TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

August 23, 1984

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of the Application of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

Please refer to my letter to you dated March 27, 1984 which requested that the Reactor Building Purge Ventilation System (RBPVS) be deleted from the Watts Bar unit 1 Technical Specifications. TVA's request was based upon the reclassification of the RBPVS air cleanup units to a non-Engineered Safety Feature status and the results of the supporting offsite radiological consequence analysis which yielded releases below 10 CFR 100 guidelines. FSAR revisions reflecting this change were provided by Amendments 49, 52, and 53.

Discussions have recently been held between TVA and NRC representatives concerning the results of the referenced radiological analysis. NRC indicated that the analysis results (200 rem thyroid) did not satisfy the acceptance criteria (75 rem thyroid) of Section 15.7.4 of the Standard Review Plan (SRP). NRC further indicated that additional information, as listed below, was needed in order to complete the review of this matter.

(1) an analysis demonstrating containment isolation before activity release,
(2) a description of the methods used in the detection of radioactivity and the response times of components in the ventilation system,
(3) the estimated particle travel time from the pool surface to the purge isolation valves and verification that the total time is equal to or greater than the 34 second isolation time.

TVA believes that the NRC Staff's use of the acceptance criteria specified by SRP 15.7.4 is inappropriate for application to a fuel handling accident. A fuel handling accident is considered a "limiting fault" which is defined in Regulatory Guide 1.70 Revision 3 as: "occurrences that are not expected to occur but are postulated because their consequences would include the potential for the release of significant amounts of radioactive material." TVA further maintains that the conservatively calculated dose of 200 rem thyroid is sufficiently below the 10 CFR 100 guideline of 300 rem thyroid to qualify for compliance with Federal regulations.

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However, in order that this matter may be resolved before the current unit 1 fuel load date (October 1984) TVA, during an August 6-7, 1984 TVA/NRC Technical Specification meeting, proposed that the RBPVS (including the air cleanup units) be classified and maintained as an Engineered Safety Feature system and that the technical specifications governing the testing of the RBPVS filters be developed with the relaxed acceptance criteria of less than 10 percent for methyl iodide penetration. TVA noted that a revised radiological analysis would be performed using an assigned filter efficiency of 90 percent for inorganic iodine and 30 percent for organic iodine (as outlined in Regulatory Guide 1.52 Revision 2 for an inside containment filter system without humidity control using a methyl iodide penetration of less than 10 percent) and modified with respect to the narrow tolerance on air flow associated with HEPA filter efficiencies. TVA's proposal was favorably received by the NRC reviewers responsible for this issue.

The subject analysis has been completed and results demonstrate that a fuel handling accident inside the primary containment would not result in any significant releases of particulates. The effects of relaxed flow requirements on the charcoal adsorbers would only result in increased filter efficiencies. Enclosure 1 provides the information to be included in FSAR Chapter 15 which reflects the assumptions used in and results of the recent radiological analysis. Revisions to information in Chapters 6 and 9 of the FSAR will be required but are not available for transmittal at this time. The next amendment to the FSAR (Amendment 54) will reflect the revisions to Chapters 6, 9, and 15.

Enclosure 2 provides associated proposed modifications to the technical specifications.

If you have any questions concerning this matter, please get in touch with D. B. Ellis at FTS 858-2681.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills

L. M. Mills, Manager
Nuclear Licensing

Sworn to and subscribed before me
this 23rd day of Aug. 1984

Paulette H. White
Notary Public
My Commission Expires 9-5-84

Enclosures

cc: U.S. Nuclear Regulatory Commission (Enclosures)
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT

REVISED FSAR PAGES

15.5-29 AND 15.5-30

10. All iodine escaping from the pool is immediately exhausted at ground level to the environment through charcoal filters.
11. A filter efficiency of 99 percent is used for elemental and organic iodine in the conservative and Regulatory Guide 1.25 analyses.

12. No credit is taken for natural decay either due to holdup in the auxiliary building or after the activity has been released to the atmosphere.

13. The short-term, i.e., 0-2 hour, atmospheric dispersion factor at the site boundary given in Table 15a-2 is used. Doses are based on the dose models presented in Appendix 15A.

The thyroid, gamma and beta doses from a postulated fuel handling accident at the site boundary and low population zone are given in Table 15.5-23 for the realistic, conservative, and Regulatory Guide 1.25 analyses. These doses are much less than the 10CFR100 reference values of 300 rem to the thyroid and 25 rem to the whole body.

It is also necessary to consider a fuel handling accident occurring inside the primary containment. The Reactor Building Purge Ventilation System is an engineered safety feature containing air cleanup units with prefilters, HEPA filters, and 2-inch-thick charcoal absorbers. This system is similar to the Auxiliary Building Gas Treatment System except that the latter is equipped with 4-inch-thick charcoal absorbers. Anytime fuel handling operations are being carried on inside the primary containment, either the containment will be isolated or the Reactor Building Purge Ventilation System will be operating. The assumptions listed above are, therefore, applicable to a fuel handling accident inside primary containment except that the assigned filter efficiency is 90 percent for inorganic iodine, and 30 percent for organic iodine, since no relative humidity control is provided. As a direct result of the reduction in iodine adsorption efficiencies, the release of inorganic iodine increases by a factor of 10 and the organic iodine increases by a factor of 70. The contribution of each to the thyroid dose increases by a corresponding amount, the increases in the beta and gamma doses are negligible. For the Regulatory Guide 1.25 analysis, this results in a thyroid dose at the site boundary of 50 rem and at the LPZ boundary of 11.3 rem. In these considerations no allowance has been made for possible holdup or mixing in the primary containment or isolation of the primary containment as a result of high radiation signals from montors in the ventilation systems. Containment isolation can only result in smaller releases to the environment and lower doses. The result of a fuel handling accident inside the primary containment are far below the limits of 10CFR100.

15.5.7 Environmental Consequences of a Postulated Rod Ejection Accident

Three analyses of a postulated rod ejection accident are performed:

1) a realistic analysis, 2) a conservative analysis, and 3) an analysis based on Regulatory Guide 1.77 (Reference 12). The parameters used for each of these analyses are listed in Table 15.5-24.

The conservative analysis of the doses resulting from a rod ejection accident is based on the analysis given previously in this chapter which demonstrates a conservative fission product release of the gap activity from 10% of the fuel rods in the core.

For the conservative and Regulatory Guide 1.77 analyses it is assumed that the plant is operating at equilibrium levels of radioactivity in the primary and secondary systems prior to the postulated rod ejection accident as a result of coincident fuel defects and steam generator tube leakage. Following a postulated rod ejection accident, two activity release paths contribute to the total radiological consequences of the accident. The first release path is via containment leakage resulting from release of activity from the primary coolant to the containment. The second path is the contribution of contaminated stea in the secondary system dumped through the relief valves since offsite power is assumed to be lost.

Model

Prior to the accident it is assumed that the plant has been operating with simultaneous fuel defects and steam generator tube leakage for a sufficient period of time to establish equilibrium levels of activity in the primary and secondary coolant.

Following a postulated rod ejection accident, the activity released from the fuel pellet-clad gap due to failure of a portion of the fuel rods is assumed to be instantaneously released to the primary coolant. It is assumed that this release to the primary coolant is uniformly mixed throughout the coolant instantaneously. Thus the total activity released from the fuel rod gaps is assumed to be immediately available for release from the reactor coolant system.

Of the activity released to the containment from the coolant through the rupture in the reactor vessel head, 100% is assumed to be mixed instantaneously throughout the containment and is available for leakage from the containment at the design leak

ENCLOSURE 2

WATTS BAR NUCLEAR PLANT

UNIT 1 TECHNICAL SPECIFICATIONS

PROPOSED MODIFICATIONS TO TECHNICAL SPECIFICATION 3/4.9.13

REACTOR BUILDING PURGE VENTILATION SYSTEM

3/4.9.13 REACTOR BUILDING PURGE VENTILATION SYSTEM

PROOF & REVIEW COPY

LIMITING CONDITION FOR OPERATION

3.9.13 The Reactor Building Purge Ventilation Systems shall be OPERABLE.

APPLICABILITY: During CORE ALTERATIONS or movement of irradiated fuel within the containment.

ACTION:

a. With one Reactor Building Purge Ventilation System inoperable, CORE ALTERATIONS or movement of irradiated fuel within the containment may proceed provided the OPERABLE Reactor Building Purge Ventilation System is capable of being powered from an OPERABLE emergency power source and is in operation and discharging through at least one train of HEPA filters and charcoal adsorbers.

b. With no Reactor Building Purge Ventilation System OPERABLE, suspend all operations involving CORE ALTERATIONS or movement of irradiated fuel within the containment until at least one Reactor Building Purge Ventilation System is restored to OPERABLE status.

c. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.13 The above required Reactor Building Purge Ventilation Systems shall be demonstrated OPERABLE:

a. At least once per 31 days on a STAGGERED TEST BASIS by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the system operates for at least 15 minutes;

b. At least once per 18 months, or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the system, by:

   1) Verifying that the system statisfies the in-place penetration and bypass leakage acceptance criteria of less than 1% and uses the test procedure guidance of Regulatory Positions C.5.a, and C.5.c~~, and C.5.d~~ of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is ~~14,000 cfm ± 10%~~ less than or equal to 15,400 cfm;

2) Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than ~~0.7%~~ 10.0%; and

3) Verifying a system flow rate of ~~14,000 cfm ± 10%~~ less than or equal to 15,400 cfm during system operation when tested in accordance with ANSI N510-1975.

c. After every 720 hours of charcoal adsorber operation, by verifying within 31 days after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978, for a methyl iodide penetration of less than ~~0.7%~~ 10.0%;

d. At least once per 18 months by:

1) Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6 inches Water Gauge while operating the system at a flow rate of ~~14,000 cfm ± 10%;~~ less than or equal to 15,400 cfm and

2) Verifying that on a High Radiation test signal, the system isolates.

e. After each complete or partial replacement of a HEPA filter bank, by verifying that the cleanup system satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 1% in accordance with ANSI N510-1975 for a DOP test aerosol while operating the system at a flow rate of ~~14,000 cfm ± 10%~~ less than or equal to 15,400 cfm; and

f. After each complete or partial replacement of a charcoal adsorber bank, by verifying that the cleanup system satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 1% in accordance with ANSI N510-1975 for a halogenated hydrocarbon refrigerant test gas while operating the system at a flow rate of ~~14,000 cfm ± 10%~~ less than or equal to 15,400 cfm.