



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20565-0001

February 12, 1997

Mr. James P. O'Hanlon
Senior Vice President - Nuclear
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

72-16
50-338/939

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) CONCERNING THE
APPLICATION FOR THE NORTH ANNA INDEPENDENT SPENT FUEL STORAGE
INSTALLATION (TAC NO. L22113)

Dear Mr. O'Hanlon:

By letter dated May 9, 1995, you submitted an application to the Nuclear Regulatory Commission in accordance with 10 CFR Part 72 for the review and approval of a site-specific license for an independent spent fuel storage installation (ISFSI) at the North Anna Nuclear Power Station site. The staff has determined that additional information is required to determine compliance with 10 CFR Part 72. You should be aware that the enclosed request for additional information (RAI) may be the first in a series of information solicitations to which you will have to respond. You should prepare and submit your response to this request within 60 calendar days from the date of this letter.

Although the staff determined that sufficient information was submitted to initiate its review, the staff is concerned that some information was either lacking or insufficiently presented. In particular, the staff has concerns regarding the proposed site's design earthquake as well as analyses presented in the safety analysis report (SAR) regarding cask sliding and tipping. The staff encourages you to ensure that the responses to these and other aspects of this RAI are given thorough and accurate review prior to submittal to the NRC.

Some topical areas do not have any RAI items. This should not be interpreted that the staff will not have future questions in these areas. Some topical areas (e.g., quality assurance) will be subject to subsequent inspection activity.

It is incumbent upon you to determine if information submitted in response to this RAI is proprietary. If it is necessary to submit proprietary information, you are required to submit the appropriate affidavit in accordance with 10 CFR 2.790. Finally, Office of Management and Budget approvals regarding information collection requirements are delineated in 10 CFR 72.9.

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J.P. O'Hanlon

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As before, please reference the TAC number noted above in future correspondence related to this licensing action. If you have any comment or question concerning this request, please contact me at 301-415-8549.

Sincerely,

Original signed by /s/

Margaret E. Lusardi, Project Manager
Spent Fuel Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No. 72-16 (50-338/339)

Enclosure: Request for Additional Information

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Dockets 72-16, 50-338/-339

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cc:

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REQUEST FOR ADDITIONAL INFORMATION

This document, titled Request for Additional Information (RAI), contains a compilation of additional information requirements identified to date by the U.S. Nuclear Regulatory Commission staff during its review of the applicant's application and Safety Analysis Report (SAR). This RAI follows the same format as the applicant's SAR.

Each individual RAI describes information needed by the staff for it to complete its review of the application and/or the SAR and to determine whether the applicant has demonstrated compliance with the regulatory requirements. Where an individual RAI relates to one or more regulatory requirements or where an RAI specifically focuses on compliance issues associated with one or more specific regulatory requirements (e.g., specific design criteria or accident conditions), such requirements are specified in the individual RAI.

This RAI is organized as follows:

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|--------------|------------------------------------------------------|
| Chapter 1.0 | Introduction and General Description of Installation |
| Chapter 2.0 | Site Characteristics |
| Chapter 3.0 | Principal SSSC Design Criteria |
| Chapter 4.0 | Storage System |
| Chapter 5.0 | Storage System Operations |
| Chapter 6.0 | Waste Management |
| Chapter 7.0 | Radiation Protection |
| Chapter 8.0 | Accident Analysis |
| Chapter 9.0 | Conduct of Operations |
| Chapter 10.0 | Operating Controls and Limits |
| Chapter 11.0 | Quality Assurance |
| TS | Technical Specifications |
| FAD | Financial Assurance and Decommissioning |

ENCLOSURE

Chapter 1.0 Introduction and General Description of Installation

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR 72.2(a)(1), 72.11, 72.24(b), 72.24(c)(3), 72.24(j), 72.28(a), 72.230(b), and 72.236(a). It should be noted that other regulatory requirements may be applicable to this section.

- 1-1 Update the SAR to reflect the revision of the TN-32 Topical Safety Analysis Report (TSAR) approved by the Nuclear Regulatory Commission.

Chapter 2 Site Characteristics

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR 72.2(a)(1), 72.11, 72.24, 72.90, 72.92, 72.94, 72.98, 72.102, 72.104, 72.106, 72.120, and 72.122. It should be noted that other regulatory requirements may be applicable to this section.

- 2-1 Revise the safety analysis report (SAR) sections and associated analyses pertaining to the independent spent fuel storage installation (ISFSI) design earthquake to clearly comply with the requirements of 10 CFR 72.102(a)(1), (a)(2), (f)(1), and (f)(2).

SAR Section 2.5.2.3 states that the North Anna Power Station Units 1 and 2 Preliminary Safety Analysis Report and design were completed prior to the promulgation of Appendix A to 10 CFR Part 100, and the term "design-basis earthquake" as used in the ISFSI SAR has the meaning it had prior to the promulgation of these regulations. The SAR also references American National Standards Institute/American Nuclear Society (ANSI/ANS) 2.19 and states that "The North Anna Power Station operating-basis earthquake in Section 2.5.2.6 of the UFSAR exceeds the 500-year earthquake and was used as the Design Earthquake" (page 4.2-3). NRC has not endorsed ANSI/ANS 2.19 as acceptable for meeting the requirements of 10 CFR 72.102. In any case, the design earthquake must comply with 10 CFR Part 72 requirements.

- 2-2 Provide calculations and documentation to demonstrate compliance with 10 CFR 72.102(c) and support the statement in the SAR that "... liquefaction would not occur under the Design Basis Earthquake of 0.18g."

While the ISFSI concrete storage pads may not be classified as a structure system or component important to safety, the SAR must demonstrate that the pad will continue to support the casks without causing a tip-over as a result of the ISFSI design earthquake. The calculations should provide the maximum pad settlement(s) and identify the location(s). If reinforcing bars are stressed beyond yield, identify the locations and evaluate the effect on the casks.

Chapter 3.0 Principal SSSC Design Criteria

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR 72.2(a)(1), 72.11, 72.24(c), 72.24(d), 72.24(e), 72.24(f), 72.24(g), 72.24(m), 72.24(l)(2), 72.30(a), 72.44(d), 72.102, 72.104, 72.106, 72.120(a), 72.122, 72.124, 72.126, 72.128, and 72.130. It should be noted that other regulatory requirements may be applicable to this section.

- 3-1 Revise SAR Table 3.1-1 to provide the manufacturer and reactor type for the spent fuel assemblies.

The information was noted elsewhere in the SAR but should be provided here for completeness.

- 3-2 Revise SAR Section 3.2.3 to comply with the requirements of 10 CFR 72.102 (see also RAI 2-1).

The design earthquake defined in this section is not in compliance with the requirements of 10 CFR 72.102 nor is it consistent with the 0.18g design basis earthquake stated in SAR Sections 2.5.2.3, 2.5.2.4, and 2.5.4.

- 3-3 Clarify your statement in SAR Section 3.3.5 that no occupational dose is expected from decommissioning.

The dose rate on the bottom of the Transnuclear Inc., Dry Storage Cask (TN-32) is significant (133 gamma/368 neutron), and potential activation of the concrete should be addressed.

Chapter 4.0 Storage System

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR 72.11, 72.24(c)(3), 72.24(d), 72.26, 72.44(c), 72.102(f), 72.106, 72.120, 72.122(h)(1), 72.122(i), 72.124, 72.128(a)(4), 72.182(b), and 72.182(c). It should be noted that other regulatory requirements may be applicable to this section.

- 4-1 Clarify the design compressive strength for the concrete ISFSI pad.

SAR Section 4.2.1 states that the minimum compressive strength shall be 3000 psi.

- 4-2 Clarify the "E" load identified for the structural design of the concrete storage pad with respect to the design earthquake used for the ISFSI to assure compliance with 10 CFR 71.102 (see also RAI Item 2-1).

- 4-3 Revise the analyses in SAR Sections 4.2.1.4 and 4.2.1.5 to demonstrate that the casks will not slide or tip-over, as a result of the ISFSI design earthquake, based on the method of ANSI/ANS 57.9, Section 6.17.4.1 (see also RAI Item 2-1). Justify that the North Anna site conditions are bounded by the TN-32 Topical Safety Analysis Report (TSAR) Section 2.2.3 analysis.

The analyses provided show that the casks will tip and slide under North Anna Power Station's operating basis earthquake and design earthquake. The calculated accelerations exceed those evaluated in the TN-32 TSAR that are needed to cause tip-over. NRC endorses the ANSI/ANS 57.9 method which defines a factor of safety of 1.1 against sliding and overturning.

- 4-4 Describe, in more detail, and provide drawings for the impact limiter and lift beam, that are identified as equipment important to safety.
- 4-5 Describe the location of the flashing light described in SAR Section 4.4.5.3 that will energize as a result of the sealed surface storage casks' (SSSCs) pressure monitoring system alarm.

Chapter 5.0 Storage System Operations

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR Parts 20 and 50 and Sections 72.11, 72.24(e), 72.24(f), 72.24(l)(2), 72.40(a)(5), 72.104, 72.106, 72.122, 72.128(a)(5), and 72.150. It should be noted that other regulatory requirements may be applicable to this section.

- 5-1 Add a statement that lifting within the spent fuel and decontamination buildings is governed by the regulatory requirements of 10 CFR Part 50.
- 5-2 Describe the steps that will be taken to monitor and control cask internal pressure and potential fuel damage during cask reflood for unloading operations.

Chapter 6.0 Waste Management

No questions at this time.

Chapter 7.0 Radiation Protection

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR 20.1101, 20.1201, 20.1207, 20.1208, and Subpart F and 10 CFR 72.11, 72.24(e), 72.102(b), 72.104, 72.106, and 72.126(a). It should be noted that other regulatory requirements may be applicable to this section.

- 7-1 Clarify and revise, as necessary, SAR Section 7.3 to consider higher neutron surface dose rates for the TN-32 based on Chapter 5 of NRC's Safety Evaluation Report (SER) for the TN-32.

Chapter 5 of the SER notes that the neutron source term could double for spent fuel enriched to less than 3.85%, thereby, increasing the neutron dose for the cask. Increases in neutron doses were also possible for burnups greater than 35,000 MWd/MTU.

- 7-2 Explain how the time estimates for the various tasks were determined for estimating the occupational exposures to ISFSI personnel in SAR Tables 7.4-1 through 7.4-6.

- 7-3 Define what the letters A through H indicate on Figure 7.3-1.

- 7-4 Provide the calculations that demonstrate compliance with 10 CFR 72.104(a).

In addition to complying with the requirements in 10 CFR Part 20, the dose limit requirements in 10 CFR 72.104(a) for normal and anticipated occurrences must also be met.

Chapter 8.0 Accident Analysis

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR 72.2(a)(1), 72.11, 72.24(b), 72.24(d), 72.24(m), 72.104(a), 72.106(b), 72.122(d), 72.122(g), 72.122(h)(1), 72.122(i), 72.122(l), 72.124, 72.126(a), 72.128(a)(4), 72.182(b), and 72.182(c). It should be noted that other regulatory requirements may be applicable to this section.

- 8-1 Reference the SAR section that describes the procedures for verifying proper loading of the spent fuel assemblies in SAR Section 8.2.6.2.

Chapter 9.0 Conduct of Operations

The following regulatory requirements are applicable to the RAIs in this chapter: 10 CFR 72.24(h), 72.28, 72.32, 72.40(a)(9), 72.190, 72.192, and 72.194 and Subpart I, "Training and Certification of Personnel." It should be noted that other regulatory requirements may be applicable to this section.

- 9-1 Verify that the results of the pre-operational testing will be evaluated for lessons learned and potential changes to equipment and procedures.
- 9-2 Clearly define the acceptance criteria, margins, and acceptance criteria for the pre-operational tests and SSSC seal testing.

SAR Section 9.2.3 refers to other sections for this information, but the information is not clearly stated in those referenced sections.
- 9-3 Describe the process by which procedures will be generated for the 10 CFR Part 72 licensed activities.
- 9-4 Describe the process/program for the preparation and review of safety and environmental evaluations allowed under 10 CFR 72.48, "Changes, tests, and experiments" (e.g., procedure, preparer/reviewer training and qualifications, unreviewed safety question guidance and determination, etc.).
- 9-5 Provide a description of North Anna's systematic approach to ISFSI training.

A systematic approach to training should include, but not be limited to, identification of tasks to be trained in, identification of skills and knowledge required to perform the identified tasks, design of the training program and performance measures, development of lesson plans, implementation of the training, and mechanisms for evaluating the program and personnel being trained.
- 9-6 Provide a copy of the revised North Anna Emergency Plan, noting the sections that were revised due to the addition of the ISFSI.

Chapter 10.0 Operating Controls and Limits

No questions at this time.

Chapter 11.0 Quality Assurance

The following regulatory requirements are applicable to the RAIs in this section: 10 CFR Part 72, Subpart G, "Quality Assurance," specifically, Sections 72.140 through 176. It should be noted that other regulatory requirements may be applicable to this section.

- 10-1 Clarify the most recent revision and list of amendments for the Quality Assurance Program document VEP-1-5A.

The revision reviewed by staff, as provided by the licensee, was VEP-1-5a, Amendment 5. The cover sheet shows that the document was updated in February 1994, but the "List of Amendments" on page 17.2-iv shows the last update of the document as June 16, 1992.

Technical Specifications

No questions at this time.

Financial Assurance and Decommissioning

The following regulatory requirements are applicable to the RAIs in this section: 10 CFR 72.11, 72.30, 72.54, 72.130, 72.236(i), and 10 CFR 61.55. It should be noted that other regulatory requirements may be applicable to this section.

- FAD-1 Provide the annual schedule of construction and operation expenses that Virginia Electric and Power Company (Virginia Power) and Old Dominion expect to incur for the ISFSI over its scheduled operating life.
- FAD-2 Explain whether or not Virginia Power and Old Dominion intend to seek recovery of all or part of the construction, operation, and decommissioning expenses of the ISFSI through ratepayers. If so, state when such rate recovery will be sought.
- FAD-3 Verify that the ISFSI decommissioning cost will be fully assured by trust fund or other assurance mechanism provided in 10 CFR 50.75(e)(1) or (3) (as referenced in 10 CFR 72.30(c)(5)).

Although Section 10.2 of the license application briefly discusses decommissioning trust funds, it is not clear that the ISFSI decommissioning costs have been provided for separately, over and above other decommissioning costs associated with the North Anna facility. At a minimum, the North Anna decommissioning trust should either have a separate sub-account for ISFSI decommissioning costs or some clear method to identify separately the various components of decommissioning costs, including the NRC-required radiological decommissioning costs, non-radiological costs not required by the NRC, and ISFSI costs.