="212 277 989 797"><b>§2.1002(a)</b> The Licensing Support System is an electronic information management system containing the documentary material of the DOE and its contractors, and the documentary material of all other parties, interested governmental participants and potential parties and their contractors. Access to the Licensing Support System by the parties, interested governmental participants, and potential parties provides the document discovery in the proceeding. The Licensing Support System provides for the electronic transmission of filings by the parties during the high-level waste proceeding, and orders and decisions of the Commission and Commission adjudicatory boards related to the proceeding.</p> <p data-bbox="212 841 974 1203"><b>§2.1013(c)(1)</b> All filings in the adjudicatory proceeding on the license application to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to Part 60 of this chapter shall be transmitted electronically by the submitter to the Presiding Officer, parties, the LSS Administrator, and the Secretary, according to established format requirements. Parties and interested governmental participants will be required to use a password security code for the electronic transmission of these documents.</p>	<p data-bbox="1031 277 1461 792"><b>[LSS1-003]</b> The LSS shall provide an electronic mail (E-mail) function to facilitate communications between authorized E-mail users. This function shall allow E-mail users to transmit and receive electronic documents (e.g. motions, filings, orders, decisions, etc.). Each E-mail user shall have a corresponding electronic mailbox to receive and store electronic correspondences.</p>	<p data-bbox="1497 277 1881 607">The electronic mail function will facilitate written communication during the licensing hearings. Therefore, it is essential that the mail system enable users to send messages to other users and send/attach documents with their messages.</p>

10 CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1003(a)(1)  Subject to the exclusions in §2.1005 of this subpart and paragraphs (c) and (d) of this section, each potential party, interested governmental participant or party, with the exception of the DOE and the NRC, shall submit to the LSS Administrator--Subject to paragraph (a)(3) of this section, an ASCII file, an image, and a bibliographic header, reasonably contemporaneous with its creation or acquisition, for all documentary material (including circulated drafts but excluding preliminary drafts) generated by, or at the direction of, or acquired by, a potential party, interested governmental participant, or party after the date on which such potential party, interested governmental participant or party is given access to the Licensing Support System.</p> <p>§2.1003(b)(1)  Subject to the exclusions in §2.1005 of this subpart, and subject to paragraphs (c) and (d) of this section, the DOE and the NRC shall submit to the LSS Administrator--An ASCII file, an image, and a bibliographic header, reasonably contemporaneous with its creation or acquisition, for all documentary material (including circulated drafts but excluding preliminary drafts) generated by, or at the direction of, or acquired by, the DOE or the NRC after the date on which the Licensing Support System is available for access.</p>	<p>[LSS1-004]  The LSS shall be capable of accepting electronically formatted and transmitted document information in the following combinations:</p> <ul style="list-style-type: none"> <li>a) Bibliographic header and digital image</li> <li>b) Bibliographic header, digital image, standard text representation</li> <li>c) Bibliographic header only</li> </ul>	<p>It is anticipated that the LSS Administrator will receive the required document information in electronic form from one or more parties to the licensing hearing. Therefore, functionality is specified to ensure that the LSS can accept information in an electronic form.</p>

DRAFT

15

2/28/95

Applicable 10, CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1003(a)(1) Subject to the exclusions in §2.1005 of this subpart and paragraphs (c) and (d) of this section, each potential party, interested governmental participant or party, with the exception of the DOE and the NRC, shall submit to the LSS Administrator--Subject to paragraph (a)(3) of this section, an ASCII file, an image, and a bibliographic header, reasonably contemporaneous with its creation or acquisition, for all documentary material (including circulated drafts but excluding preliminary drafts) generated by, or at the direction of, or acquired by, a potential party, interested governmental participant, or party after the date on which such potential party, interested governmental participant or party is given access to the Licensing Support System.</p> <p>§2.1003(b)(1) Subject to the exclusions in §2.1005 of this subpart, and subject to paragraphs (c) and (d) of this section, the DOE and the NRC shall submit to the LSS Administrator--An ASCII file, an image, and a bibliographic header, reasonably contemporaneous with its creation or acquisition, for all documentary material (including circulated drafts but excluding preliminary drafts) generated by, or at the direction of, or acquired by, the DOE or the NRC after the date on which the Licensing Support System is available for access.</p>	<p>[LSS1-005] The LSS shall provide the capability to recognize characters from the digital image of a document and convert these characters into a standard text representation of the document. This optical character recognition function shall achieve character recognition accuracies that are consistent with the accuracies achievable with the best commercial products available at the time of the LSS system design.</p>	<p>Section 2.1003 requires LSS participants to submit a text representation of each document, if appropriate. If a digital version of document is not available, then the document must be either retyped, or digitally scanned and processed by optical character recognition (OCR) software in order to generate a standard text representation of the document. Because of the large volume of data expected to be processed and loaded into the LSS, automation of the text conversion process is necessary.</p> <p>It is noted that Subpart J does not explicitly require the LSS to include OCR capabilities since each LSS Participant is expected to provide standard text files as part of their document submissions. However, this function will be necessary in order to meet the material submission requirements. It is included here for completeness.</p>

Applicable 10 CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1003(c)(1) Each potential party, interested governmental participant, or party shall submit, subject to the claims of privilege in §2.1006, an image and a bibliographic header, in a time frame to be established by the access protocols under §2.1011(d)(10) of this subpart, for all graphic oriented documentary material. Graphic-oriented documentary material includes, raw data, computer runs, computer programs and codes, field notes, laboratory notes, maps, diagrams and photographs which have been printed, scripted, hand written or otherwise displayed in any hard copy form and which, while capable of being captured in electronic image by a digital scanning device, may be captured and submitted to the LSS Administrator in any form of image. Text embedded within these documents need not be separately entered in searchable full text. Such graphic-oriented documents may include: Calibration procedures, logs, guidelines, data and discrepancies; Gauge, meter and computer settings; Probe locations; Logging intervals and rates; Data logs in whatever form captured; Text data sheets; Equations and sampling rates; Sensor data and procedures; Data Descriptions; Field and laboratory notebooks; Analog computer, meter or other device print-outs; Digital computer print-outs; Photographs; Graphs, plots, strip charts, sketches; Descriptive material related to the information above.</p>	<p>[LSS1-006] The LSS shall have the capability to create a digital image of each page of a document from a paper copy of the page.</p>	<p>According to §2.1001, an image is defined as a "...visual likeness of a document, presented on a paper copy, microform, or a bit-map on optical or magnetic media." This requirement intentionally excludes the need for creating a digital image directly from microform. Instead, it is assumed that all document images residing on microfilm will be first be copied to paper, and a digital image of the document will then be created from the paper copy. This process will ensure that the intent of the rule is retained while eliminating redundant and potentially costly LSS functionality.</p>

DRAFT

17

2/28/95

Applicable 10,CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1003(c)(2) Each potential party, interested governmental participant, or party, in a time frame to be established by the access protocols under §2.1011(d)(10) of this subpart, shall submit, subject to the claims of privilege in §2.1006, only a bibliographic header for each item of documentary material that is not suitable for entry into the Licensing Support System in image or searchable full text. The header shall include all required fields and shall sufficiently describe the information and references to related information and access protocols. Whenever any documentary material is transferred to some other media, a new header shall be supplied. Any documentary material for which a header only has been supplied to the system shall be made available to any other party, potential party or interested governmental participant through the access protocols determined by the LSS Administrator under §2.1011(d)(10) or through entry upon land for inspection and other purposes pursuant to §2.1020.</p>	<p>[LSS1-007] Documentary material not suitable for imaging and conversion to a standard text file shall be identified with a header that includes a reference to the storage location of the material. This reference shall be descriptive enough for users to identify the location of the material and how to access the material.</p>	<p>This requirement will impact the manner in which documents are processed and the type of fields required in a document header. It is included here because it could have an impact on system design.</p>

Applicable 10,CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1004(a) Within sixty days after a document has been entered into the Licensing Support System by the LSS Administrator during the pre-license application phase, and within five days after a document has been entered into the Licensing Support System by the LSS Administrator after the license application has been docketed, the submitter shall make reasonable efforts to verify that the document has been entered correctly, and shall notify the LSS Administrator of any errors in entry.</p>	<p>[LSS1-008] The LSS shall include a function that allows a document submitter to verify that document information entered into the LSS database is identical to the document information submitted to the LSS Administrator.</p>	<p>In order to satisfy this requirement, it is essential that a document submitter have a tool that allows him to verify that information stored in the LSS database is the same information provided to the LSS Administrator. Because of the large volume of information expected to be stored in the LSS, an automated tool might be necessary to minimize human involvement in the verification process.</p>

Applicable 10, CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1004(b)(3) The LSS Administrator shall ensure that the bibliographic header for the original document specifies that a corrected version is also in the Licensing Support System.</p> <p>§2.1004(c)(2) The LSS Administrator shall ensure that the bibliographic header for the original document specifies that revisions have been entered into the Licensing Support System.</p>	<p>[LSS1-009] The LSS shall provide a function to allow the LSS Administrator to alert users that subsequent revisions to a document exist.</p>	<p>The intent of the Subpart J citations is to make the user aware that revisions to a document are available in the LSS database. Subpart J suggests accomplishing this task by editing the header associated with the original document to indicate that revisions exist. Unfortunately, if the header resides on optical disk or some other read-only medium, then the original headers cannot be modified. Therefore, in order to prevent the language of the rule from eliminating specific LSS implementation options, the requirement for editing the headers of the original documents is restated to capture the original intent of the rule, but without constraining system design.</p>

Applicable 10 CFR Part 2 Subpart J Citations	Level 1 Requirement	Comments
<p>§2.1007(a)(1) Terminals for access to full headers for all documents in the Licensing Support System during the pre-license application phase, and images of the non-privileged documents of DOE, shall be provided at the headquarters of DOE, and at all DOE Local Public Document Rooms established in the vicinity of the likely candidate site for a geologic repository.</p> <p>§2.1007(a)(2) Terminals for access to full headers for all documents in the Licensing Support System during the pre-license application phase, and images of the non-privileged documents of NRC, shall be provided at the headquarters Public Document Room of NRC, and at all NRC Local Public Document Rooms established in the vicinity of the likely candidate site for a geologic repository, and at the NRC Regional Offices, including the Uranium Recovery Field Office in Denver, Colorado.</p> <p>§2.1007(a)(3) The access terminals specified in paragraphs (a)(1) and (a)(2) of this section shall include terminals at Las Vegas, Nevada; Reno, Nevada; Carson City, Nevada; Nye County, Nevada; and Lincoln County, Nevada.</p>	<p>[LSS1-010] The LSS shall be accessible by the public from the following locations as a minimum:</p> <ul style="list-style-type: none"> <li>- DOE Headquarters, Washington DC</li> <li>- DOE Project Office, Las Vegas NV</li> <li>- NRC Headquarters, White Flint, MD</li> <li>- NRC Region 1 Office, King of Prussia, PA</li> <li>- NRC Region 2 Office, Atlanta, GA</li> <li>- NRC Region 3 Office, Glenn Ellyn, IL</li> <li>- NRC Region 4 Office, Arlington, TX</li> <li>- NRC Uranium Recovery Field Office, Denver, CO</li> <li>- Las Vegas, NV</li> <li>- Reno, NV</li> <li>- Carson City, NV</li> <li>- Nye County, NV</li> <li>- Lincoln County, NV</li> </ul>	<p>The applicable Subpart J citations list the generic location for public access to the LSS. This requirement simply states the location of these facilities as they exist at the time of writing. This requirement can be revised if locations are added or deleted although the requirement is written to allow for a greater number of access locations without modification.</p> <p>It might also be noted that the word "terminal" is conspicuously absent from the requirement. As discussed in Section 2.3, the word terminal implies a specific type of equipment to some readers and could unnecessarily imply constraints on LSS implementation options.</p>

Applicable 10 CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1007(a)(1) Terminals for access to full headers for all documents in the Licensing Support System during the pre-license application phase, and images of the non-privileged documents of DOE, shall be provided at the headquarters of DOE, and at all DOE Local Public Document Rooms established in the vicinity of the likely candidate site for a geologic repository.</p> <p>§2.1007(a)(2) Terminals for access to full headers for all documents in the Licensing Support System during the pre-license application phase, and images of the non-privileged documents of NRC, shall be provided at the headquarters Public Document Room of NRC, and at all NRC Local Public Document Rooms established in the vicinity of the likely candidate site for a geologic repository, and at the NRC Regional Offices, including the Uranium Recovery Field Office in Denver, Colorado.</p> <p>§2.1007(a)(4) The headers specified in paragraphs (a)(1) and (a)(2) of this section shall be available at the same time that those headers are made available to the potential parties, parties, and interested governmental participants.</p> <p>§2.1007(a)(5) Public access to the searchable full text and images of all the documents in the Licensing Support System, not privileged under §2.1006, shall be provided by the LSS Administrator at all the locations specified in paragraphs (a)(1) and (a)(2) of this section after a notice of hearing has been issued pursuant to §2.101(f)(8) or §2.105(a)(5) on an application for a license to receive and possess high-level radioactive waste at a geologic repository operations area.</p>	<p>[LSS1-011] The LSS shall provide the public with one of two search and retrieval modes depending upon whether a notice of hearing on the high-level waste license application has been issued:</p> <p><i>Prior to notice</i> - Full-text search of each field in the bibliographic headers and retrieval of the header and associated image.</p> <p><i>After notice is issued</i> - same as above <u>plus</u> full-text search of the standard text files.</p> <p>At the DOE's discretion and given concurrence of the LSS Advisory Review Panel, the latter search mode can be provided to the public prior to the hearing notice.</p>	<p>See Section 2.3 for a discussion of the issue.</p> <p>It is noted that LSS Participants (i.e. potential parties, interested government participants, and parties) will have access to full-text search regardless of whether the hearing notice has been issued. Therefore, the dual access mode only applies to non-LSS Participants (i.e. the public).</p>

Applicable 10 CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1007(a)(1) Terminals for access to full headers for all documents in the Licensing Support System during the pre-license application phase, and images of the non-privileged documents of DOE, shall be provided at the headquarters of DOE, and at all DOE Local Public Document Rooms established in the vicinity of the likely candidate site for a geologic repository.</p> <p>§2.1007(a)(2) Terminals for access to full headers for all documents in the Licensing Support System during the pre-license application phase, and images of the non-privileged documents of NRC, shall be provided at the headquarters Public Document Room of NRC, and at all NRC Local Public Document Rooms established in the vicinity of the likely candidate site for a geologic repository, and at the NRC Regional Offices, including the Uranium Recovery Field Office in Denver, Colorado.</p> <p>§2.1007(a)(4) The headers specified in paragraphs (a)(1) and (a)(2) of this section shall be available at the same time that those headers are made available to the potential parties, parties, and interested governmental participants.</p>	<p>[LSS1-012] The LSS shall be capable of electronically storing and retrieving the bibliographic header related to each document in the system.</p>	<p>This requirement addresses one of the basic functions of any database system--storing and retrieving information pertaining to a record.</p>

DRAFT

23

2/28/95

Applicable 10, CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1007(a)(5) Public access to the searchable full text and images of all the documents in the Licensing Support System, not privileged under §2.1006, shall be provided by the LSS Administrator at all the locations specified in paragraphs (a)(1) and (a)(2) of this section after a notice of hearing has been issued pursuant to §2.101(f)(8) or §2.105(a)(5) on an application for a license to receive and possess high-level radioactive waste at a geologic repository operations area.</p> <p>§2.1007(c)(1) Access to the Licensing Support System for potential parties, interested governmental participants, and parties will be provided in the following manner--Full text search capability through dial-up access from remote locations at the requestor's expense;</p>	<p>[LSS1-013] The LSS shall be capable of electronically storing the standard text representation associated with each page in a document</p>	<p>This requirement ensures that standard text files can be stored and available within the LSS for full-text search and retrieval of headers and images. Although it is not specifically required by Subpart J, the text associated with a document could be made available as well since it will already reside in the system.</p>

DRAFT

24

2/28/95

Applicable 10,CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1007(a)(5) Public access to the searchable full text and images of all the documents in the Licensing Support System, not privileged under §2.1006, shall be provided by the LSS Administrator at all the locations specified in paragraphs (a)(1) and (a)(2) of this section after a notice of hearing has been issued pursuant to §2.101(f)(8) or §2.105(a)(5) on an application for a license to receive and possess high-level radioactive waste at a geologic repository operations area.</p> <p>§2.1007(c)(2) Access to the Licensing Support System for potential parties, interested governmental participants, and parties will be provided in the following manner-- Image access at remote locations at the requestor's expense;</p>	<p>[LSS1-014] The LSS shall be capable of electronically storing and retrieving the digital image associated with each page in a document.</p>	<p>This requirement addresses one of the basic functions of the LSS--storing and retrieving document images.</p>

Applicable 10,CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1007(c)(1) Access to the Licensing Support System for potential parties, interested governmental participants, and parties will be provided in the following manner--Full text search capability through dial-up access from remote locations at the requestor's expense;</p>	<p>[LSS1-015] The LSS shall be accessible by potential parties, interested governmental parties, and parties from locations other than those listed in requirement [LSS1-010] at the requestor's expense.</p>	
<p>§2.1007(c)(2) Access to the Licensing Support System for potential parties, interested governmental participants, and parties will be provided in the following manner--Image access at remote locations at the requestor's expense;</p>	<p>[LSS1-016] Potential parties, interested governmental parties, and parties who access the LSS from locations other than those listed in requirement [LSS1-010] shall be provided access to images at the requestor's expense.</p>	
<p>§2.1007(c)(3) Access to the Licensing Support System for potential parties, interested governmental participants, and parties will be provided in the following manner--The capability to electronically request a paper copy of a document at the time of search;</p>	<p>[LSS1-017] Potential parties, interested governmental parties, and parties who access the LSS from locations other than those listed in requirement [LSS1-010] shall be capable of electronically requesting a paper copy of a document at the time of search.</p>	

Applicable 10, CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1011(d)(7) The LSS Administrator shall be responsible for the management and administration of the Licensing Support System, including the responsibility to--Ensure LSS availability and the integrity of the LSS data base;</p>	<p>[LSS1-018] The system shall provide the necessary hardware and/or software to ensure the integrity and availability of the LSS database.</p>	<p>Hardware and/or software tools are typically used by a system administrator to make routine backups of data and to enhance the efficiency of the database. These and other tools effectively ensure the integrity and availability of a database.</p>
<p>§2.1011(d)(9) The LSS Administrator shall be responsible for the management and administration of the Licensing Support System, including the responsibility to--Maintain security for the Licensing Support System data base, including assigning user password security codes;</p>	<p>[LSS1-019] The system shall provide the necessary hardware and/or software to ensure the security of the LSS database. The system shall be capable of providing users various levels of read/write access.</p>	

Applicable 10, CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1011(d)(11) The LSS Administrator shall be responsible for the management and administration of the Licensing Support System, including the responsibility to--Maintain the thesaurus and authority tables for the Licensing Support System;</p>	<p>[LSS1-020] The LSS shall include a function that allows the LSS Administrator to construct and maintain a thesaurus.</p>	<p>A thesaurus can be used during document searches to associate search words with related words included in the thesaurus. The thesaurus can be used to expanded queries to include searches on related words as well as the words entered in the query.</p>
<p>§2.1011(d)(11) The LSS Administrator shall be responsible for the management and administration of the Licensing Support System, including the responsibility to--Maintain the thesaurus and authority tables for the Licensing Support System;</p>	<p>[LSS1-021] The LSS shall include a function for the LSS Administrator to construct and maintain authority tables.</p>	<p>Authority tables are used to restrict the vocabulary entered in select header fields. By restricting the vocabulary, words, names, etc. are entered in a consistent manner thereby eliminating variations of the same word, name, etc.</p>

Applicable 10 CFR Part 2 Subpart J Citation	Level 1 Requirement	Comments
<p>§2.1011(f)(2)(v) The responsibilities of the LSS Advisory Review Panel shall include advice on-- Reasonable requirements for headers, the control of duplication, retrieval, display, image delivery, query response, and "user friendly" design;</p>	<p>[LSS1-022] The LSS shall provide a graphical user interface (GUI) for all LSS access locations.</p>	<p>Graphical user interfaces have essentially replaced traditional command line interfaces and are in use by virtually all potential LSS users. GUIs are intended to enhance the usability of software by providing a more visual interaction with the computer. Therefore, to ensure that the LSS is as "intuitive and user friendly" as possible, the LSS user interface should be implemented in GUI environment.</p>
<p>§2.1011(f)(2)(v) The responsibilities of the LSS Advisory Review Panel shall include advice on-- Reasonable requirements for headers, the control of duplication, retrieval, display, image delivery, query response, and "user friendly" design;</p>	<p>[LSS1-023] The LSS shall provide a function that assists the LSS Administrator in identifying duplicate documents.</p>	<p>The LSS Administrator is responsible for loading the LSS with documents provided by DOE, NRC, and all other parties to the licensing hearing. Even if the document streams submitted by each party are free of duplicate documents, it is likely that duplicate documents will exist when the streams are combined. Therefore, in order to minimize the number of duplicate documents in the system, the LSS Administrator must have a tool to help identify duplicate documents.</p>

Applicable 10 CFR Part 2 Subpart J Citations	Level 1 Requirement	Comments
<p>§2.1013(c)(1) All filings in the adjudicatory proceeding on the license application to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to Part 60 of this chapter shall be transmitted electronically by the submitter to the Presiding Officer, parties, the LSS Administrator, and the Secretary, according to established format requirements. Parties and interested governmental participants will be required to use a password security code for the electronic transmission of these documents.</p>	<p>[LSS1-024] The E-mail function shall provide password protection for all documents transmitted electronically.</p>	
<p>§2.1013(c)(3) Service upon a party or interested governmental participant is completed when the sender receives electronic acknowledgment ("delivery receipt") that the electronic submission has been placed in the recipient's electronic mailbox.</p> <p>§2.1013(c)(4)(i) Proof of service, stating the name and address of the person on whom served and the manner and date of service, shall be shown for each document filed, by--Electronic acknowledgment ("delivery receipt");</p>	<p>[LSS1-025] The E-mail function shall provide for an electronic acknowledgement that mail has been delivered to the recipient's electronic mailbox. The acknowledgement shall include as a minimum, the name and address of the recipient and the date the electronic mail was delivered.</p>	<p>Gateways that link various electronic mail systems together are becoming common as popularity with the Internet grows. If an E-mail user accesses the LSS via a gateway that does not allow receipt notices to "jump" the gateway, then the delivery receipt need only indicate the date the message was delivered to the recipients's gateway.</p>

Applicable 10,CFR Part 2 Subpart J Citations	Level 1 Requirement	Comments
<p>§2.1017 In computing any period of time, the day of the act, event, or default after which the designated period of time begins to run is not included. The last day of the period so computed is included unless it is a Saturday, Sunday, or legal holiday at the place where the action or event is to occur, in which event the period runs until the end of the next day which is neither a Saturday, Sunday, nor holiday. Whenever a party, potential party, or interested governmental participant, has the right or is required to do some act within a prescribed period after the service of a notice or other document upon it, one day shall be added to the prescribed period. If the Licensing Support System is unavailable for more than four access hours of any day that would be counted in the computation of time, that day will not be counted in the computation of time.</p>	<p>[LSS1-026] The LSS shall be designed so that system availability meets industry averages at the time of LSS system design.</p>	<p>The intent of the LSS is facilitate document discovery during the high-level waste hearings and help the NRC meet the three-year license review period required in the Nuclear Waste Policy Act. This requirement is included to ensure that the time saved during the licensing hearings from use of the LSS is not significantly impacted by poor availability of the system.</p>

#### 4. REFERENCES

1. Science Application International Corporation, "Licensing Support System Systems-Level Requirements Document", Revision 5.0, December 12, 1990.
2. TRW Environmental Safety Systems Inc., "Evaluation of Licensing Support System Options", Revision 0, January 16, 1995.