



Department of Energy
Washington, DC 20585

FEB 27 1990

John J. Linehan, Director
Repository Licensing and Quality
Assurance Project Directorate
Division of High-Level
Waste Management
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Linehan:

In comment 128 of the Nuclear Regulatory Commission's (NRC) Site Characterization Analysis (SCA), issued July 31, 1989, the NRC staff indicated that the Department of Energy (DOE) in doing the evaluation of the exploratory shaft facility (ESF) Title I design did not consider 11 of the requirements from 10 CFR Part 60. In a letter dated December 8, 1989, the NRC identified this as an open item. DOE believes that this letter resolves the open item by: 1) providing further clarification on our overall approach that we used in the past to determine the applicability of all Part 60 requirements to the ESF, and in particular the rationale for our evaluation of the 11 requirements in question at that time; and 2) the application of these requirements on the current ESF Alternate Strategy Study.

This history is as follows. In December of 1988, a DOE Technical Oversight Group (TOG) performed a comprehensive evaluation of 10 CFR Part 60 to identify requirements applicable to the ESF design, construction, and operation. The results of this evaluation were documented in a report entitled "Applicability of 10 CFR Part 60 Requirements to the Yucca Mountain Exploratory Shaft Facility - Technical Oversight Group Report," December 1988. This report was used as a basis for the ESF Title I Design Acceptability Analysis (DAA), and was issued as a companion document to the DAA on February 9, 1989.

The TOG was a multi-disciplinary group consisting of personnel experienced in the areas of licensing, engineering, geosciences, and performance/safety assessment. In doing the evaluation, Part 60 was divided into 157 requirements, of which 46 were found to be applicable to the ESF design, construction, and operation.

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In general terms, an applicable requirement was considered to be one that imposed technical restrictions, criteria, or programmatic constraints that needed to be considered in the design, construction, or operation of the ESF, and that needed to be considered so that the ESF could be incorporated into the repository. The list of assumptions and criteria that were originally used to evaluate the applicability of the 11 items of concern to the NRC was included in Attachment G of the TOG Report. In addition to these assumptions, the program position to not use radioactive waste in the ESF was also considered.

The enclosure to this letter identifies the 11 additional requirements the NRC believes are applicable to the ESF. For each of these requirements, we have noted the NRC rationale (from SCA comment 128) as well as the past DOE rationale regarding applicability. The DOE rationale is similar to the rationale previously contained in Attachment I of the TOG Report. Some additional information is included to address the NRC concerns raised in SCA comment 128 and reflects our review of those concerns.

There were two major areas that we believed needed to be clarified. First, in some of these cases, a requirement could be considered to provide indirect guidance even if it didn't directly impact the ESF design. We recognized that these requirements would need to be considered in the site characterization program and reflected in the SCP. The SCP in turn identified those parameters, if any, that needed to be considered in the ESF design. The end result was that, while such a requirement was not directly applicable, it was not ignored. Secondly, some of the NRC staff's comments regarding these requirements relate to the use of radioactive waste in the ESF and the NRC staff's view that the ESF design should provide the flexibility to accommodate such testing with radioactive waste. The current DOE position is that testing with radioactive waste will not be done in the ESF.

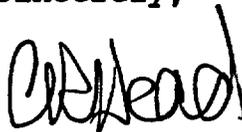
As you know, a general discussion of these requirements was held between our staffs at the July 6-7, 1989, technical meeting on the ESF design control process. A more detailed discussion was held on October 4, 1989, at the technical exchange on the flowdown of 10 CFR 60 requirements. It is our understanding that the NRC staff views the determination of which Part 60 requirements need to be considered in the ESF as a two-step process: 1) since the ESF will be incorporated as part of the repository, then all Part 60 requirements are applicable to the ESF; and 2) DOE must then evaluate which of these requirements actually have an impact on the design of the ESF. We believe that our approach, discussed at the October 4, 1989, technical exchange and further explained in this transmittal is not inconsistent with NRC's approach.

To assure the 11 requirements are appropriately addressed, OCRWM has directed the Yucca Mountain Project Office to consider the 11

requirements in question in the ESF Alternate Strategy Study that will be completed by December of 1990. We will also consider these 11 requirements in future ESF design activities.

If you need any further information on this, please contact Steven Rossi of my staff on 586-9433.

Sincerely,



FOR Gordon Appel, Chief
Licensing Branch
Office of Civilian Radioactive
Waste Management

Enclosure:

Applicability of 10 CFR 60 Requirements to the Exploratory Shaft Facility, U.S. Department of Energy, January 1990

cc: R. Loux, State of Nevada
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
S. Bradhurst, Nye County, NV

**APPLICABILITY OF 10 CFR 60 REQUIREMENTS
TO THE EXPLORATORY SHAFT FACILITY**

U.S. DEPARTMENT OF ENERGY

JANUARY 1990

**ASSUMPTIONS AND CRITERIA FOR
DETERMINING PART 60 APPLICABILITY**

Basic Assumptions:

- o Portions of the ESF will eventually become part of the geologic repository.
- o The ESF design shall not jeopardize the integration of the ESF into the geologic repository.
- o The four permanent items in the ESF, namely, 1) underground openings, 2) shaft liners, 3) operational seals, and 4) ground support shall be designed and constructed to be incorporated into the repository and must be designed to have a maintainable life and quality as specified for the repository.
- o Any component of the ESF, or any activities relating to that component, which could have an effect on waste isolation shall be subject to the requirements of 10 CFR 60 Subpart G.
- o DOE is currently conducting an analysis for identifying items important to safety or waste isolation in the ESF. In view of this, adopt a conservative approach on the applicability of requirements relevant to important to safety or waste isolation.
- o The ESF shall be designed to accommodate the Site Characterization Program and the Performance Confirmation Program.
- o ESF temporary surface facilities are not expected to be part of the repository permanent facility.
- o The two exploratory shafts will become future permanent ventilation intake shafts for the waste emplacement area.

Basic Criteria:

- o Does the requirement impose restrictions on the design, construction or operation of the ESF?
- o Does the requirement impact the design of any structures, systems, or components which may affect the waste isolation capability of the site?
- o Does the requirement impose restrictions which, if not considered, may affect the future licensability of the site?
- o Is the ESF component which is subject to the requirement, to be redesigned or replaced in the final repository design and construction?
- o Does the requirement impose programmatic constraints on the ESF program?

**ADDITIONAL REQUIREMENTS IDENTIFIED BY NRC
(SCA COMMENT 128)**

60.17: Contents of Site Characterization Plan
60.24(a): Updating of Application and
Environmental Report
60.113(a)(2): Pre-waste-emplacement groundwater travel
time
60.113(b)(2),(3),(4): Factors NRC will consider in
case-by-case evaluation of performance
objectives
60.122: Siting criteria
60.131(a): General design criteria for radiological
protection
60.131(b)(4)(ii): Onsite facilities for emergencies
60.131(b)(8): Instrumentation and control systems
60.131(b)(10): Shaft conveyances used in radioactive
waste handling
60.134: Design of seals for shafts and boreholes
60.143: Monitoring and testing of waste packages

10 CFR 60.17
CONTENTS OF SITE CHARACTERIZATION PLAN

NRC Rationale:

- o The ESF will be used to obtain information called for by (a) the SCP, (b) the waste package program, and (c) the repository design.
- o As such, this requirement could potentially affect ESF requirements.

DOE Rationale:

- o This section does not directly impose requirements on the ESF since it only briefly identifies the required contents of the SCP, referring specifically to plans and descriptions that need to be provided in that document.
- o The SCP and its supporting study plans identify the parameters that need to be considered in ESF design, construction, and operation.

10 CFR 60.24(a)
UPDATING OF APPLICATION AND ENVIRONMENTAL REPORT

NRC Rationale:

- o This section requires various applications (e.g., license application) to be as complete as possible in light of information that is reasonably available at the time of docketing.
- o This requirement is applicable to ESF design because it provides guidance regarding scope and possible sequencing of activities.

DOE Rationale:

- o This section does not directly impose requirements on the design, construction and operation of the ESF since its focus is directed to providing for updating the license application and accompanying documents.
- o It provides indirect guidance to the extent that the license application must be as complete as possible in terms of the information required for NRC to make a determination.
- o The SCP provides the plans with respect to what needs to be considered in the ESF design.

10 CFR 60.113(a)(2)
PRE-WASTE-EMPLACEMENT GROUNDWATER TRAVEL TIME

NRC Rationale:

- o This regulation is applicable because the ESF design could impact the location of the disturbed zone boundary.

DOE Rationale:

- o While the design, construction, and operation of the underground workings of the ESF could affect the location of the disturbed zone boundary, this requirement directs determination of groundwater travel time from wherever that boundary ends up being. This is effectively a siting criterion applicable to the geologic setting, but does not directly impose requirements on the ESF.
- o The requirement to minimize impacts to the disturbed zone is generally covered by 60.15(d), not 60.113(a)(2).

10 CFR 60.113(b)(2), (3), (4)
FACTORS NRC WILL CONSIDER IN CASE-BY-CASE
EVALUATION OF PERFORMANCE OBJECTIVES

NRC Rationale:

- o These requirements are applicable to the ESF design, as the ESF design should allow gathering of information necessary to evaluate factors which bear upon:
 - the time during which the thermal pulse is dominated by decay heat from the fission products
 - geochemical characteristics of the host rock
 - sources of uncertainty in predicting the performance of the geologic repository

DOE Rationale:

- o This section does not directly impose requirements on the ESF. This section serves to provide flexibility with respect to the numerical limits pertaining to the performance objectives for the engineered barrier system and the geologic setting, as stipulated in 60.113(a).
- o The need for the ESF to allow gathering of information relevant to the factors listed in this section of Part 60 come from the scope of the site characterization program, which is defined in the SCP, and related study plans.

**10 CFR 60.122
SITING CRITERIA**

NRC Rationale:

- o This requirement is applicable, as it provides detailed descriptions of the information which must be obtained (largely in ESF) to assess the adequacy of the site and to assess other adverse conditions.
- o In particular, 60.122(c)(1) imposes a design criterion on the location of underground accesses.

DOE Rationale:

- o This section does not directly impose requirements on the ESF since it addresses favorable and potentially adverse conditions which are to be used as siting criteria applicable to the geologic setting.
- o The requirement to evaluate the existence of potentially adverse conditions, including 10 CFR 60.122(c)(1) is addressed in program requirements documents and the SCP and its related study plans.
- o Evaluation of the location of underground accesses with respect to flooding potential is being considered as part of the ESF design process in accordance with 10 CFR 60.133(d).

10 CFR 60.131(a)
GENERAL DESIGN CRITERIA FOR RADIOLOGICAL PROTECTION

NRC Rationale:

- o This requirement is applicable because it imposes requirements on all components of the ventilation systems, not just mechanical equipment.
- o DOE's statement that "Compliance with the specified criteria is a function of equipment design and operational procedures, which imposes future requirements on equipment and operation, but not on the ESF permanent components" (Attachment I, p. 32) is too narrow.
- o See, also, Attachment J (TOG's Members' Statement, filed by D. Michlewicz).
- o Also, 10 CFR 60.15(d)(4) requires coordination of subsurface excavation with the geologic operation area design and construction.
- o As currently planned, ESF shafts and drifts will be part of ventilation system for the repository.

DOE Rationale:

- o This section, in particular 60.131(a)(1), needs to be considered to the extent that the ESF must be designed such that it does not preclude the repository from meeting these requirements. It should be noted that compliance with these requirements is primarily a function of equipment design and operating procedures for the purpose of radiation protection, which imposes future requirements on equipment and operations.
- o It should be noted that, while the NWPA requires the NRC to concur on the need to use radioactive material during site characterization, the use of such material is not subject to NRC licensing requirements, as stipulated in 60.7. DOE radiological safety orders would be applicable.
- o Currently, there is no plan to use radioactive wastes in the ESF during site characterization.

**10 CFR 60.131(b)(4)(i)
ONSITE FACILITIES FOR EMERGENCIES**

NRC Rationale:

- o See Attachment H, p. 7. (TOG report).

"60.131(b)

This paragraph applies only to items important to safety. The stated requirements can, therefore, only apply to the ESF after incorporating it into the GROA plus the finding then that an item is important to safety.

60.131(b)(4) provides for emergency capability for items important to safety, with concurrent full control over radioactive material. (6.0 C(J), 6.0 C(M))."

DOE Rationale:

- o This section does not impose requirements on the ESF since it addresses requirements that are applicable only to repository operations and would not affect the design of ESF permanent components.
- o The section requires that the geologic repository operations area (GROA) include onsite facilities and services for responding to radiological emergencies and that facilitate the use of available offsite services for that application.
- o The ESF will include similar facilities or services in accordance with non-radiological safety requirements.
- o It should be noted that, while the NWPA requires the NRC to concur on the need to use radioactive material during site characterization, the use of such material is not subject to NRC licensing requirements, as stipulated in 60.7. DOE radiological safety orders would be applicable.
- o Currently, there is no plan to use radioactive wastes in the ESF during site characterization.
- o It should also be noted that, as explained in the TOG Report, Attachment H of that report was only a preliminary evaluation of Part 60 applicability which eventually led to the final position in Attachment I of the same report.
- o Also, the statement on page 7 of Attachment H, referred to by NRC, actually was meant to refer only to 60.131(b)(4)(i) and not to (ii).

10 CFR 60.131(b) (8)
INSTRUMENTATION AND CONTROL SYSTEMS

NRC Rationale:

- o This requirement is applicable, because it could impact ESF design by requiring allowances for instrumentation and control systems.

DOE Rationale:

- o This section does not directly impose requirements on the ESF since it addresses requirements that are applicable only to repository operations and would not affect the design of ESF permanent components.
- o The section requires that instrumentation and control systems be provided to monitor the behavior of systems important to safety over the anticipated ranges for normal operation and for accident conditions.
- o The extent to which this requirement would need to be considered in ESF design is to ensure that the ESF design does not preclude the addition of instrumentation and control systems. However, the inclusion of such a requirement is not expected to provide any additional flexibility in design beyond what already exists.

10 CFR 60.131(b) (10)
SHAFT CONVEYANCES USED IN RADIOACTIVE WASTE HANDLING

NRC Rationale:

- o If radioactive wastes are to be placed in the ESF, then this requirement is applicable.

DOE Rationale:

- o This section does not impose requirements on the ESF since it addresses requirements for hoists important to safety that are used for radioactive waste handling.
- o Currently, radioactive wastes are not planned to be used in the ESF during site characterization.
- o It should be noted that, while the NWSA requires the NRC to concur on the need to use radioactive material during site characterization, the use of such material is not subject to NRC licensing requirements, as stipulated in 60.7. DOE radiological safety orders would be applicable.

10 CFR 60.134
DESIGN OF SEALS FOR SHAFTS AND BOREHOLES

NRC Rationale:

- o This requirement is applicable, because it provides design guidance relative to future sealing requirements.
- o The SCP recognizes the relevance of this requirement in Section 8.3.3 (see, for example, p. 8.3.3.2-52, Table 8.3.3.2-9b).

DOE Rationale:

- o This section does not directly impose requirements on the ESF since it addresses requirements that are applicable to the design of postclosure seals so that they don't become preferential pathways that could compromise the isolation capability of the geologic repository. The extent to which this would need to be considered in ESF design is to ensure that the design does not preclude the repository from meeting these requirements.
- o Nevertheless, the requirement that the ESF design facilitate permanent closure is stipulated by inclusion of 60.21(c)(11).

10 CFR 60.143
MONITORING AND TESTING OF WASTE PACKAGES

NRC Rationale:

- o This requirement is applicable for the same reasons that 60.131(b)(10) is applicable - namely, that 10 CFR 60.74 requires flexibility in testing.

DOE Rationale:

- o This section does not impose requirements on the ESF since it addresses performance confirmation monitoring and testing that is specifically applicable to the waste packages.
- o Currently, no radioactive wastes are planned to be used in the ESF during site characterization.
- o Likewise, in the future, the ESF portion of the geologic repository operations area will not contain waste packages.