



Department of Energy

Washington, DC 20585

OCT 19 1990

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

Dear Mr. Meyer:

In response to a July 17, 1990, letter from John J. Linehan to Ralph Stein, and in accordance with the August 14, 1990, Federal Register notice of availability (55 FR 33193), we hereby submit our comments on the Draft Technical Position on Regulatory Considerations in the Design and Construction of the Exploratory Shaft Facility (TP). It is apparent that the staff has put much effort into the TP. We believe it provides an excellent opportunity to discuss and clarify our respective views on the application of regulatory considerations to the exploratory shaft facility (ESF), the repository itself, and the possible ultimate integration of the ESF into the geologic repository operations area (GROA). Specific comments on the draft TP are enclosed; a brief summary of our more significant concerns follows.

The design process presented in the text of the draft TP (and the accompanying Figure 1) calls for a comparative evaluation of GROA design features potentially important to waste isolation, in accordance with 10 CFR 60.21(c)(1)(ii)(D), prior to selection of the GROA design concept(s) and development of the conceptual design. While the DOE acknowledges that such an evaluation is needed to support the license application, we believe that this comparative evaluation at such an early stage of the design, prior to obtaining site-specific information from the site characterization program, would not provide a meaningful basis upon which decisions could be made with regard to a preferred design concept or set of concepts. Nevertheless, we do understand that such an early evaluation for major ESF design features potentially important to waste isolation should be conducted, using data currently available.

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The draft TP states that the staff used two general principles:

- (1) the ESF design limits adverse impacts on the waste isolation capability of the geologic repository, and
- (2) this design does not preclude the gathering of sufficient data necessary to demonstrate site suitability and for the design of the GROA.

We agree with these general principles and are using them in our ESF activities. However, it is important to keep in mind that the need for an ESF is to provide access for in situ testing and underground site characterization. The draft TP should recognize that principles (1) and (2) could conflict and that tradeoffs may be necessary. We suggest that, for clarity, the TP combine the two principles into the following single statement: "The ESF must be designed to obtain the data necessary to determine the suitability of the site and to design the GROA and, to the extent practicable, limit adverse effects on the repository's long-term performance." This statement better reflects the actual requirement in 10 CFR 60.15(c)(1).

The draft TP indicates that Section 4.0 provides a discussion of the supporting rationale behind the technical positions stated in Section 3.0. However, Section 4.0 presents additional positions without providing any supporting rationale for many positions.

We hope that you find these comments useful in the finalization of this TP. If there are any questions, please contact Linda Desell at (202) 586-1462 or Jerry Parker at (202) 586-5679.

Sincerely,



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Enclosure

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cc w/encl:

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ENCLOSURE

COMMENTS ON DRAFT TECHNICAL POSITION ON  
REGULATORY CONSIDERATIONS IN THE DESIGN  
AND CONSTRUCTION OF THE EXPLORATORY  
SHAFT FACILITY, JUNE 1990

1. Section 3.0 and Section 4.0

On page 2 the TP states: "The technical position statements are listed in Section 3.0. Section 4.0 of this paper provides a discussion of the supporting rationale behind the stated technical positions."

Section 4.0 provides very little supporting rationale for the technical positions stated in Section 3.0. In fact, Section 4.0 actually presents additional technical positions. Based on our review, over three-quarters of all of the technical positions are found in Section 4.0.

The following are some examples of technical positions for "Planning and Coordination of ESF Design with GROA Design," item (3) in Section 3.0 and Section 4.0.

Technical Positions in Section 3.0 (p. 5):

"A conceptual design of the GROA should be considered in the design of the ESF."

"For example, the shafts, ramps, and drifts for the ESF should be selected in locations where these features are planned for the GROA unless a need for different design can be justified and their impact on the waste isolation capability of the site and impact on data collection from site characterization are acceptable."

Additional technical positions in Section 4.0 (pp. 10-11):

"The ESF test area and exploratory drifts should be at the same depth as that proposed for waste emplacement, and the shafts or ramps designed for the ESF should be selected for those planned for the GROA, to the extent practical."

"In general, the requirements for the ESF should not unnecessarily increase the number of the repository shafts or ramps."

"The location of ESF shafts or ramps should take into account possible uplift or subsidence caused by the thermal

effects of waste emplacement, fault movement, and tectonics."

"Potential effects of fault movements caused by thermal or tectonic effects should also be considered when selecting the locations for the ESF access openings."

"The shaft or ramp locations, construction methods, and liner material for the access openings should accommodate future needs for sealing and drainage."

"The approach to the selection, design, and construction of the ESF shafts and/or ramps should account for uncertainties in the likely dominant flowpaths into or out of the repository."

"Suitable provisions should be made for proper drainage from the underground openings and the design should facilitate future sealing options."

We suggest that all technical positions be placed in Section 3.0 and that Section 4.0 be rewritten to provide the supporting rationale for the technical positions for DOE review and comment prior to finalization of this TP.

2. Page 1, first paragraph, last sentence

The TP states: "However, since the ESF may become part of an eventual geologic repository operations area (GROA), the ESF design will be required to satisfy applicable GROA design requirements." (emphasis added)

We agree with the statement, but would like to clarify that only the permanent components of the ESF would be incorporated into the repository. We suggest, therefore, that "the ESF" be replaced with "permanent components of the ESF."

3. Page 5, item (3), Planning and Coordination of ESF Design with GROA Design

The TP states: "For example, the shafts, ramps, and drifts for the ESF should be selected where these features are planned for the GROA unless a need for different designs can be justified and their impact on the waste isolation capability of the site and impact on data collected from characterization are acceptable". (emphasis added).

With respect to the statement regarding the justification for different designs, it is logical to expect that the

design of subsurface penetrations may need to be modified as ESF construction proceeds, to take into account conditions encountered at the site, as well as new data obtained. Such modifications in the design would need to be approved internally by DOE as part of our design control process, and would take into consideration impacts on waste isolation and the ability to obtain the needed site characterization data. The actual level of control required would be dependent on the extent of the modification. We believe that it is not necessary, nor would it be efficient, for the DOE to justify to the NRC every change made to the design, as long as our design control process is acceptable. We suggest that the TP statement be clarified accordingly.

4. Page 6, item (5), Excavation Methods

The guidance states that excavation methods "...should be selected to limit, rather than attempt to account for, mechanical, hydrological, or chemical damage to rock and to limit the creation of potential pathways for radionuclide migration around the shafts, ramps, and the underground openings."

The TP overstates the requirements in 10 CFR 60.133(f) which only states that: "The design of the underground facility shall incorporate excavation methods that will limit the potential for creating a preferential pathway for groundwater to contact the waste packages or radionuclide migration to the accessible environment."

The phrase "...limit, rather than attempt to account for..." is overly restrictive. There may be situations where the DOE is faced with some perceptible but inconsequential damage to rock where avoiding such damage would involve extraordinary costs to the program. In these situations, the DOE would account for that inconsequential damage and proceed. This would be consistent with the requirement of 10 CFR 60.133(f).

The above phrase also appears in item (6), Test Interference. Our comment applies there as well.

Also, the TP statement specifies the types of damages to the rock that the excavation method should limit, which could constrain DOE's selection of the appropriate method of excavation. We suggest that the TP be revised to conform more closely with the intent of 10 CFR 60.133(f) and the sentence containing the phrase "...limit, rather than attempt to account for..." be deleted from items (5) and (6).

5. Page 7, item (1), second paragraph

The TP states that the logic used to comply with 10 CFR 60 requirements should be based on two general principles: "(1) the ESF design limits adverse impacts on the waste isolation capability of the geologic repository, and (2) this design does not preclude the gathering of sufficient data necessary to demonstrate site suitability and for the design of the GROA."

The TP should recognize that principles (1) and (2) could conflict and that tradeoffs may be necessary. For example, principle (1) implies that we should limit our underground drifting and thereby limit adverse impacts on waste isolation. At the same time, principle (2) implies and the TP recommends, "Extensive drifting may be the most promising approach to reduce certain data uncertainties." (page 14).

We suggest that, for clarity, the TP combine the two principles into the following single statement: "The ESF must be designed to obtain the data necessary to determine the suitability of the site and to design the GROA and, to the extent practicable, limit adverse effects on the repository's long-term performance." This statement better reflects the actual requirement in 10 CFR 60.15(c)(1).

The same paragraph of the draft TP closes with the statement, "The ESF design and construction should also permit flexibility to modify, if necessary, the reference conceptual design of the GROA based on data collected during site characterization." The TP makes a similar statement on page 12, item (4), first paragraph, last sentence.

With regard to such flexibility, the ESF will be designed based on the GROA conceptual design and site characterization data needs. The detailed design of the GROA will be based on the results of the site characterization program. We suggest that the TP statement be deleted or revised to more closely reflect this situation.

6. Page 11, item (4), Consideration of Alternatives for Design Features, first sentence

The TP states: "As required by 10 CFR 60.21(c)(1)(ii)(D), a comparative evaluation of several possible alternatives to the major design features should be performed at the initial stages of the GROA design." Figure 1 of the TP illustrates an approach the NRC staff considers acceptable for the ESF to achieve compliance with 10 CFR 60 requirements.

The TP indicates that GROA design features potentially important to waste isolation should be identified, and a comparative evaluation of such features be performed (consistent with 10 CFR 60.21(c)(1)(ii)(D)), prior to selection of the GROA design concept(s) and development of the conceptual design. While the DOE acknowledges that such an evaluation is needed to support the license application, we believe that this comparative evaluation at such an early stage of the design, prior to obtaining site-specific information from the site characterization program, would not provide a meaningful basis upon which decisions could be made with regard to a preferred design concept or set of concepts.

Prior to developing ESF design concepts, it is important that the appropriate ESF criteria be established for both waste isolation and site characterization needs. It is also useful to have at least a preliminary understanding of which GROA design features are potentially important to waste isolation, using the GROA conceptual design as a basis.

The DOE understands that since the permanent components of the ESF are expected to be eventually incorporated into the repository, and the ESF will be constructed prior to designing the repository, an early comparative evaluation of the major design features of the ESF that are potentially important to waste isolation needs to be conducted, using data currently available. Enclosed is a recommended revision to Figure 1 in the draft TP which incorporates the process discussed above. The actual comparative evaluation of major GROA design features important to waste isolation would be conducted after site characterization data are available, and hence is not shown on the Figure. As required by 10 CFR 60.21(c)(1)(ii)(D), that evaluation will be included in the license application.

Figure 1 of the TP also introduces the concept of "minimizing" waste isolation impacts, which we believe is beyond the intent of the regulations. 10 CFR 60.15(c)(1) indicates that such impacts should be limited "to the extent practical", which implies that they be acceptable. The revised Figure 1 also provides recommended changes to this.

7. Page 14, item (7), first paragraph, last sentence

The TP states: "Therefore, the ESF design should ensure that the data collected will provide the ranges of conditions and processes throughout the site."

Surface-based testing as well as the ESF will provide such data. We suggest that the quoted sentence be revised to

state, "Therefore, the ESF design, in conjunction with the surface-based testing program, should ensure that data will be collected to evaluate the ranges of conditions and processes throughout the site."

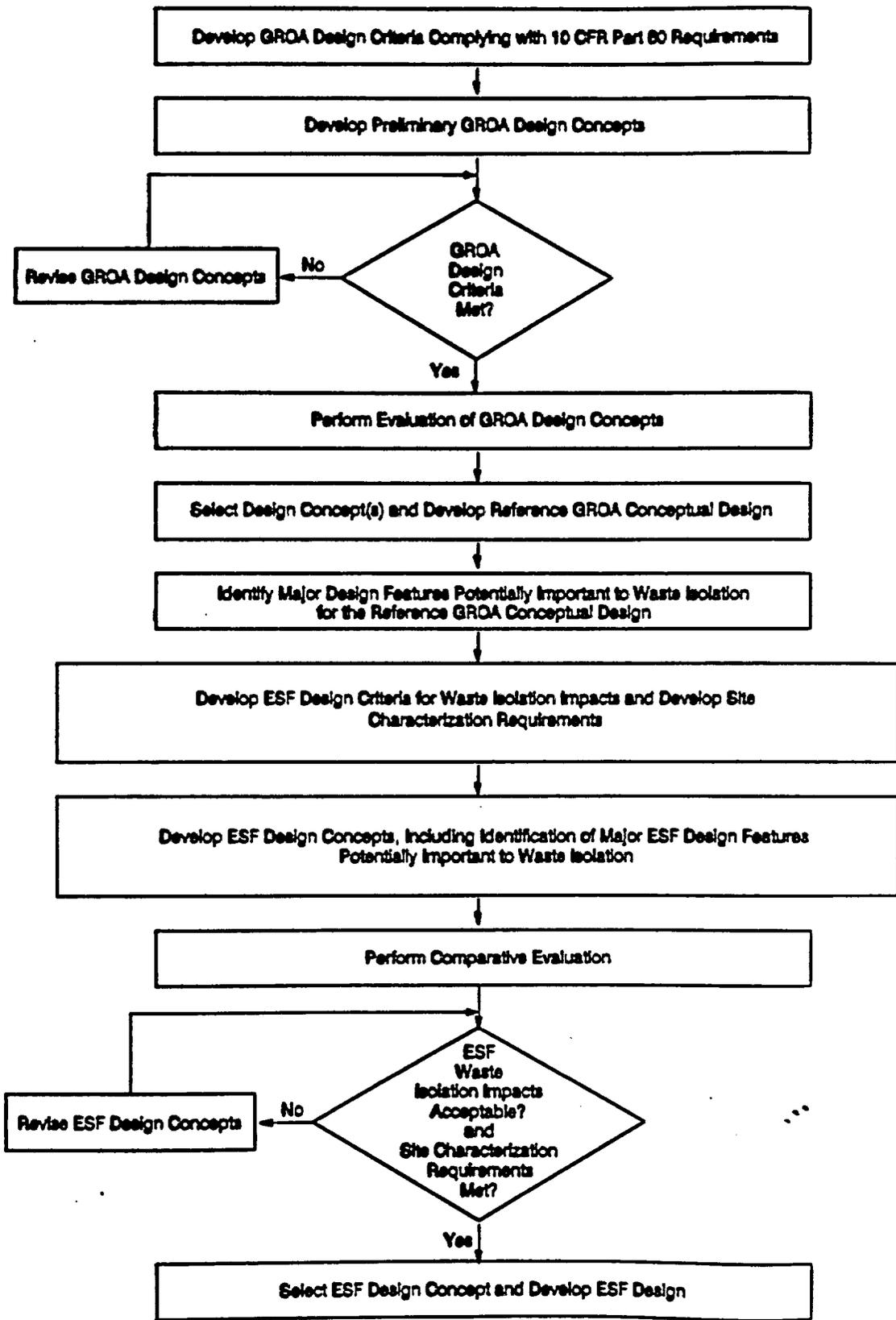


Figure 1. (Proposed Revision)