

**A PROPOSAL FOR
INTEGRATION AND LONG-TERM OPERATION
OF THE LICENSING SUPPORT SYSTEM**

**Submitted to:
The U. S. Nuclear Regulatory Commission**

By:

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I. Background

In the Nuclear Waste Policy Act of 1982, Congress stipulated that the responsibility for definition and construction of the Licensing Support System (LSS) was to be assumed by the Department of Energy (DOE). This same Act assigned the responsibility for long-term operation of the LSS to the Nuclear Regulatory Commission (NRC).

Because the LSS must contain all environmental, scientific, and legal documents pertaining to the licensing proceedings, it will store and manage a huge collection of related documents. In fact, it will most likely be the largest single on-line text-retrieval database in the public domain.

Because of the nature of this system, the task of successful long-term operation presents several unusual problems to the NRC. In this report, we discuss the nature of these problems, the conditions which must prevail to minimize their effect, and we offer a proposal designed to maximize the probability of continuous successful operation.

II. Problems Unique to the LSS

The specific problems unique to operation of the LSS are:

1. high public visibility and importance,
2. rapid growth in content (and in active users) during use,
3. very long life expectancy, and
4. strong requirements for state-of-the-art technology (not only for recognition and retrieval technology but also for processor performance, memory speed and capacity, communication capability, and user-friendly interfaces).

To build, install and attempt to operate an LSS, for even five years, without anticipating dramatic system changes during this time is a formula for failure. The combination of the public expectation of continuous efficient operation, of rapid growth, and the need for continuously upgraded technologies will generate extreme operational demands over the life of this system. We believe these problems can be solved but only if appropriate plans are made and only if the LSS operating environment is organized to deal with the demands for continuous change.

We note on one hand, that the LSS may actually be needed for a period of 15 or even 20 years. (The most conservative estimates are at least 10 years.) At the same time, it is clear that the computing and communications components of the LSS will improve in price/performance ratio by a factor of two every 2-3 years. It is clear that a factor of 5-10 reduction in cost and a similar improvement in performance in all these technologies can easily be expected over the life of this

system. In fact, the combined effects of all of these simultaneously improving technologies over ten or more years could easily generate price/performance improvements far greater than a factor of 10.

Thus, rapidly improving technologies, state-of-the-art requirements, rapid growth, and high public visibility will place special demands on the operation of the LSS.

III. Controlling problems through planning: Modular System Architecture

One important step in dealing with these problems was made at the recent LSSARP meeting which was held in Las Vegas. The establishment of an LSS Technical Working Group, suggested by Clark County, will provide the guidance to define needed technical standards.

The first task of the LSSTWG will be to review and to recommend changes needed in LSS requirements. A key component of LSS requirements will be for system architectural standards which will ensure continuous plug-and-play modularity of all components of the LSS system.

The existence and continued enforcement of these standards over the life of the system will ensure the modularity needed to permit fine grained component substitutions with minimal disruption in operation of the system. Thus, as new cheaper and/or better (software and hardware) components become available, their benefits can quickly be delivered to users of the LSS.

To ensure the continuous awareness of appropriate opportunities for improvement will require a stable, non-political, and technically responsible operating group. In fact, it would be desirable for the operating group to also be responsible for initial integration of all LSS components. Such a group would not be responsible for system design or implementation but only for final integration and operation.

This combination of "Integrator/Operator" functions in a non-profit technical group would make possible continued enforcement of modular standards by the NRC. The exploitation of opportunities for improvement would be achieved by annual "Technology Assessment" reporting to NRC staff.

IV. Controlling problems during operations: Organizing for Change

We note the stability of the University as a technical organization when contrasted with the transient nature of most U. S. government contractors. In addition, by establishing parallel experimental facilities in a University research setting, the NRC could generate continuous opportunities for improvement which seldom exist in "for-profit" organizational settings.

We believe that a University operator would be perceived as a neutral party. By utilizing University students in both operations and in improvement studies, the operating environment would naturally provide a continuous technical awareness which would be beneficial. In fact, ISRI has for several years conducted annual OCR "Technology Assessment" tests. We propose that ISRI's annual "Technology Assessment" testing be extended to other LSS critical components.

At the same time, the University can profit considerably from access to large, practical, state-of-the-art facilities. Current predictions place the ultimate size of the operating LSS at about 28 million pages. It will most likely be the largest text retrieval system accessible to the public. It will in fact, provide outstanding opportunities for advancing the state-of-the-art itself and thus advancing the reputation of the University.

V. A Proposal for LSS Operation at UNLV

We propose that UNLV/ISRI be designated as the Integrator/Operator of the LSS reporting to the NRC. Existing contracts already stipulate that UNLV will provide space to host the final search and image system. ISRI has four years of experience in working with LSS documents and with experimental research into both recognition and retrieval technologies.

We believe that UNLV can fulfill these functions in a cost effective manner and will be in a position to ensure continuous successful operation of the system. Thus, we believe the proposed operating agreement would provide significant benefits to UNLV, to the NRC, and to all users of the Licensing Support System.