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ØCAN 383Ø4

Director of Nuclear Reactor Regulation  
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U. S. Nuclear Regulatory Commission  
Washington, DC 20555

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ATTN: Mr. Robert A. Clark, Chief  
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Washington, DC 20555

SUBJECT. Arkansas Nuclear One - Units 1 & 2  
Docket Nos. 50-313 and 50-368  
License Nos. DPR-51 and NPF-6  
Additional Information Concerning  
Spent Fuel Storage Expansion

Gentlemen:

Your letter dated January 24, 1983, (ØCNAØ18316) requested additional information regarding the proposed spent fuel storage expansion. Attached is our response to your request.

Very truly yours,

John R. Marshall  
Manager, Licensing

JRM:JC:s1

Attachment

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Question 1:

Describe and illustrate in detail how Region 2 will be subdivided between high burnup (>80%) fuel and checkerboard (<80%) storage.

Response:

The proposed expansion for Unit 1 provides 220 storage locations in Region 1; and the Unit 2, Region 1 provides 234 locations. These spaces provide ample storage for a complete core offload plus additional storage for irradiated fuel assemblies which may not meet the burnup requirements necessary for placement in Region 2. The request for storage in Region 2 in a checkerboard configuration is based on providing additional space for unirradiated or less than fully irradiated assemblies in the event of unforeseen circumstances.

In the event that storage in Region 2 in a checkerboard configuration is necessary, a specific area of Region 2 will be procedurally designated for checkerboard storage. In addition, the area designated will be subdivided from the normal storage of Region 2 by a row of vacant storage spaces.

Question 2:

If administrative controls alone are relied upon for the fuel assembly storage arrangement in Region 2, postulated accidents should include loading errors. In these cases, the double contingency principle would not be applicable since an assembly misloading and the loss of soluble boron in the storage pool water need not necessarily be concurrent but could conceivably occur several refueling cycles apart. Therefore, analyses should be performed for both of the following accidents:

- (a) Misloading of an unirradiated high enrichment assembly in the high burnup region with pure water at full density as moderator.
- (b) Misloading of an unirradiated high enrichment assembly in a space which is supposed to be vacant in the checkerboard storage configuration with pure water at full density as moderator.

Response:

The results of misloading an unirradiated assembly in Region 2 using the checkerboard configuration (i.e. placing the assembly in a checkerboard space intended to be vacant) are the same as misloading an unirradiated assembly in Region 2 using the standard configuration.

NUREG-0830, "Safety Evaluation Report related to the Operation of Callaway Plant Unit-1" finds the use of administrative controls for the fuel assembly storage in Region 2 "acceptable". This NUREG also suggests that to implement the administrative controls and ensure safety, the Technical Specifications should include certain specified elements. The design and storage operations of the Arkansas Nuclear One (ANO) proposed spent fuel storage racks are similar to those of Callaway Unit-1. In addition, the ANO-1 & 2 proposed Technical Specifications associated with rack expansion address the elements suggested in NUREG-0830. This includes the maintenance and surveillance of spent fuel pool boron concentration to ensure the limits of the spent fuel pool accident and criticality analyses will not be exceeded.

Assuming that misloading and loss of boron are not concurrent, the possibility of exceeding limits in the spent fuel pool criticality analyses would credibly exist only under the following conditions:

- 1. a. Failure to follow strict administrative controls applied by written procedures to select assemblies to be stored in Region 2, resulting in loading an unirradiated high enrichment assembly in a checkerboard space which is planned to be vacant or in the Region 2 standard storage configuration; and/or

(NOTE: Loading an unirradiated high enrichment assembly in Region 2 using proper checkerboard sequence will not result in exceeding limits in the criticality analyses even with pure water.)

- b. Failure to follow strict administrative control procedures requiring periodic independent verification (1 verification per 6 months) of fuel assembly serial number versus storage location;
- 2. And, continued failure to perform, or inaccurate results of, one or more specified spent fuel pool boron surveillance tests (1 survey per 31 days) resulting in an unidentified gradual loss of boron in the pool.

In summary, the administrative controls established to prevent loading errors and to monitor the soluble boron in the spent fuel pool reduce the probability of postulated accidents to levels found acceptable at similar facilities.

Question 3:

Provide a description of the administrative procedures to be used for loading Regions 1 and 2 of the spent fuel pool.

Response:

ANO Administrative Procedure 1022.12, "Control and Accountability of Special Nuclear Materials", provides the controls to be used in determining the storage location for new and irradiated fuel in the spent fuel pools of both units. The "Spent Fuel Pool Inventory Maps" will be changed to reflect the additional storage locations in the spent fuel pools and the separation of these pools into two distinct regions (Form No. 1022.12M, Unit 1 and Form No. 1022.12N, Unit 2).

The procedure will include a description of the two regions and the method used to determine whether irradiated fuel should be placed in Region 1 or Region 2. Figures 3.8.2 (Unit 1) and 3.9.2 (Unit 2) in the proposed Technical Specifications describes the classification of each assembly as "Restricted" or "Non-Restricted" by comparing its burnup with its initial enrichment. Also included will be an evaluation of the guidelines pertaining to "Restricted" fuel when stored in Region 2 (i.e., by using a checkerboard pattern and separating these "Restricted" bundles from the "Non-Restricted" bundles by a vacant row of storage spaces). This procedure will require an independent check by two individuals classifying the irradiated fuel as "Restricted" or "Non-Restricted" and verifying the correct storage location, considering the Region and the assembly identification number.

Question 4:

Describe the Technical Specifications which will be used to provide a basis for the administrative control of assemblies stored in the spent fuel pool.

Response:

The proposed Technical Specifications providing the bases for the expansion and administrative control of spent fuel storage at Arkansas Nuclear One Units 1 & 2 were transmitted by our letter dated February 17, 1983, (ØCANØ283Ø2).