

## STRATEGIC MANAGEMENT OF HLW REPOSITORY PROJECTS

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### ABSTRACT

This paper suggests an approach to strategic management of HLW repository projects based on the premise that a primary objective of project activities is resolution of issues. The approach would be implemented by establishing an issues management function with responsibility to define the issues agenda, develop and apply the tools for assessing progress toward issue resolution, and develop the issue resolution criteria. A principal merit of the approach is that it provides a defensible rationale for project plans and activities. It also helps avoid unnecessary costs and schedule delays, and it helps assure coordination between project functions that share responsibilities for issue resolution.

#### Basis for the Proposed Strategic Approach

Under requirements of the Nuclear Waste Policy Act (NWPA), the NRC and EPA regulations, and the 10 CFR 960 Siting Guidelines, the US Department of Energy (DOE) is implementing a program to site, design, and license high-level waste (HLW) repositories. The DOE plan for the first repository involves a sequence of decisions in which a slate of nine candidate sites will first be reduced to five, the five will subsequently be narrowed to three, and the preferred site will be selected from the three finalists. A repository system will be designed for the selected site and subjected to licensing review by the NRC.

The basis for the siting decisions, which can be regarded as early stages of the overall licensing process, is development and comparison of a comprehensive body of information concerning the safety performance potential of repository systems located at the candidate sites and the social and environmental impacts that would be incurred at the candidate locations. To develop the needed information, DOE has established project organizations for the candidate repository sites. The project organization for the selected site will also have responsibility to develop detailed information needed for the later stages of the licensing process.

The DOE program and the individual site projects face management problems that are unique and unprecedented. First, DOE has never been an applicant for an NRC license, and NRC has never licensed a HLW repository. The information base and procedures to be used in the licensing process are therefore to be established. Second, anticipation of information needs, based on requirements of the NWPA and the NRC and EPA regulations, shows that there will have to be project functions, interactions, and activities that are unconventional.

How should this unique enterprise be managed? This paper offers an answer to that question. It suggests a strategic approach to management which can satisfy the mandates of the NWPA, serve the needs of the licensing process, and survive intense public

scrutiny. The discussion focuses on management of individual projects such as those at Hanford and Nevada but, of necessity, includes consideration of management functions at the overall program level. Some of the management needs must be addressed at the program level because they are generic and result in principles and guidance for all projects.

A conventional engineering project proceeds in more-or-less linear fashion to develop information, evaluate tradeoffs, and select a final system design that meets needs. For example, an aircraft manufacturer will design and market an airplane that meets the business requirements of the commercial airlines and the safety requirements of the FAA. In many ways, the DOE HLW repository projects are similar in needs, function, and mission to those of an aircraft design project. They face, however, two unique problems: the analog of the FAA requirements has not been fully established (i.e., the licensing groundrules are uncertain), and one part -- the geologic setting -- of the system they are designing is beyond human control, of uncertain performance capability, and can only be characterized with massive effort over long periods of time. In sum, the DOE program and site projects must evolve the groundrules as they proceed, and they must figure out how to embed the slow-to-evolve results of site characterization in the site selection and licensing processes. Results of site characterization can force changes in activities, costs, schedules, assumptions, design, and strategy at both the program and project levels.

The groundrules for licensing will evolve through dialogue between DOE and NRC, and productive dialogue is already underway. Of ultimate importance is the information content of that dialogue. The NRC has indicated they will follow established principles of "reasonable assurance", but DOE is expected to take initiatives to establish the specifics of application of this concept in the HLW repository licensing process. The DOE must therefore develop and defend approaches to licensing issues such as margin between required and expected performance, treatment of uncertainty, and need for testing. The approaches selected will in large measure depend on the realities of site

characterization and repository system performance assessment.

The strategy offered here for DOE fulfillment of its mission (i.e., for developing approaches to the licensing process and for embedding the results of site characterization in both program and project progress) is based on "issues management." The key premise is that requirements such as those of the NWPA and the NRC regulations give rise to issues. The issues in turn give rise to plans and activities designed to resolve the issues; implementation of plans then develops information aimed at resolving the issues. This paper describes principles and practice for a DOE program strategy derived from this issues management concept.

#### PRINCIPLES FOR ISSUES MANAGEMENT

Principle 1. A primary function of the DOE program is to resolve issues. This is the cardinal principle of the concepts presented in this paper, and in practice is probably the most difficult to sustain and apply. In contrast to efforts such as the Manhattan Project, which was strongly motivated to close issues, the DOE HLW program must deal with many motives to proliferate and sustain issues and relatively few motives to resolve them. Motives for closure, such as the schedule mandates of the NWPA and institutional commitment, must overcome obstacles such as diversity of opinion playing the what-if game, issue invention by obstructionists, and to-be-expected conservatism on the part of all participants in this safety-related, first-ever enterprise of its type.

The incentives and dis-incentives for issue closure have both been created by the legislative and regulatory framework for the program. The DOE will have to consciously and diligently work to overcome the dis-incentives which could lead to excessive costs, schedule slippages, and lack of confidence that DOE can get the job done. A program strategy based on issue resolution is suggested as the means to fulfill this objective.

Principle 2. The agenda of issues should be explicitly defined. In some situations, an agenda of issues is readily developed. For example, the NRC's review of the BWIP Site characterization Report generated a list of issues to be addressed in future work. In most circumstances, however, the objectives of project activities are not expressed in terms of issue resolution. As a result, work levels (and, consequently, costs and schedules) tend to be based on nice-to-know rather than on need-to-know. If project effort is based explicitly on an agenda of issues to be resolved, the work will be focused on needs, sensitivity to purpose will be increased, and project plans will be easily defended.

Principle 3. Issue resolution criteria should be developed and implemented. In DOE's HLW program, issue resolution is primarily a matter of reducing uncertainty to acceptable levels and distributing the residual uncertainties in acceptable ways. Realistic criteria for deciding when an issue has been resolved because uncertainty has been reduced to a practical minimum must therefore be developed, and work functions aimed directly at this task must be established. Effort to develop these criteria is needed at both the program and the project levels.

At the program level, the effort should be directed at generic, strategic issues that impact the

entire program. An example of such an issue is selection of the approach to compliance with EPA's integrated nuclide release limits. The degree of compliance with the EPA standards will be clouded in the NRC licensing process by technical issues such as evaluation of uncertainty and by procedural issues such as interpretation of "reasonable assurance". The DOE should develop and propose criteria for compliance with the EPA standards (and with NRC's other 10 CFR 60 requirements), negotiate with NRC, and feed the results back to the projects as principles and guidance.

The projects will need to develop criteria for resolution of issues that are site-specific. An example of such issues is the "How-much-is-enough?" question for site characterization. Characterization programs required to bring uncertainties concerning the geologic setting to a practical minimum will depend on the complexity of the site's geology and hydrology. Each project therefore should dedicate effort to generation of criteria for feasibility and sufficiency of site characterization. Similar effort is needed for other items on the site's issues agenda.

As a footnote to the assertion that issue resolution is strongly related to uncertainty reduction and management, it is of interest to note that uncertainty starts small (because "nominal" values for parameters can be assumed in the absence of actual data), grows to a maximum, and falls to a practical minimum as data acquisition and analysis proceeds. Active, dedicated issues management effort will help avoid the excessive costs and delays associated with overshoot of the maximum (e.g., as a result of an uncontrolled what-if syndrome) and undershoot of the practical minimum.

Principle 4. Project functions dedicated to issues management should be established. According to the theses of this paper, all project functions are aimed at issues resolution and management. What's needed is a high-level function with lead responsibility for management of the issues agenda. Operation of this function is discussed later.

Principle 5. Plans should include a rationale derived from issues management. If issue resolution is the focus of project functions, project plans will be deduced from assessments of issue status using the resolution criteria. The plans will automatically be accompanied by rationale, which would be a description of the outcome of the issue assessment process.

#### IMPLEMENTING ISSUES MANAGEMENT

Implementation of the principles and concepts of issues management can be represented as shown in Fig. 1. This diagram illustrates the hierarchy in which requirements produce issues, issues produce plans, plans lead to results, and assessments of results in terms of progress toward issue closure produces revision of plans or documentation of issue closure.

Other features of issues management illustrated by Fig. 1 include:

- Plans for resolution of site issues and program issues differ but interact and should be described in the Mission Plan mandated by the NWPA.
- Progress is iterative.

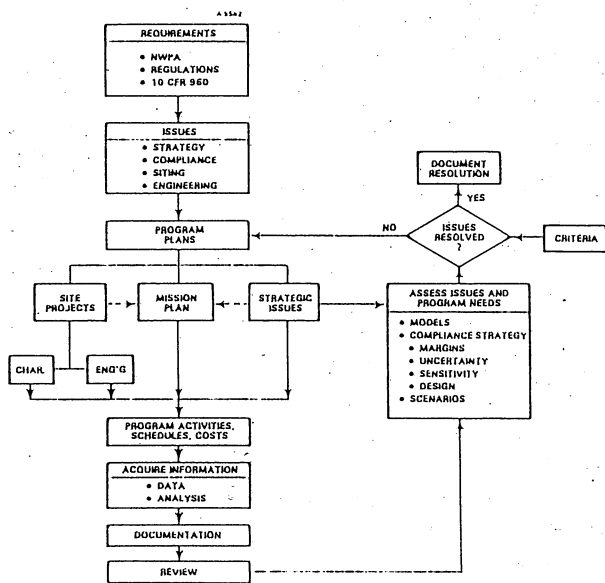


Figure 1. Implementation of Issues Management

- Issue closure assessment is essential for both site and program issues.
- Criteria are essential as a basis for revising plans or documenting issue closure.

The tools for issue assessment are performance evaluation models, the analytic techniques that result from selection of the regulatory compliance strategy, and the list of process and event scenarios that potentially affect repository system performance. These tools serve three functions: they help establish the issues agenda, they assess progress toward issue closure, and they are the means by which the closure criteria are established. Ideally, all tools would be in place at project inception. In practice, tool development and project activities are proceeding simultaneously, and there are issues concerning the tools themselves that must be resolved. Simultaneous effort will help assure that the tools meet needs, but the tools must be selected first so they can be used effectively.

As indicated in Principle 4, project functions dedicated to issue management should be established. To be effective, the function should be highly-placed in the organization. It should be given authority to provide strong guidance to the plans and activities of other project functions. Duties assigned to the function should include definition of the issues agenda, development and application of issue assessment tools needed by the project, and development of issue resolution criteria for the project. The function should also have responsibility for interaction with activities at the program strategic level that affect issue assessment within the project.

Outputs from this issues management function will include documentation of assessment methods and criteria, and results of application of the methods and criteria. These results will include guidance and rationale for plans in other project functions and documentation needed for compliance with the NWPA and regulations.

Issue management will play a key role in integrating and interfacing project activities. Many issues are interactive; i.e., they affect the plans and activities of two or more project functions. Development of the issues agenda will identify such issues and help assure coordinated effort.

One of the most important contributions of issue management is to assure a defensible rationale for plans. In the absence of issues management, plans tend to be developed from the bottom up, with emphasis on what can be done rather than what needs to be done, and without sufficient attention to interfaces. Defense of plans generated in this manner is difficult and vulnerable to the question, "Why?". In contrast, issues management provides a top down approach to planning and automatically provides reasons for proposed action. This will be beneficial in public and up-the-line reviews of plans, and in the licensing process, which will require clear justification of all actions and results.

As previously indicated, site characterization controls project progress and many other project activities. It is therefore imperative that criteria for issue closure on site characterization (i.e., criteria for deciding when uncertainty about site characteristics has been brought to a practical minimum) be developed as soon as possible. This effort will provide guidance and rationale for the characterization work and for the activities that depend on its results. Development of these criteria will be iterative; i.e., targets may have to be adjusted as the characterization data base expands. Actions that depend on those targets, such as allocation of performance to engineered components, would change accordingly, but at any given time there would be a defensible basis for plans and activities.

Oversight of the issues management function should be provided by an independent, external Issues Review Board. Senior project management personnel should be part of this Board in order to avoid communication gaps, but most members of the Board would be external to project operations. The Board would be charged with responsibility to periodically review the issues agenda and the implementation of the issues management function. It would be expected to provide constructive assistance in defining issues and their interfaces, in developing issue resolution criteria, and in facilitating interaction between project and program-level work to resolve issues.