

**EDISON ELECTRIC  
INSTITUTE**

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October 23, 1990

Chief  
Regulatory Publications Branch  
Division of Freedom of Information and Publications Services  
Office of Administration  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Re: Draft Technical Position on Regulatory Considerations in the Design and  
Construction of the Exploratory Shaft Facility (55 Fed. Reg. 33,193)

Dear Sir:

The Edison Electric Institute (EEI), through its Utility Nuclear Waste and Transportation Program (EEI/UWASTE), is pleased to provide comments on the above referenced document.

EEI is the association of the nation's investor-owned electric utilities. Its members generate approximately 75% of all the electricity in the nation. EEI/UWASTE is a group representing the vast majority of electric utilities with nuclear energy programs that takes actions necessary to ensure that safe, environmentally sound, publicly acceptable, and cost-effective radioactive waste management and disposal, and nuclear material transportation systems are maintained and developed in a timely manner. Together, EEI/UWASTE represent most of the holders of contracts with DOE for disposal of spent fuel under the Nuclear Waste Policy Act, as amended. To date, electric utilities and their customers have contributed the vast majority of the \$4.5 billion that has been paid into the Nuclear Waste Fund.

Enclosed please find our detailed comments. These comments are further broken into two categories -- general and specific. We hope the Nuclear Regulatory Commission (NRC) will find these comments useful as it considers the ultimate disposition of the Draft Technical Position on Regulatory Considerations in the Design and Construction of the Exploratory Shaft Facility (55 Fed. Reg. 33,193). Our comments fall into four

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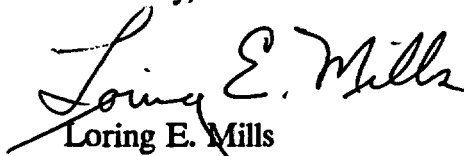
areas: (1) recognition of the need for a flexible approach; (2) the NRC's role in Exploratory Shaft Facility (ESF) design; (3) the purpose of the ESF; and (4) the overemphasis on geologic repository operations area (GROA) design certainty.

Although we have chosen to divide our comments into the above categories, all of our comments focus on the proposed strict regulatory control of the ESF design. The proposed approach is not appropriate at this time and will only complicate and prolong the site characterization process. EEI/UWASTE agrees that minimizing adverse impacts and maintaining the integrity of the site should be a major consideration in the design of the ESF. However, the primary purpose of the ESF is to characterize the host rock. If the Department of Energy (DOE) is to make the ESF part of the GROA, the ESF must meet GROA requirements. Ultimately, DOE may need to take steps to alter or modify the ESF in order to bring it into compliance; it is imperative that DOE also keep this in mind as they design the ESF. However, it is not necessary for NRC to take regulatory action to ensure such compliance until DOE determines that the ESF should be part of the GROA.

In our view, the appropriate approach to ESF design is that outlined on page 14 of the draft TP under number 7 wherein NRC emphasizes flexibility in approach, the need to obtain a sufficient range of data, and an iterative approach to site characterization. This approach is also consistent with that outlined in the DOE Site Characterization Plan. Accordingly, we urge the NRC to reorganize the draft TP using the discussion on page 14 as guidance for both the approach to ESF design and the relationship between the ESF design and the GROA design.

We appreciate the opportunity to comment on the subject draft technical position. Please do not hesitate to call if you have questions or desire further information.

Sincerely,

  
Loring E. Mills  
LEM/chc

Enclosures

cc: The Honorable John W. Bartlett

**EEI/UWASTE Comments on the  
Nuclear Regulatory Commission Draft**

**TECHNICAL POSITION ON REGULATORY CONSIDERATIONS  
IN THE DESIGN AND CONSTRUCTION OF THE  
EXPLORATORY SHAFT FACILITY  
(55 Fed. Reg. 33,193)**

October 19, 1990

The following comments on the above-referenced document are submitted by the Edison Electric Institute/Utility Nuclear Waste and Transportation Program (EEI/UWASTE). EEI/UWASTE has concerns in four areas: (1) recognition of the need for a flexible approach; (2) the NRC's role in Exploratory Shaft Facility (ESF) design; (3) the purpose of the ESF; and (4) the overemphasis on geologic repository operations area (GROA) design certainty.

## **GENERAL COMMENTS**

### **Recognition of Need for Flexible Approach**

The appropriate approach to Exploratory Shaft Facility (ESF) design is that outlined on page 14 of the draft TP under number 7 wherein NRC emphasizes flexibility in approach, the need to obtain a sufficient range of data, and an iterative approach to site characterization. This approach is also consistent with that outlined in the Department of Energy's (DOE) Site Characterization Plan (SCP), which recognizes that due to the limited amount of information available prior to site characterization, plans must be flexible and incremental to permit modification as new information becomes available. [SCP at 8.4.2-2.] However, because this discussion does not appear until the very end of the draft TP, it seems to be more of an afterthought than a guiding principle for ESF design. We urge that this approach be adopted by the NRC.

There are several additional points in the draft TP that appropriately recognize the need for flexibility in ESF design. Unfortunately, however, these statements are overshadowed by other provisions in, and the general tone of, the draft TP. For example, an evaluation of alternative designs for the ESF may indicate that the preferred ESF design and location for purposes of data collection and site characterization is not optimal for purposes of radionuclide containment and isolation. The draft TP belatedly recognizes this fact at page 12, but indicates that, in such a case, the ESF design should be justified and its impact on waste isolation of the geologic repository studied. However, this statement is at

odds with the discussion on page 8 of the TP, which appears to indicate that waste isolation should be given priority in repository design and, therefore, in planning and design of the ESF.

Similarly, page 7 of the draft TP, paragraph 2 acknowledges that the ESF design and construction should permit flexibility to modify the design of the geologic repository operations area (GROA) based on data collected during site characterization. However, this critical assumption does not appear to be reflected through the remainder of the document. Accordingly, we urge the NRC to reorganize the draft TP, using the discussion on page 14 as guidance for both the approach to ESF design and the relationship between the ESF design and the GROA design.

### **NRC Role in ESF Design**

The draft TP is based on the premise that, because the ESF may eventually become part of the GROA, the ESF design "will be required to satisfy applicable GROA design requirements" specified in 10 C.F.R. Part 60. [Draft TP at 1.] However, at this early stage in the repository development program, when DOE has not even made an assessment of site suitability, the possibility that the ESF will not become part of the GROA still exists. It is important that NRC plays a role in reviewing the design and construction of the ESF; however, it is not clear that NRC has a statutory or regulatory basis to license the ESF design as an independent facility. Any such licensing authority would arise if and when the ESF is incorporated into the repository.

The Nuclear Regulatory Commission's (NRC) appropriate role in the site characterization process consists of commenting on the DOE's Site Characterization Plan as it has already done, overseeing DOE's quality assurance program, specifying general guidelines for the conduct of site characterization activities (as it has done in 10 C.F.R. §60.15), and to facilitate communications between DOE and NRC such that there are no "surprises" during the licensing process. To the extent that the draft TP attempts to reach beyond this appropriate role, and regulate the ESF on the assumption that it may become part of the GROA, EEI/UWASTE submits that the draft TP is inappropriate.

### **Purpose of the ESF**

The purpose of the ESF is to provide a means for the DOE to access the subsurface and proposed repository host-rock. This would allow DOE to obtain the data necessary "to establish the geologic condition and the ranges of the parameters of [the Yucca Mountain site] relevant to the location of a repository . . . and the suitability of [the site] for the location of a repository. . . ." [42 U.S.C. 10101(21)(B).] Although the draft TP appears to recognize this fact at several points, the draft TP taken as a whole creates the impression

that the NRC has subordinated the ESF's chief role of data collection to that of ensuring that the ESF (1) will not interfere with the waste isolation capability of the site and (2) will become a part of the repository. This is done in several ways.

First, throughout the draft TP the NRC lists two "guidelines" for ESF design. Typically, the need for data collection is secondary to limiting adverse impacts on the waste isolation capabilities of the site. For example, the first page of the draft TP states:

Proper coordination between ESF design and GROA design is essential to ensure that the ESF, as constructed, will not interfere with the waste isolation capability of the site, and will facilitate site characterization activities.

[Draft TP at 1, para. 3.] This inversion of the relative priorities is reflected at several other points in the draft TP, as noted in the specific comments below.

Second, the NRC repeatedly states the purposes of data collection in the negative rather than the positive. In other words, while the purpose of the ESF should be to facilitate data collection, the draft TP speaks in terms of not precluding data collection. For example, on page 2 of the draft TP, NRC words the second of its two general guidelines as follows:

(1) the ESF design, construction and operation should not preclude the collection of needed site data.

Thus, in addition to subordinating the role of data collection to a secondary consideration in ESF design, the draft TP denigrates the importance of designing and locating the ESF so as to facilitate the collection of sufficient and representative data concerning the site characteristics.

Third, the draft TP is based on the assumption that the ESF "will eventually become a part of a future GROA." [Draft TP at p. 2, para. 1. See also page 9, para. 3 ("the ESF is likely to become a part of a future repository").] As a result of this assumption, the NRC would require that the ESF design meet all applicable GROA design requirements. This requirement is premature. DOE has not yet even begun the scientific investigations described in the Site Characterization Plan to determine whether the site is suitable for a repository. Until those investigations are underway, it is not possible to determine whether the ESF will become part of the GROA. Although the NRC appears to recognize this fact at certain points in the draft TP,<sup>1</sup> it nevertheless would require a high level of certainty with respect to the design of the GROA and the placement of the ESF in that design. The net

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<sup>1</sup> See, e.g., page 1, para. 1 (the ESF "may" become part of the GROA); page 7, para. 1 ("if" the ESF becomes part of the repository).

result of this requirement is to overemphasize the need for design compatibility at the expense of data collection and site characterization.

NRC has previously recognized the need to reconcile the competing concerns of data collection and waste isolation capability. In adopting the regulation that is now 10 C.F.R. §60.15, the Commission felt itself obligated to clarify the rule describing the site characterization process. The NRC noted that:

The original language could have been construed to mean that the purpose of the [site characterization] investigations was to limit [adverse] effects.

The final rule modified the proposed rule so that it was clear that the primary purpose of the investigations was to collect site characterization data, not to protect the site.

The provision calling, as a minimum, for the selection of borehole locations to limit subsurface penetrations was said to be confusing; the revision, which expresses the Commission's intention more clearly, includes a phrase that emphasizes that the number of penetrations must be adequate to obtain needed site characterization data.

[48 Red. Reg. 28195, 28206 (1983).] Unfortunately, because of the subordinate role data collection takes relative to limiting adverse impacts in the language of the draft TP, the draft TP is not consistent with the Commission's position as stated in 10 C.F.R. §60.15.

#### Overemphasis on GROA Design Certainty

As noted above, the NRC's assumption that the ESF eventually will become part of the GROA has led it to require a high level of certainty with respect to the GROA design at the very early stages of site characterization. This approach creates a significant dilemma for DOE. Prior to designing the ESF, DOE must have a relatively complete GROA design. However, final GROA design can not be completed until the host rock is characterized.

EEI/UWASTE agrees that minimizing adverse impacts and maintaining the integrity of the site should be a major consideration in the design of the ESF. However, NRC and DOE must keep in mind that the primary purpose of the ESF is to characterize the host rock. If DOE finds the site suitable and then decides to make the ESF part of the GROA, the ESF must eventually meet the GROA requirements. Ultimately, DOE may need to take steps to alter or modify the ESF in order to bring it into compliance; it is imperative that DOE keep this in mind as they design the ESF. However, it is not necessary for NRC to take regulatory steps to ensure such compliance until DOE determines that the ESF should be part of the GROA.

This problem is perhaps best illustrated by the NRC's indication on page 11 under paragraph (4) that, in order to plan the ESF design, the DOE must undertake a comparative

evaluation of several possible alternatives to the major design features for the GROA as required by 10 C.F.R. §60.21(c)(1)(ii)(D). That regulation specifies the required content of the Safety Analysis Report (SAR) to be submitted with the DOE's application for a construction authorization for the repository. To prepare a SAR, however, DOE must first conduct the detailed site characterization effort, of which the ESF is a major component. The point is that the design of the GROA should be based on the data gathered through site characterization and the ESF. Although the GROA design should be considered, it should not be the prime consideration in ESF location and design.

The draft TP's undue emphasis on GROA design certainty when designing the ESF is a vivid example of the concern expressed by the National Research Council's Board on Radioactive Waste Management (Board) in its July, 1990 Position Statement entitled "Rethinking High-Level Radioactive Waste Disposal." In that Statement, the Board criticizes the Nuclear Waste Policy Act program and its regulatory structure for placing too much emphasis on certainty and not enough emphasis on the need to maintain sufficient flexibility to modify the program as it develops: "[t]his 'perfect knowledge' approach is unrealistic, given the inherent uncertainties of this unprecedented undertaking, and it runs the risk of encountering 'show-stopping' problems and delays that could lead to a further deterioration of public and scientific trust."

The NRC's overemphasis on the GROA design and the role of the ESF in the repository will not only unduly complicate the ESF design process and delay site characterization, but is inconsistent in certain regards with the DOE's approach as outlined in the Site Characterization Plan (SCP), and analyzed in the NRC's Site Characterization Analysis (SCA). For example, in Volume VIII of the SCP, DOE explains that the requirements of 10 C.F.R. Part 60 must be considered during site characterization "to ensure that the proposed characterization activities will not only allow the DOE to obtain the necessary data for a license application, but also to ensure that the activities are carried out in a manner consistent with meeting licensing requirements for maintaining site integrity and consistency with the repository design." [SCP at 8.4.1-3.] In connection with the rock characterization program, the NRC expressed concern in the SCA over the extent to which the "[ESF] combined with the surface-based test program, may not yield data representative of conditions and processes throughout the repository block." [SCA at 2-2.] Thus, DOE, and -- within the contexts of the SCA -- the NRC, recognizes the priority of data collection during the site characterization process.

## **SPECIFIC COMMENTS**

### **Section 1.0**

**Page 1, Para. 1:** This language appropriately recognizes that the "primary purpose" of the ESF is to support site characterization activities. It also appropriately recognizes that it is not a certainty that ESF will become part of GROA. In light of this uncertainty, the NRC should not require that the ESF design satisfy applicable GROA design requirements. If in fact the ESF does become part of the GROA, DOE will bear the risk of demonstrating to the NRC that the GROA meets applicable licensing criteria. It is also inappropriate to use the word "require" in a TP. As noted subsequently in the document, a TP only provides guidance.

**Page 1, Para. 3:** The draft inappropriately reverses the priority of the guidelines applicable to ESF design. In addition, the statement of the need to ensure that the ESF "will not interfere with the waste isolation capability of the site" is inconsistent with the language of 10 C.F.R. §60.15(c)(1), which states that site characterization should be conducted so as "to limit adverse effects on the long-term performance of the geologic repository to the extent practical."

**Page 2, Carryover para.:** The NRC should not base the TP on the assumption that the ESF will eventually become a part of the GROA.

**Page 2, first full para.:** The general guidelines are stated in inverse order. In addition, the first guideline should track the language of 10 C.F.R. §60.15(c)(1) by including the phrase "to the extent practical." The second guideline should be rewritten to be stated in a positive manner (e.g., the ESF design, construction, and operation should facilitate the collection of needed site data).

**Page 2, second full para.:** The word "important" should be changed to "primary" or "chief." The last sentence is too vague. The NRC should indicate an acceptable approach to accounting for such uncertainties.

**Page 2, last para.:** It should not be taken as a given that 10 C.F.R. Part 60 requirements relating to GROA design are applicable to the ESF design.

**Page 3, first para.:** Although the TP is essentially a guidance document, it nevertheless will play an important role in DOE's site characterization activities. Thus, the TP should properly reflect the role of the NRC in the regulatory scheme and the purpose of the site characterization program. In particular, the TP should not imply that the NRC has licensing authority over the ESF design as a prerequisite to site characterization. Nor should it obscure the purpose of the ESF.



## Section 2

Page 3, Introductory para.: The first two sentences are inconsistent. The language should be clarified to indicate clearly that the list provided in Appendix B is preliminary.

Page 3, bulleted para.: The language should track the provisions of 10 C.F.R. §60.15(c). For example, the phrase "to the extent practical" should be added to (1), and (4) should be modified to be consistent with 10 C.F.R. 60.15(c)(4).

Page 4, 10 C.F.R. 60.21(c)(1)(ii)(D): To be consistent with Part 60, the word "not" should be inserted in the second line after the word "may." The alternatives analysis can only be properly done following site characterization, when the required data to perform the analysis will be available. This is evidenced by the fact that this regulation describes the contents of the SAR to support the repository license application. To conduct such an analysis prior to site characterization would require reliance on too many assumptions, thereby distorting the value of the analysis. There is no regulatory basis for performing the alternatives analysis at this time.

Page 4, 10 C.F.R. 60.112: This is another example of the type of assessment that should be done after site characterization.

Page 4, 10 C.F.R. 131 and 60.133: Again, this is the type of analysis that should be done after site characterization. Indeed, the purpose of site characterization is to obtain the necessary information to determine the appropriate design criteria for the underground facility in the GROA.

Page 4, 10 C.F.R. 60.152: It is not possible at this preliminary point in the repository development process to determine which components are important to safety or waste isolation. However, the entire site characterization process will be subject to an approved quality assurance program. In any event, the language should be modified to track the language of 10 C.F.R. §60.151, particularly with respect to waste isolation.

## Section 3.0

Para. (1): This statement, as well as Figure 1, implies that a GROA conceptual design has not yet been developed by DOE. In fact, the SCP includes a GROA conceptual design as required by the NWPA and 10 C.F.R. §60.17(c). See SCP, Vol. VI. Figure 1 provides a graphic confirmation of the inverted priority assigned by the TP to the purpose of the ESF by totally subordinating it to the GROA design. A more fundamental problem with Figure 1 is that it assumes the necessity for compliance of the ESF design with 10 C.F.R. Part 60, when there is no basis for such an assumption.

Para. (2): See previous comments regarding quality assurance requirements during site characterization.

Para. (3): The primary criteria for ESF design and location should be to optimize data collection and site characterization activities. The language of this paragraph fails to recognize this fact by making consistency of the ESF design with GROA design the predominant concern. In addition, the language of this paragraph is inconsistent with the requirements of 10 C.F.R. §60.15(c) and should be modified to track the regulation ("to the extent practical") . .

Para. (4): This type of comparative evaluation is not necessary or appropriate when designing an ESF. Rather, it should be applied after site characterization, as recognized by the provisions of 10 C.F.R. §60.21.

Para. (5): The first sentence indicates an approach dominated by the avoidance of presumed problems, rather than optimization of site characterization activities that may identify means of accommodating problems. This type of approach will hinder data collection efforts and, given the range of uncertainties and likely problems, make it extremely difficult to excavate the ESF. Moreover, there is no indication of why it is inherently undesirable to compensate for certain rock damage or other problems created by the ESF. The last sentence provides another example of the reversal of priorities for the ESF.

Para. (6): This paragraph suffers from the same infirmity as that discussed above in that it suggests an approach to ESF design geared towards avoiding interference with site characterization when some interference may be necessary to optimize data collection.

#### Section 4.0

As a general comment, if subsections (1) through (7) are intended to be listed according to priority, with the most important first, then the list should be reversed. The top priority should be accorded to subsection (7), which discusses the primary need to gather site specific data during the site characterization process, and to ensure that the ESF design is sufficient to facilitate adequate data collection. In fact, the discussion under subsection (7) should provide the guiding principles for the TP. On the other hand, subsection (1), which defines an approach to meeting the requirements in 10 C.F.R. Part 60 applicable to GROA design, should be accorded lesser priority in ESF design.

Page 7, Part (1): This entire section indicates that the draft TP is placing undue emphasis on compliance with Part 60 requirements and repository licensing during ESF design, when the emphasis should be on site characterization. The second sentence in the first paragraph appropriately recognizes that it is not a certainty that the ESF will become part of a future repository.

The second paragraph provides another example of the reversal of priorities for the ESF. Moreover, number (2) is stated in the negative and should be rewritten to replace the words "does not preclude" with "should facilitate." The last sentence of the second paragraph appropriately recognizes the need for flexibility in the ESF and GROA designs.

Page 8, paragraphs 2 and 3: This approach to ESF design, by requiring coordination with GROA design, may result in inappropriate emphasis being placed on waste isolation during ESF design. Given the chief purpose of the ESF to facilitate data collection, the preferred ESF design may not be the optimal design with respect to waste isolation. The approach to ESF design must provide for an appropriate balancing of the need to collect adequate and representative data and to provide for waste isolation.

Page 8, last para.: This paragraph appropriately recognizes the possibility that the ESF design may need to be modified during the construction process.

Page 9, last para.: The NRC should not assume that it is likely that the ESF will become a part of a future repository.

Page 10(3), para. 1: This paragraph suggests that the ESF design and site characterization activities should be dictated by the GROA design, when in fact the GROA design should reflect the information and data gathered during site characterization. Although the ESF design and the GROA design should be coordinated to the extent practical, coordination is not desirable to the extent that it would hinder data collection activities during site characterization. The last sentence of the paragraph should be revised to read as follows: "Also, the ESF test area and exploratory drifts should be at least as deep as the depth proposed for waste emplacement, . . . ." It may be necessary for DOE to assess the geologic conditions below the proposed depth of waste emplacement to make a complete assessment of repository performance.

Page 10(3), para. 2: This paragraph suggests that DOE should eliminate ESF shafts, ramps, and drifts or otherwise restrict its site characterization activities if it will not be possible to integrate such excavations into the GROA design. There is no justification for the imposition of such a restriction on DOE's site characterization activities. There is no technical reason why shafts, drifts, and ramps that are used during site characterization but not incorporated in the GROA cannot be backfilled and sealed or otherwise rendered benign.

Page 11, para. 1: This paragraph assumes both that DOE will have a considerable amount of knowledge concerning the geologic conditions at the site when it conducts site characterization activities, and that the ESF will eventually become a part of the GROA. The purpose of the ESF and site characterization is to assess the site and to determine whether the types of problem areas identified in this paragraph exist. Whether the ESF will be optimally located with respect to the GROA remains to be seen. Thus, while DOE should attempt to avoid these problem areas to the extent practical in excavating the ESF,

it should also have wide discretion to locate the ESF so as to obtain a broad and sufficient range of representative data.

Page 11, para. 2: The third sentence of this paragraph requires DOE to account for "considerable uncertainties" in designing and constructing the ESF. There is no indication of how DOE should account for these uncertainties. While this is a desirable goal in the abstract, given the range of uncertainties, it simply may not be possible to account for all such uncertainties consistent with optimization of the site characterization program.

Page 12, para. 1: This paragraph appropriately recognizes that the reference GROA design may require changes as a result of the data gathered during site characterization and, therefore, that flexibility in design is essential.

Page 12, para. 2: This paragraph provides another example of the draft TP's subordination of the goal of site characterization to that of repository waste isolation. The paragraph appropriately recognizes that there may be justification for an ESF design for site characterization purposes that is not within the constraints of the GROA design (including location).

Pages 12-13, carryover para.: This paragraph provides a good example of a generic problem with the draft TP. Although the paragraph is titled "Excavation Methods," it discusses the "construction and operation" of the ESF. An ESF is not a typical construction project or operating facility. In technical terms, it is "excavated" rather than "constructed." By consistently referring to the ESF as a constructed facility, the draft TP overemphasizes the role of the ESF as a potential element in the GROA and detracts from the fact that its primary function is one of exploration.

In the carryover sentence, the word "should" should be replaced with the word "must." The chief purpose of the ESF is to facilitate data collection, not to provide a repository shaft.

Page 14, (7): As noted above, the discussion under this subsection should provide the guiding principles for the TP. This section recognizes the primary purpose of the ESF--data collection--and the need for flexibility in both ESF and GROA design to ensure the ability to modify designs as dictated by the site characterization results. Moreover, the last sentence of this section recognizes the need for a balancing of site characterization needs with geologic repository performance objectives, rather than a subordination of site characterization needs to repository design. Unfortunately, because this section is located at the end of the draft TP, it appears as an afterthought. It is not sufficient to override the tone of the previous sections of the draft TP, which place an undue emphasis on the ESF's role in the repository design. The approach outlined in this subsection should be explained at the beginning of the TP, and should be followed throughout the document.