

THE ANNOTATED OUTLINE PROCESS FOR A MINED GEOLOGIC DISPOSAL SYSTEM LICENSE APPLICATION

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ABSTRACT

Yucca Mountain, Nevada is currently being studied by the U.S. Department of Energy (DOE) as a potential site for a mined geologic repository for high-level nuclear waste. DOE has the responsibility to develop a license application for authorization to construct the potential repository; if the site is found suitable, the license application would be submitted to the U.S. Nuclear Regulatory Commission (NRC). Current plans are to submit the license application in 2001. To manage development of the license application, DOE has developed the Mined Geologic Disposal System Annotated Outline for License Application (AO). The AO provides a method to verify the site characterization program and to implement the guidance given by the NRC in their draft regulatory guide on the license application. (1) In addition, the AO helps to focus interactions with the NRC and will contribute to clarification of the regulations, if necessary. As semiannual revisions of the AO are produced, they are transmitted to the NRC to provide information and to facilitate NRC's staff guidance to DOE. Management of the complex technical and regulatory information requirements for development of a license application is a challenge, and the AO process has been an effective method to control the development of the license application.

INTRODUCTION

The DOE is currently studying Yucca Mountain, Nevada, to determine the suitability of the site to safely store high-level nuclear waste. If the site is found suitable, DOE would submit a license application for repository construction to the NRC; this submittal is currently scheduled for 2001.

The Mined Geologic Disposal System Annotated Outline for License Application (AO) is a product-oriented management tool that has a key role in the Yucca Mountain Site Characterization Project Office's (YMPO) program management and licensing strategies. The AO provides a method to verify the site characterization program, and acts as a vehicle for the implementation of guidance provided by the NRC in their draft regulatory guide, "Format and Content for the License Application for the High Level Waste Repository"¹ (FCRG). In addition, the AO facilitates focused interactions with the NRC and provides an instrument for the resolution of technical and regulatory issues. Programmatic benefits from AO development are many; in addition to assisting incorporation of actual experience in the FCRG, it will also contribute to the development of shared interpretation and understanding of the NRC regulations (see Fig. 1).

ANNOTATED OUTLINE PROCESS

The AO process is used to verify the site characterization program by determining the specific information needed in a potential license application. Planning packages, outlines of information required for each AO section, were developed as the first step in production of the potential license application. The planning packages contain plans to develop text corresponding to sections within the FCRG, tables, figures, and references. In addition, the planning packages contain forms

which request information needed from external organizations, forms for responding to requests for information, and forms for tracking information requests. The planning packages are used as a basis to develop skeleton text of each section. Planning packages are currently in place for all sections of the AO.

The planning packages, which serve as an outline for information, help in the development of necessary skeleton text (see Fig. 2). Skeleton text is text with blank spaces; the spaces are placeholders for information that is ultimately needed in a potential license application but is currently unavailable. A comprehensive search for the information is initiated by the author. In order to ensure that the necessary information will be available, the author identifies an existing approved plan to acquire the information or develops a plan to provide the information. In this manner, the AO process either validates the baselined YMPO technical program or initiates a request to change it. In either case, the information is inserted into the blank space when available, resulting in more comprehensive and complete text with expanded detail. This text will eventually form the basis for the final license application, if the site is found to be suitable.

One benefit of the AO is the focusing of resources on the production of the license application. This is achieved, in part, by identifying the specific information needed in a potential license application during site characterization. Funding for tasks that do not directly support the acquisition of information for site suitability and/or a potential license application can be deferred or redirected to more appropriate tasks. Planning, budgeting, and scheduling are facilitated by the early identification and development of the information needed in a potential license application.

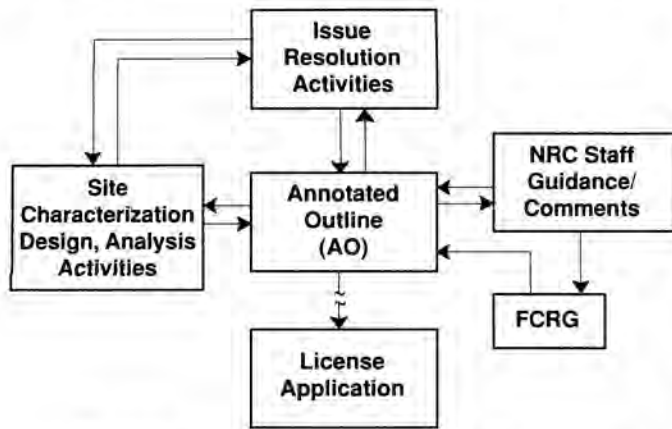


Fig. 1. Schematic of the annotated outline process.

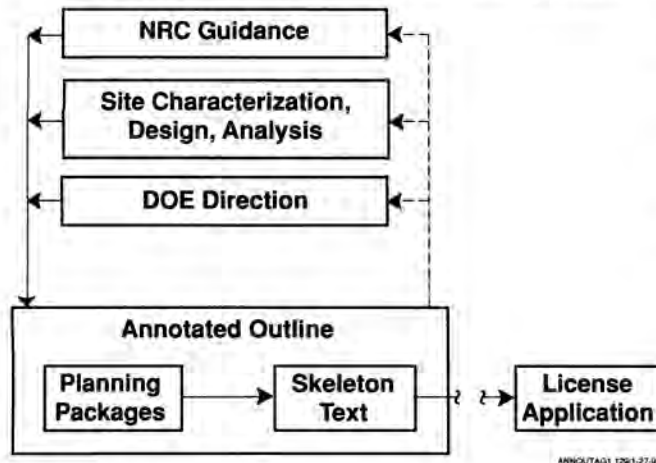


Fig. 2. Relationship between the annotated outline, planning packages, and skeleton text.

A method with which to implement the NRC's guidance contained in the FCRG (1) is also provided by the early development of the AO. As discussed above, the AO was originally drafted to correspond to the guidance provided in the FCRG. After actually using the draft guidance contained in the FCRG as a basis for AO development, and cross referencing to the regulations themselves, the author is in a position to recommend changes to the FCRG. Considerable and valuable experience is gained by the actual application of the NRC guidance; authors are then in a much better position to recommend changes or adaptations to respective AO sections. Comments on the FCRG could result from the comprehensive cross referencing of the regulations or could result from a need to enhance clarity and reduce duplication.

Effective communications between the potential license applicant and the regulator are also enhanced and encouraged by the AO development process. The AO a living document that evolves as new information becomes available. The AO is transmitted semiannually to the NRC to provide information and to facilitate NRC staff guidance to DOE. The NRC provided detailed comments on AO Revision 0 in July 1992 (3); comments indicated that NRC performed a detailed review to determine if DOE's understanding of the guidance provided in the FCRG was consistent with its intent.

In response to NRC comments on AO Revision 0, DOE incorporated two of the three comments in AO Revision 1 in September 1992. One comment indicated that a particular sub-section of the FCRG is only intended to address radiation protection issues during the period of repository operations prior to permanent closure. DOE incorporated that comment by removing the discussion of potential impact to the accessible environment from post-closure releases. In another comment, NRC indicated that a section of the FCRG was only intended to address EBS release rate requirements in 10 Code of Federal Regulations (CFR) 60.113(a)(1) rather than those in 40 CFR 191.13. DOE incorporated the comment by removing a discussion of performance assessments addressing the requirements in 40 CFR 191.13.

In a third comment, the NRC indicated that a sub-section in Chapter 5, Engineered Barrier System (EBS), did not discuss the potential for disposal of waste forms other than spent fuel and high-level waste glass in the repository. In response to the comment, DOE agreed that appropriate discussion of all waste forms accepted at and disposed of in the geologic repository must be included in that section; however, DOE has not incorporated additional information into the AO as there are no plans to dispose of wastes other than spent fuel and high-level waste glass in the first repository at this time.

NRC comments on AO Revision 0 and their resolutions are indicative of the type of specific interactions that are facilitated by the AO process. Common understanding and general agreement on interpretations of the regulations will be established with the regulators prior to their formal review.

The AO is also a vehicle for the early identification and resolution of technical and regulatory issues to the extent that is practicable prior to the formal submittal and subsequent review of license applications. As issues requiring resolution are identified during the development of the AO, written reports will be prepared to document the DOE's proposed resolution. These reports will be incorporated into skeleton text and submitted as part of the developing AO to the NRC. In this manner, the NRC will know well in advance exactly how the applicant plans to respond to specific regulatory requirements. General agreement can be reached on the resolution of technical and regulatory issues long before submittal of a potential license application.

FUTURE PLANS

Most of the work planned for Revision 2 consists of incorporating new material that was produced in fiscal year (FY) 1992 after Revision 1 went into formal review. Specifically, the following is planned for AO Revision 2:

1. Refine, review, and incorporate AO sections that were partially developed in FY 92. These sections are in the following chapters:
 - Chapter 5 Engineered Barrier Systems
 - Chapter 6 Overall System Performance Assessment
 - Chapter 8 Performance Confirmation Program
2. Comprehensively reference applicable 10 CFR 60 citations in the planning package for each AO section. Linking 10 CFR 60 to the AO, which is based on draft guidance provided in the FCRG, ensures that the FCRG adequately addresses the requirements in 10

CFR 60. This is an important part of the plan to provide comments on the FCRG in a separate submittal to the NRC in June 1993.

The main focus of AO Revision 3 is the development of Chapter 3, The Natural Systems of the Geologic Setting, for distribution to the NRC in November 1993. A key role of the AO process is to verify that the site characterization program has plans to acquire the specific information needed in a potential license application. Development of Chapter 3 in FY 93 will establish a large percentage of these linkages. Development of Chapter 3 includes the following:

1. Writing skeleton text that references all known information and specifically identifies the need for missing information.
2. Linking AO information needs to the project plans that are currently in place to acquire such information. In this manner, the AO process either validates the site characterization program or initiates a request to change it.
3. Incorporating DOE reports on erosion, calcite-silica, and seismic hazards methodology into the appropriate sections of Chapter 3.

CONCLUSIONS

Managing the design and development of nuclear facilities that are subject to regulatory requirements is a unique challenge. The AO is a product-oriented means to implement the YMPO's overall project management strategy. Technical activities, including site characterization, analysis, and design development, must be focused on the production of information required for a potential license application. The AO is a management tool that ensures that the required information is developed as described above. It also facilitates effective communications with the NRC, clarifies interpretations of the regulations, and provides a vehicle for the resolution of technical and regulatory issues.

REFERENCES

1. Nuclear Regulatory Commission, 1990, "Format and Content for the License Application for the High-Level Waste Repository," Draft Regulatory Guide, DG-3003, Office of Regulatory Research.
2. ROBERTS, J.P., et al., 1992, "Licensing Issues: Clarification and Convergence," International High-Level Waste Management Conference, American Society of Chemical Engineers and American Nuclear Society, p. 233-236.
3. Letter from Joseph Holonich (USNRC) to John Roberts (USDOE) dated 7/13/92.