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John A. Scalice
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MAR 1 1 1997

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - RESPONSE TO REQUEST REGARDING NO SIGNIFICANT HAZARD DETERMINATION FOR SPENT FUEL POOL RERACKING AND ENRICHMENT INCREASE (WBN-TS-96-010) (TAC NO. M96930)

The purpose of this letter is to provide a response to NRC's comments in a letter dated February 12, 1997. Enclosure 1 provides a response to those comments. Enclosure 2 provides a revised Enclosure 3 of TVA's October 23, 1996 letter, "Determination of No Significant Hazards Considerations."

NRC's February 12, 1997, letter stated that two additional aspects would need to be addressed before introducing fuel of 5.0 weight percent (wt%) U-235 enrichment into the plant. The first aspect involved information regarding the Reactor Building fuel handling accident analysis for 5.0 wt% U-235 enrichment. TVA did not consider this information required to perform a technical specification design modification for the spent fuel pool rerack and the capability to store 5.0 wt% fuel in the spent fuel pool located in the Auxiliary Building. TVA understands that the analysis must be performed for the Reactor Building before fuel with enrichment greater than previously analyzed can be placed in the reactor. The second item concerned a Technical Specification change for the new fuel storage vault. This was addressed in TVA's Question 2 response dated December 11, 1996, to NRC's request for additional information dated November 7, 1996. As stated in that response, TVA does not anticipate fresh fuel with enrichment

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greater than 4.3 wt% U-235 to be stored in the new fuel vault before fuel is purchased for Cycle 3. TVA is aware that a license amendment must be requested before that activity may take place.

If you should have any questions, please contact P. L. Pace at (423) 365-1824.

Sincerely,

J. A. Scalice

Enclosures
cc (Enclosures):
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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
REQUEST FOR ADDITIONAL INFORMATION REGARDING
DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION (NSHC)
SPENT FUEL POOL RERACKING AND ENRICHMENT INCREASE

The following provides responses to address comments from NRC's letter dated February 12, 1997.

CRITERION 1

"The first criterion is that operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated."

COMMENT 1

"The Watts Bar Final Safety Analysis Report (FSAR) includes two fuel handling accident analyses. One addresses consequences of fuel handling accidents in the reactor building and one addresses consequences of fuel handling accidents in the spent fuel pool. The amendment application does not address reanalysis of the reactor building accident. Although not explicitly required for the spent fuel pool reracking activities, reanalysis of the reactor building fuel handling accident would be required prior to moving fuel in the reactor building having an enrichment in excess of the enrichment value currently reflected in the analysis."

TVA RESPONSE

TVA does not consider the Reactor Building fuel handling accident for 5.0 weight percent (wt%) fuel to be a part of this technical specification design request to rerack the spent fuel pool and have the capability to store 5.0 wt% fuel in the spent fuel pool. TVA understands that a revision to the current analysis must be completed before fuel in excess of the enrichment value currently reflected in the analysis is moved into the Reactor Building. However, since the analyses have already been performed, the results are being provided for information only. The radiological dose consequences of a fuel handling accident in both the Auxiliary Building and the Reactor Building are provided in Table 1 for 5.0 wt% U-235 fuel at exposures of 1000 and 1500 effective full power days (EFPDs). For comparison purposes, the information presently included in the WBN FSAR, Table 15.5-23, for 3.5 wt% fuel is also shown. As noted in Table 1, actual values for Gamma and Beta have decreased. Slight increases are noted in the thyroid values, however, the increase is insignificant when the overall dose value is evaluated. These values remain well within the 10 CFR 100 requirements.

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COMMENT 2

"TVA's analysis concludes that "after installation activities have been completed, the presence of additional fuel in the pool does not increase the probability of occurrence of these four events." TVA's proposed amendment encompasses installation activities. TVA's conclusions should also encompass the effects of installation activities on its proposed NSHC determination."

TVA RESPONSE

See the revised NSHC determination (Enclosure 3 of original submittal) in Enclosure 2 of this submittal. The NSHC contains references to the documents that support the statement for the staff's information.

COMMENT 3

"The proposed amendment includes discussion of the potential for drop of a fuel pool transfer canal gate or a cask pit divider gate in its NSHC determination for the first criterion. Discuss why these activities are considered to be within the group of accidents previously evaluated for Watts Bar."

TVA RESPONSE

The drop of a fuel pool transfer canal gate or a cask pit divider gate is very similar to and is readily bounded by the spent fuel assembly accident probability and consequences previously analyzed for WBN. The gate drop was addressed for safety evaluation completeness as an additional aspect of a drop which could potentially cause fuel damage in the newly installed racks.

The radiological consequence of an assembly drop accident, is the failure of all fuel rods in a maximum burnup fuel assembly. This consequence has been evaluated and the results are presented in Table 1. The gate, like a fuel assembly and its handling tool, is also a relatively light-weight load (3820 lbs) however, the gate has a somewhat larger footprint than a fuel assembly. The criticality consequences for three cases of a dropped fuel assembly and for the case of a dropped gate, are presented in Sections 7.2 and 7.3 respectively, of Enclosure 2 to TVA's letter to NRC dated October 23, 1996. In the four cases analyzed, there is no effect on the subcriticality of fuel stored in the rack cells, and for the gate drop specifically, rack deformation is limited to a maximum depth of less than six inches below the top of the rack. Since the top of the active fuel region is approximately twenty inches below the top of the racks, the storage cell damage does not extend to the top of this region or even to the top of the fuel assembly itself which is more than eight inches below the top of the racks. It is readily concluded

therefore, that similar to the fuel assembly drop accidents, there is no effect on subcriticality of stored fuel. Also, since there is no fuel damage, the radiological consequences are obviously bounded by the fuel assembly drop.

With respect to the probability of this type of drop accidents, there are approximately 450 fuel and fuel-related component movements in the spent fuel area during a refueling outage. By comparison, the gates are normally moved only once or twice during a refueling cycle. This movement normally occurs just before or during the refueling outage. Provisions which minimize the probability of a gate drop were further discussed in TVA's response dated February 10, 1997, to Question No. 5 of NRC's request for additional information. In summary, it is reasonable to conclude that neither the probability nor consequences of a gate drop are significantly increased by the proposed reracking relative to the very similar and bounding refueling drop accident for a fuel assembly.

COMMENT 4

"The paragraph on future load travel over the cask pit does not appear to address issues related to probability or consequences of accidents previously evaluated. Discuss why these activities are considered to be within the group of accidents previously evaluated for Watts Bar."

TVA RESPONSE

The paragraph on future load travel over the cask pit is included both for completeness and to emphasize the defense-in-depth measures taken. Such a load, in addition to satisfying the criteria of NUREG-0612, will be prohibited unless a specially designed impact shield is in place. Detrimental effects of a load drop are precluded by requiring a traversing load to meet analytically predetermined weight, travel height, and cross-sectional area criteria. A Technical Requirement Manual (TRM) technical surveillance requirement (TSR) has been proposed to ensure implementation of these criteria. With these provisions in place, a heavy load drop on spent fuel is not considered to be a credible accident event, and therefore, issues related to the probability or consequences of accidents previously evaluated were not addressed. In essence, placing the engineered shield over the cask area creates a single-failure-proof situation such that adverse consequences would require, not only a load drop (equipment, rigging, or handling failure), but also either a personnel error in failing to install the shield or properly evaluate the load (weight, travel height, cross sectional area), or failure of the shield itself.

With respect to handling of the cask pit impact shield, it is designed in such a way that a drop into the cask loading area is not credible. An isometric drawing of the shield is shown in Figure 2.4.1 of Enclosure 2 to TVA's letter to NRC dated October 23, 1996. Movement

of the impact shield into position is described in the last paragraph on Page 2-9 of that same enclosure. The cask pit area is approximately 12 feet wide. The 18-inch "wings" on each end of the shield as shown in Figure 2.4.1 prevent the shield from dropping beyond the top of the cask pit walls. See Figures 1.1 and 2.1.1 of the above referenced October 23, 1996 letter, Enclosure 2 for the cask pit layout. The shield is carried a few inches above the refueling floor, moved from south to north across the shallow pit (which contains no fuel), and then set in place over the deep pit or cask loading area where the 15 x 15 rack would be located. During this transit the impact shield's supports or wings are only a few inches over the top of the cask pit concrete walls and the shield itself is parallel with the horizontal plane. As stated on Page 2-9 of the Enclosure 2 of the referenced letter, these factors preclude any credible scenario whereby the impact shield lift, which meets NUREG-0612 criteria, could drop into the cask pit. Any mishap during movement would simply bring the shield supports onto the top of cask pit walls.

COMMENT 5

"The paragraph on consequences of a spent fuel assembly drop states: 'Thus, the consequences of this type of accident are not changed from previously evaluated spent fuel assembly drops that have been found acceptable to NRC.' The applicable test for satisfying this criterion is whether the proposed amendment would involve a *significant increase* in the consequences of an accident previously evaluated for Watts Bar Unit 1. The staff's review indicates that the radiological consequences of the fuel assembly drop accident reported in the application *have changed* from those last reported in the FSAR and the staff's Supplemental Safety Evaluation Report No. 15. Therefore, this statement in the NSHC determination should be revised to reflect conclusions applicable for Watts Bar and to reflect consistency with the definition of the criterion in which it is discussed."

TVA RESPONSE

It is concluded from the dose information provided in Table 1 that operation of WBN Unit 1 in accordance with the proposed amendment would not involve a significant increase in the consequences of the fuel handling accidents previously evaluated. Gamma and Beta doses have actually decreased. Thyroid has slightly increased, however, the doses are significantly less than the regulatory guidance for "well within" relative to 10 CFR 100 guidelines. The NSHC has been revised to reflect this change.

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CRITERION 2

"The second NSHC criterion is that operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously analyzed."

COMMENT 6

The present licensing basis included analysis of a fuel assembly (2059 pounds) drop accident in the reactor building and the spent fuel pool. TVA's proposed application proposes to modify the plant by adding fuel racks in the cask pit. Discuss these plans, with their attendant provisions for moving heavy loads over the cask pit, with respect to whether they meet the provisions of this criterion."

TVA RESPONSE

In response to Comment 4, it was noted that the impact shield together with its attendant administrative controls and NUREG-0612 heavy load lift compliance, rendered the possibility of a heavy load drop on fuel as not credible in accordance with the NUREG-0612 single-failure-proof criteria. Accordingly, since this particular part of the proposed reracking modification is not a change that could malfunction by a new single failure, it is not considered necessary to analyze movement of heavy loads over the cask pit for meeting the second NSHC criteria, i.e., it does not create the possibility of a new or different kind of accident from any previously analyzed. The discussion under Criterion 2 has been revised to state the basis for not creating the possibility of a new or different kind of accident from any accident previously analyzed.

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TABLE 1
DOSES (rem) FROM FUEL HANDLING ACCIDENTS (FHA)
REGULATORY GUIDE 1.25 ANALYSIS

FHA IN AUXILIARY BUILDING

	3.5 WT% U-235 (650 EFPDS)		5.0 WT% U-235 (1000 EFPDS)		5.0 WT% U-235 (1500 EFPDS)	
	Exclusion Area Boundary (EAB)	Low Population Zone (LPZ)	Exclusion Area Boundary (EAB)	Low Population Zone (LPZ)	Exclusion Area Boundary (EAB)	Low Population Zone (LPZ)
Gamma	0.7103	0.1650	0.675	0.1568	0.6561	0.1534
Beta	2.0509	0.4764	1.9614	0.4556	1.9385	0.4503
Thyroid	1.6893	0.3924	1.8141	0.4214	1.8279	0.4246

FHA IN REACTOR BUILDING

	3.5 WT% U-235 (650 EFPDS)		5.0 WT% U-235 (1000 EFPDS)		5.0 WT% U-235 (1500 EFPDS)	
	Exclusion Area Boundary (EAB)	Low Population Zone (LPZ)	Exclusion Area Boundary (EAB)	Low Population Zone (LPZ)	Exclusion Area Boundary (EAB)	Low Population Zone (LPZ)
Gamma	0.7198	0.1672	0.6845	0.1590	0.6656	0.1546
Beta	2.0569	0.4778	1.9670	0.4569	1.9441	0.4516
Thyroid	42.2364	9.811	45.4178	10.55	45.7622	10.63