DEPARTMENT OF ENERGY PLANS FOR DEVELOPING A MONITORED RETRIEVABLE STORAGE FACILITY

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ABSTRACT

The U.S. Congress authorized the development of a monitored retrievable storage facility (MRS) as part of the high-level radioactive waste management system. The MRS will be used to receive, store, and stage shipments of intact spent fuel to the permanent repository. Early development of the MRS is crucial to honoring the long-standing Federal commitment to timely and adequate waste acceptance. The Department of Energy's (DOE) objective is initial waste acceptance at the MRS beginning in 1998. DOE's strategy for MRS siting is to support the efforts of the Nuclear Waste Negotiator to find a volunteer host. The major components of the MRS development process include environmental assessment, design development, and licensing. DOE has undertaken a variety of activities in each of these areas to prepare for MRS development and has developed a schedule of major milestones leading to waste acceptance in 1998.

INTRODUCTION

In 1987, the U.S. Congress authorized the development of a monitored retrievable storage facility (MRS) for the temporary, above-ground storage of spent nuclear fuel from commercial utilities. The MRS will be an integral part of the high-level radioactive waste management system, and will contribute to the mission of pursuing permanent disposal in a geologic repository. This paper describes current plans for MRS development, including a brief discussion of the need for an MRS and the preferred strategy for siting an MRS, followed by descriptions of the major processes leading to MRS construction and operation, including discussions of the environmental assessment, design development, and licensing processes. Finally, a schedule with major milestones leading to the start of waste acceptance at an MRS in 1998 is included.

Need For An MRS Facility

An MRS facility will make a significant functional contribution to the performance of the high-level radioactive waste management system. The MRS facility will be used to receive, store, and stage shipments of intact spent fuel to the permanent repository. The MRS will be designed so that it could be later expanded to perform additional functions that may be determined to be beneficial or required as the system design matures. It will provide a flexible coupling between at-reactor waste management operations and repository operations, interfacing between systems with dissimilar functions and characteristics. The MRS will facilitate an orderly transfer of spent fuel to the Federal system, independent of the ability to emplace fuel in the repository, thus increasing system reliability. The use of high-capacity, dedicated trains to ship spent fuel from the MRS to the repository will enhance transportation efficiency. Early development of the MRS is crucial to meeting the objective of timely and adequate waste acceptance, and will contribute to meeting the objectives of schedule confidence and system flexibility.

An MRS will also reduce utilities' needs to expand their on-site storage capacity for spent fuel. With the start of repository operations now deferred to 2010, it is clear that the only way to honor the long-standing Federal commitment to early waste acceptance is by beginning MRS operations independent of repository development. DOE's objective is initial waste acceptance at the MRS beginning in 1998.

The primary mission of the waste management program is permanent disposal of high-level waste in a geologic repository. DOE's plans for MRS development do not in any way change that mission. In fact, providing for centralized interim storage will allow the repository program to develop at a pace consistent with its first-of-a-kind nature, and not dictated by unrealistic waste acceptance objectives. This is similar to the policies pursued by several other countries, including Sweden, Germany, and France.

MRS Siting Strategy

The Nuclear Waste Policy Amendments Act of 1987 (Amendments Act) provided for two different paths to siting an MRS: siting through a DOE-directed site survey and evaluation process; and siting through the efforts of the Nuclear Waste Negotiator -- who may negotiate a proposed agreement with a State or Indian Tribe willing to host the MRS. Recognizing the difficulty of DOE-directed siting through national or regional screening, DOE prefers an MRS facility that is sited through the efforts of the Nuclear Waste Negotiator. In addition, a negotiated agreement would be subject only to those terms and conditions contained therein, which could include terms that differ from the capacity limits and schedule linkages between the MRS

and the repository that are contained in the Amendments Act.

The Secretary of Energy signed a Memorandum of Understanding (MOU) with the Negotiator in November 1990. The MOU establishes a working relationship between the Office of the Nuclear Waste Negotiator and DOE that assures a timely flow of information between the parties; provides the Negotiator with use of such DOE services, facilities, and personnel as the Secretary determines appropriate; and maintains each party's independence. Subsequent MOUs between the Negotiator and DOE addressing procedures and relations regarding other provisions of the Act, such as environmental assessment of sites and financial assistance to potential host jurisdictions to assess the feasibility of siting an MRS, may be entered into at a later date.

The remainder of this paper discusses the MRS development process, the basic components of which will be the same regardless of where the facility is located. The paper also outlines DOE initiatives to support MRS development and includes a schedule of major milestones leading to waste acceptance in 1998.

ENVIRONMENTAL ASSESSMENT PROCESS

The Amendments Act provisions for Negotiator siting of an MRS specify a two-step environmental assessment process: preparation of an environmental assessment (EA) to accompany any negotiated agreement submitted to Congress for approval; and, if an agreement is enacted, preparation of an environmental impact statement (EIS) that will accompany the license application submitted to the Nuclear Regulatory Commission (NRC). Described below are the major steps in the development of the EA and the EIS, along with the status of DOE activities to support EA development.

Development Of The EA For A Potential MRS Facility Site

The Amendments Act provides that, upon the request of the Negotiator, DOE will prepare an EA of any site that is the subject of negotiations. Thus it is possible that DOE will be requested to prepare more than one EA. The EA is to include a detailed statement of the probable impacts of construction and operation of an MRS facility at the site. There are several Amendments Act provisions governing preparation of the EA and the EIS. In addition, both the EA and the EIS will be prepared in accordance with the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and with DOE's regulations for NEPA compliance. The major steps in EA development are:

- Conduct EA public (scoping) hearings: inform residents that a site is under consideration and receive their comments; solicit and receive any recommendations of residents for issues that should be addressed in the EA.
- Collect and analyze data for the EA: use available geophysical, geologic, geochemical, hydrologic, and other information. Borings or excavations are not permitted at a site unless the Secretary certifies that there is no other way to collect the necessary information. Will need information on the environment, the transportation system, socioeconomic conditions, and emergency response facilities.
- Prepare the EA: include brief discussion of alternatives -- including alternative locations for the facility and alternative design technologies; environmental impacts of the proposed action; and a listing of agencies and persons consulted.
- Provide the EA to affected parties for review: provide to the host State (and, if applicable, Indian Tribe) and, as appropriate, adjacent States, for a 14-30 day comment period.
- Issue the EA: considered a final agency action, subject to judicial review.

Development Of The EIS For An MRS Facility Site

Preparation of the EIS is a two-phase process: publication of a separate Draft EIS (DEIS), followed by preparation of a Final EIS (FEIS). The major steps in EIS development are:

- Issue EIS Notice of Intent (NOI): begin the public scoping process, by inviting comments and suggestions on the scope of the EIS.
- Conduct EIS scoping activities: hold at least one public scoping meeting to offer residents the opportunity to participate in the process; prepare an EIS Implementation Plan stating the scope and content of the EIS, recording the results of the scoping process, and describing the approach that will be used to prepare the EIS.
- Collect and analyze data for the EIS: expand on and supplement the data collected for the EA.
- Prepare the DEIS: include discussions of alternatives; affected environment; environmental consequences; list of preparers; and list of recipients.
- Issue the DEIS.
- Hold a public review and comment period: conduct at least one public hearing.
- Prepare the FEIS: include an analysis of, and response to, comments received; reflect new information acquired during the review period.
- Issue a Record of Decision (ROD): if a determination is made to go forward with the MRS facility at the site

covered by the EIS, issue a ROD stating the decision, identifying alternatives considered, and indicating whether all means to minimize environmental harm were adopted, and, if not, why not; include a determination of compliance with floodplain/wetlands environmental review requirements.

DOE has undertaken several activities to prepare for EA development. DOE completed a draft management plan for the EA and produced a draft annotated outline for a generic EA. In 1991, DOE will be prepared to start preparation of one (or more) EAs, if requested by the Negotiator. The schedule at the end of this paper includes dates for the major milestones in the environmental assessment process.

DESIGN DEVELOPMENT PROCESS

Once it is fully operational, the MRS facility's functions will be to receive spent fuel in shipping casks, transfer that fuel to storage modules, store the fuel, and transfer the fuel back to shipping casks for shipment to the repository for permanent disposal. However, DOE intends to maintain flexibility to include additional functions, such as rod consolidation or packaging, if they are beneficial and if the facility host agrees. It is also possible that a negotiated agreement could provide for the co-location of other, related facilities, such as cask maintenance or transportation operations facilities.

The design of the MRS will be based on an overall systems analysis, including safety, cost, licensing, and schedule considerations, as well as input from the volunteer host. An MRS configuration that can be constructed within DOE's schedule and uses proven technologies to the greatest extent practicable will be chosen. DOE is currently evaluating a number of proven and reasonably achievable technologies and configuration alternatives.

The major steps in the design development process are:

- Complete functional analysis to identify MRS facility design requirements: define the specific functions the MRS will perform and the requirements governing those functions; develop a set of detailed MRS design requirements.
- Identify the technologies to be evaluated during conceptual design: assess the technologies according to their ability to meet the MRS design requirements.
- Prepare conceptual design: develop the technologies to a configuration that meets the MRS design requirements.
- Select a preferred technology: select technology by a thorough evaluation of the conceptual design, including safety, cost, licensing, and schedule considerations, as well as input from the volunteer host.
- Prepare Title I (preliminary) design: confirm the conceptual design and complete the design incorporating site-specific information, as available; specify materials and equipment to be used.
- Prepare Title II (final) design: will be used to construct the MRS facility.

DOE has identified and assessed dozens of potential technologies and has undertaken a comprehensive functional analysis to identify MRS facility design requirements. The schedule at the end of the paper includes dates for the major design milestones.

LICENSING PROCESS

DOE will apply for an NRC materials license under 10 CFR Part 72 in order to construct and operate the MRS facility. NRC regulations enforce Environmental Protection Agency (EPA) guidelines for radiological safety of spent fuel management and storage. DOE plans to submit a single license application for the MRS facility, which will contain all the information needed to obtain a materials license. The license application will describe the proposed facility, address conditions under which it will be constructed and operated, and explain how and where activities will be performed. It will contain an assessment of the proposed operations to determine whether they are in compliance with the NRC regulatory criteria, and will include an environmental impact statement.

In order to expedite the licensing process, DOE has developed several strategies:

- Employ an MRS facility design that uses proven technologies -- particularly those already licensed or certified by the NRC -- or closely approximates existing NRC-licensed facilities.
- To the extent practicable, select a design that will be suitable for expedited licensing and certification independent of site-specific conditions.
- Conduct pre-licensing interactions with the NRC to identify licensing issues and begin working to resolve them. Submit topical reports and obtain NRC staff review prior to submittal of the license application.

The major steps in the licensing process are:

- Prepare and submit topical reports (TRs): three TRs will be developed -- Quality Assurance (non site-specific); Physical Protection (site-specific); and Facility Design and Operations (site-specific).
- NRC review and approval of TRs: after NRC approval of the TRs, the information contained in the TRs can be incorporated by reference in the license application.

- Prepare and submit the License Application (LA): include general and financial information, technical qualifications, technical information (safety analysis report), conformity to design criteria, operating procedures, quality assurance program, operator training, records requirements, physical protection plan, decommissioning plan, emergency plan, environmental report, proposed license conditions, and technical specifications.
- Application review: the NRC issues a notice of proposed action, and provides an opportunity for a public hearing; NRC staff review the LA and prepare a Safety Evaluation Report (SER) on it; the Advisory Committee on Nuclear Waste reviews the LA and the SER and makes a recommendation; the Atomic Safety Licensing Board (ASLB) conducts the hearing and issues an initial decision; and the NRC Commissioners review the ASLB's decision, and may then direct the issuance of a materials license.
- License issued: the Commissioners' decision constitutes a final agency action, which is subject to judicial review.
- Update the safety analysis report (SAR) periodically: during the MRS facility construction and operation phases, DOE must submit SAR updates to the NRC.

If, at a later date, DOE determines that it would be beneficial to perform additional operations at the MRS facility, such as rod consolidation or packaging, a license amendment would be required. The application would be considered by the NRC in the same manner as described above, including the opportunity for a public hearing.

DOE has begun to prepare for the licensing process. A draft MRS Licensing Plan has been developed. Potential topics for TRs have been identified and guidance for producing TRs has been developed. An MRS regulatory guidance document is being developed. The schedule for major licensing milestones follows.

MRS SCHEDULE

Figure 1, following, shows the current schedule for MRS development leading to waste acceptance in 1998. It includes the major milestones for design, siting, licensing, and environmental activities. It also includes regulatory and project management milestones. The schedule assumes that the MRS will be sited by the Nuclear Waste Negotiator. This schedule is current as of January 1991. DOE will actively manage the schedule and will establish new dates as required.

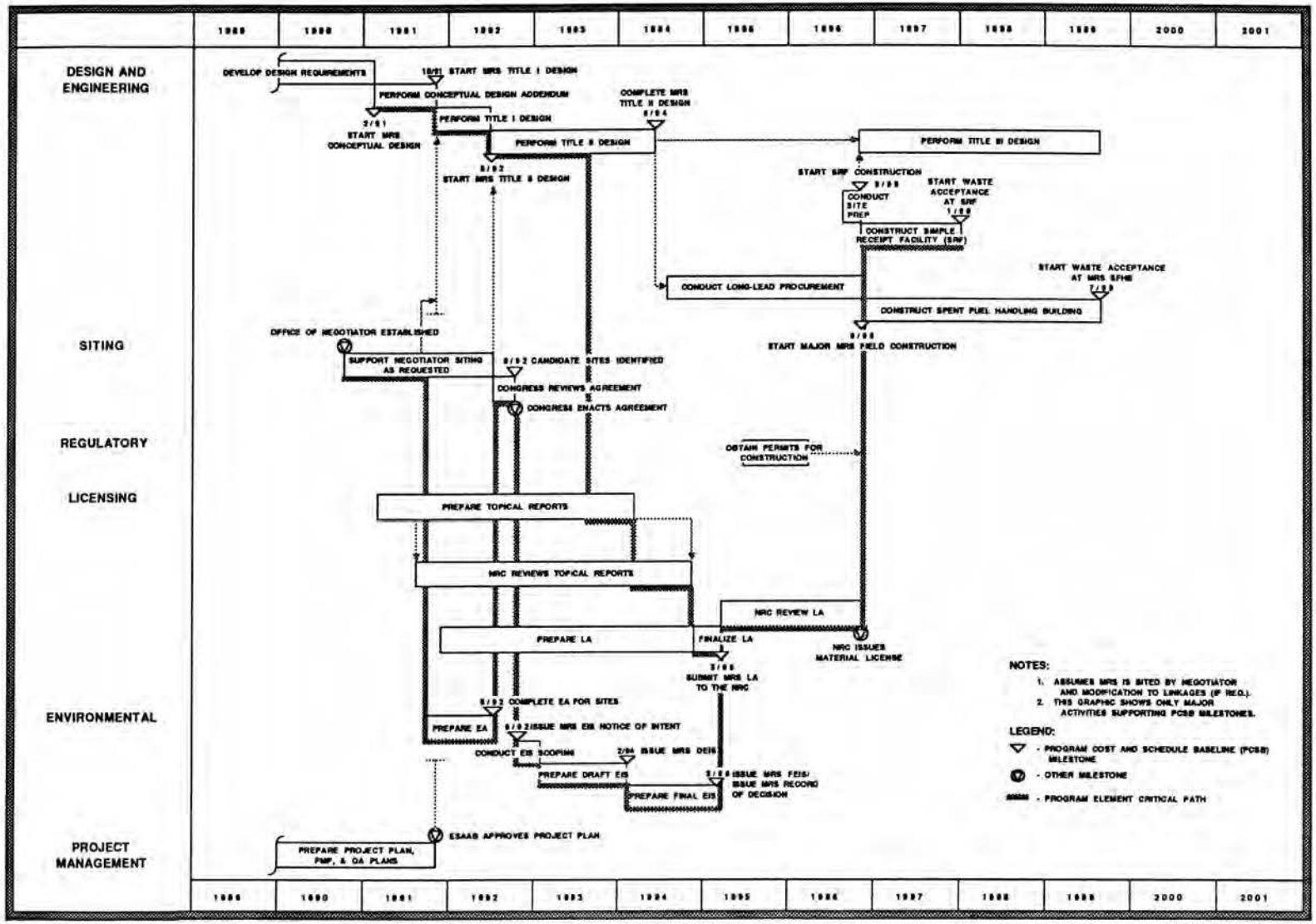

Fig. 1. MRS Schedule.