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OCT 26 1988

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - NRC INSPECTION REPORT NOS. 50-327/87-56 AND 50-328/87-56 - RESPONSE TO EVALUATION OF NOTICE OF VIOLATION NOS. 50-327, 328/87-56-02

Enclosed is TVA's response to S. D. Richardson's August 31, 1988 letter to S. A. White that transmitted NRC's evaluation of TVA's response to the subject notice of violation.

TVA initially responded to the notice of violation by letter dated November 6, 1987. TVA provided additional information in a letter dated May 13, 1988. Subsequent NRC review and evaluation of these responses were forwarded to TVA on August 31, 1988. After discussion with Office of Special Projects and Region II inspectors and management, TVA understands that NRC may not have fully understood pertinent information regarding this issue. Therefore, in response to an NRC verbal request for more detailed information, TVA is transmitting a history of laundry and shower drain processing, along with an additional response to NRC regarding the subject violation in the enclosure to this letter. TVA's evaluation of NRC's August 31, 1988 transmittal does not indicate a violation of 10 CFR 50.59 has occurred. In consideration of the enclosed response, TVA respectfully requests NRC withdrawal of this violation. The change in the due date for this response was discussed with F. R. McCoy, of NRC, and J. T. LaPoint, of TVA, on September 30, 1988; and an extension to November 1, 1988, was later confirmed by ... Brady, of your staff.

If you have any questions, please telephone M. A. Cooper at (615) 870-6549.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. Gridley, Manager
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Regulatory Affairs

Enclosures
cc: See page 2

U.S. Nuclear Regulatory Commission

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ENCLOSURE 1

Violation 50-327, 328/87-56-02

"Restatement of Violation

10 CFR 50.59 states that the holder of a license authorizing operation of a utilization facility may make changes in the facility as described in the safety analysis report, without prior Commission approval, unless this proposed change involves a change in the Technical Specifications incorporated in the license or an unreviewed safety question. The licensee should maintain records of changes in the facility which shall include a written safety evaluation which provides the bases for the determination that the change does not involve an unreviewed safety question.

Final Safety Analysis Report (FSAR), Chapter 11.2 states that the laundry and hot shower drain tank is normally sampled and discharged as an effluent, with the provision for processing the liquid through the condensate demineralizer waste evaporator (CDWE) if the sample result was above the discharge limit.

Contrary to the above, in May 1987, the licensee failed to perform an adequate safety evaluation for a change in the laundry and hot shower waste water process which directed all the waste water to the CDWE causing an increase in the volume and concentration of contaminants into the CDWE."

History of Laundry and Shower Drain Processing

As a result of recent discussions with Office of Special Projects and Region II inspectors and management, it appears that NRC may not have a fully accurate understanding of all facts surrounding this issue. Therefore, before responding specifically to NRC's August 31, 1988 letter, a brief discussion of the history and background leading to the subject issue is provided.

Since initial operation, releasing or processing of the laundry and hot shower drains has been based on various considerations such as activity levels of these wastes, river flow rate and temperature, activity levels of recent releases, tank needs for the entire facility operation, future planned releases, plant decontamination efforts, and 10 CFR 50, Appendix I, "as low as reasonable achievable" (ALARA) considerations. SQN had always used Turco as a laundry detergent for decontamination purposes in the laundry. In addition, Turco had been used for decontamination of areas.

Before this particular event in 1987, SQN was undergoing a large-scale facility decontamination effort in preparation for return to power operation. There was a large volume of laundry that required cleaning, and Turco was being used for area decontamination as well. Because of the decontamination effort, low flow rates in the river, and ALARA considerations, the laundry and hot shower tanks were being transferred to the CDWE for processing.

The subject event occurred while attempting to solidify a specific batch of CDWE bottoms for packing and shipping offsite. In preparation for solidification, a representative test specimen was taken of the specific batch and a solidification test was performed, in compliance with technical

specifications (TSs) and the approved process control program (PCP). The solidification test yielded acceptable results with no adverse reaction. It should be noted that slight exothermic reactions always occur because of inherent chemical reactions during solidification. After the test specimen was verified as acceptable, the batch was pumped into the liner and the solidification chemicals were introduced into the liner in accordance with the PCP. The liner was filled to a precalculated level that would allow the addition of chemicals and slight expansion with no voids in the liner. Disposal site criteria require the container to be 95-percent full.

After the greater than anticipated exothermic reaction occurred, the solidification process was halted in accordance with TSs and the PCP. The vendor was requested to perform an analysis of the waste stream and solidification materials to determine what caused the reaction. This analysis revealed that Turco and the vendor solidification agents were highly reactive. It was also determined that reactions could be concentration-dependent and volume-dependent, i.e., excessively reactive (only under certain conditions). TVA stopped the use of Turco and subsequently learned that other utilities had experienced similar difficulties with Turco. The potential for a similar recurrence of this type of event (resulting from chemicals introduced into waste streams) is minimal. Only a small number of chemicals are used in the plant that might be introduced into waste streams, with the only significant quantities being in cleaning activities. Those currently used onsite have an existing experience base and have been evaluated as acceptable. Additional actions have been taken, as described in TVA's response of May 13, 1988, to ensure any new chemicals used in the plant that could be introduced into the waste streams will be evaluated for chemical reactions with vendor solidification materials. In compliance with TSs, a test specimen is taken before batch solidification.

In summary, TVA's actions associated with this event did not constitute a change in the facility or operation as described in the FSAR. TVA's actions with regard to processing were taken after consideration of a variety of pertinent factors; neither past experience nor results of test specimens had predicted the event, and prudent actions were taken in response to the event. TVA's actions associated with the event were conducted in accordance with SQN's FSAR, TSs and PCP.

Licensee Comment

TVA would like to resolve the possible confusion resulting from two separate issues apparently being viewed as the same issue insofar as cause and effect. The first issue involves the question of whether a change was made to the facility as described in the safety analysis report that required an unreviewed safety question determination (USQD) in accordance with 10 CFR 50.59. The second issue involves the cause of an exothermic reaction that occurred during the solidification of waste that resulted in swelling of the material outside the confines of its shipping container; the material subsequently had to be chipped away to seal the shipping container. TVA complied with TS limiting condition for operation (LCO) 3.11.3, which has specific provisions for unexpected occurrences of defectively processed or defectively packaged solid radioactive wastes.

It must be understood that the first issue (the cited change and not conducting a 10 CFR 50.59 review) had no relation to and did not cause the second issue (exothermic reaction). The cited change involves more frequent processing of laundry and hot shower drains; this was not precluded by the SQN FSAR. More frequent processing did not cause the exothermic reaction to occur. The reaction resulted from a concentration of a laundry detergent in CDWE bottoms that reacted chemically with the vendor's solidification agents to cause the swelling during the solidification process. TVA did not have reason to expect this reaction. Any processing of laundry drains with this detergent, whether based on sample activity or not, could have resulted in a chemical reaction. However, this is not a 10 CFR 50.59 review issue. A change was not made to the facility or operating procedures. A particular brand of detergent is not specified in the FSAR, the FSAR low-sudsing requirement was always met, and the detergent had been used previously without adverse reaction. In addition, a 10 CFR 50.59 review of more frequent processing would not have identified a potential exothermic reaction. This clarification is necessary to put the violation cited in proper perspective for subsequent evaluation and discussion of validity.

TVA Specific Response to NRC Letter Dated August 31, 1988

The following is TVA's response to NRC's specific reasons cited in the August 31, 1988 letter for determining the violation occurred as stated and will further explain why TVA finds that the information provided does not constitute a basis for a violation of 10 CFR 50.59.

NRC

"FSAR Section 11.2 goes much further than merely allowing direct discharge from the laundry and hot shower tanks if sample results are below acceptable limits. FSAR Section 11.2.3.1 and 11.2.4 both state that the water is processed only if the activity concentration is too high for direct discharge."

TVA

The FSAR does not state that the water is processed only if activity concentration is too high for direct discharge. The cited FSAR section states, "If the activity concentration is too high for direct discharge, the waste may be pumped to the floor drain collection tank for further processing," and "normally no treatment is required for removal of radioactivity." Discharge limits for effluents are prescribed and regulated by 10 CFR as are limits for radiation exposure to workers. A licensee may impose more restrictive limits than prescribed in 10 CFR. Changes in these administrative limits, up to those prescribed by 10 CFR or other NRC regulations, are at the discretion of the licensee and are not prohibited by the FSAR. Reducing total activity in liquid effluents is supported by the 10 CFR 50, Appendix I, ALARA concept.

NRC

"FSAR Section 11.2.4 states that normally no treatment is required for removal of radioactivity. While not precluding additional processing, the FSAR clearly indicates that such processing only occurs if the activity concentration in the tanks is above discharge limits, otherwise it is directly discharged. Therefore, processing would only be infrequently required."

TVA

The FSAR states that water does not normally require processing. The FSAR does not clearly indicate that processing only occurs if activity levels are above discharge limits as previously discussed. The FSAR is written in permissive, not mandatory or restrictive, terms and allows processing of laundry and hot shower drains more frequently than required (but certainly no less than required). Therefore, it is speculative to presume processing would always be infrequent; the FSAR does not reference the term infrequent. The FSAR was written to reflect the licensee's ability to operate within the legal constraints of 10 CFR. The FSAR clearly provides latitude for processing (beyond that required by 10 CFR) as deemed appropriate.

NRC

"In May 1987, the licensee changed the process so that all of the waste would be processed through the CDWE prior to being sampled for release. This was a change from how the licensee had handled this waste up to that time and was a change from the FSAR description of the disposition of this waste."

TVA

Upon further investigation, TVA has verified that SQN had been intermittently processing laundry and hot shower drains through the CDWE for an extended period of time before the event occurred. Such processing was based on evaluation of various factors such as activity levels of wastes, river flow and temperature, activity levels of recent releases, tank needs for the entire facility operation, and ALARA considerations. TVA did not change the process of handling waste water, the procedures for processing the waste, the waste water processing system, or the operation of the system. The more frequent processing was conservative in that reduction in the overall activity in releases to the environment was achieved. The statement, "Normally no treatment is required for removal of radioactivity," conveys that, at a minimum, discharges will be processed to meet limits with the obvious latitude to process more waste. This latitude is clearly provided in the FSAR by reference to sections 11.2.3.1 and 11.2.4, and this change is not subject to 10 CFR 50.59. Moreover, the language of the FSAR paragraphs should be considered with the overall context of the FSAR, Chapter 11.2, "Liquid Waste Systems."

For example, FSAR, Subsection 11.2.1, "Design Objectives," states in part, "The Liquid Waste Processing System is designed to receive, segregate, process, recycle and discharge liquid wastes. The system design considers potential personnel exposure and assures that quantities of radioactive

releases to the environment are as low as practicable" [emphasis added]. FSAR, Section 11.2.4, "Operating Procedures," states in part, "All equipment installed to reduce radioactive effluents to the minimum practicable level is maintained in good operating order and will be operated to the maximum extent practicable. In order to assure that these conditions are met, administrative controls are exercised on overall operation of the system . . ." [emphasis added]. NRC agreed with TVA's course of action as evidenced in their statement, "The NRC does not disagree with the goal of the change, to reduce concentration of radioactive material in effluents."

NRC

"The process followed by the licensee in making the change did not include a review of the change under 10 CFR 50.59, as was required since the change resulted in operation different from that described in the FSAR. 10 CFR 50.59(a)(2)(ii) states that a proposed change, test, or experiment shall be deemed to involve an unreviewed safety question if a possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report may be created."

TVA

As discussed in the previous paragraph, TVA did not make a change to the facility or procedures as described in the FSAR or conduct tests or experiments not described in the FSAR. TVA considers a review under 10 CFR 50.59 inappropriate. A primary purpose of 10 CFR 50.59, as related to this type of issue, is to ensure that the licensee does not make changes to the facility that could invalidate the bases on which NRC issued the license for operation of the facility. Even if one assumed the FSAR wording indicated processing of laundry and shower drains would be infrequent, it is still unclear how a presumption of infrequent processing of drains had any relevance or bearing on NRC issuance of the SQN licenses. It is also unclear how more frequent processing could in any way invalidate the bases of the license; therefore, it would be reasonable to presume a 10 CFR 50.59 evaluation would not be required. Had the design or installation of facilities to process wastes been altered--e.g., changes to the CDWE--that type of change would have been subject to 10 CFR 50.59 review. NRC issues regarding design and operation of the SQN CDWE were independently resolved for restart of SQN unit 2. Requiring a 10 CFR 50.59 review for "changes" relative to the FSAR at this threshold could result in a significant increase in 10 CFR 50.59 reviews, which are not required to support the underlying purpose of 10 CFR 50.59 and would only serve to dilute the effectiveness of the licensee's 10 CFR 50.59 review program.

NRC

"Since the licensee's change to processing the laundry waste stream continuously resulted in the overflow of waste solidification liners and subsequent exposure of personnel, a malfunction of a different type than any evaluated previously, then this change involved an unreviewed safety question and should have been evaluated by the licensee."

TVA

Intermittent processing did not result in the overflow of waste solidification liners as previously discussed. This event resulted from concentration of laundry detergent (Turco 4324NP) in CDWE bottoms that was especially reactive with vendor solidification agents. The only FSAR reference to detergent with regard to processing laundry and hot shower drains was to state that low-sudsing cleaning agents would be used. Turco 4324NP is a low-sudsing detergent. The event was not a result of a change in the facility as described in the FSAR; therefore, discussion of evaluation in accordance with 10 CFR 50.59 is inappropriate. If TVA had performed a 10 CFR 50.59 screening review for more frequent processing, the screening review would have indicated there was no change as described in the FSAR; therefore, no 10 CFR 50.59 review would have been required. Even if a 10 CFR 50.59 review had been performed for more frequent processing, the chemical reaction associated with the detergent and vendor solidification agents would not have been identified. Furthermore, TVA had used the Turco detergent regularly and had never experienced a reaction that prevented the solidification criteria from being met. Based on that experience, TVA had no reason to believe that an event of this type would occur.

The TSs have provisions for occurrences of unknown type during the solidification process. LCO 3.11.3 requires that shipments of defectively processed or defectively packaged solid radioactive waste be suspended when provisions of the process control program are not satisfied. Surveillance requirement TS 4.11.3.1.a is satisfied by verifying the solidification of at least one representative test specimen from at least every 10th batch of each type of wet radioactive waste (e.g., filter sludges, spent resins, evaporator bottoms). This surveillance requirement was complied with during this event because processing was suspended immediately. TVA considers all actions that took place during the episode were in accordance with SQN's PCP. TVA has addressed the specific event issue and now requires that chemicals that can come into contact with vendor solidification material be tested by the vendor for chemical compatibility before being used. TVA's actions in this area were addressed in a letter to NRC dated May 13, 1988.

NRC

"FSAR Section 11.2.1 does state that the design of the liquid waste processing system considers potential personnel exposures. The effect of processing the laundry waste was inconsistent with this design objective in that when the licensee attempted to solidify the CDWE bottoms containing high concentrations of laundry detergents, the liner content overflowed due to chemical reaction with the solidification agent. The overflow then hardened and personnel had to chip away the excess material, which measured up to 3 R/hour, so that the lid could be placed on the liner. The change to the routine method of processing the laundry waste should have received a review under 10 CFR 50.59, and if found appropriate, the change could then have been implemented."

TVA

The more frequent processing of laundry waste had no effect on the design or design intent of the liquid waste processing system except in a positive sense to reduce total activity of liquid effluents. Changes in frequency of processing did not cause the cited event. As detailed previously, a review under 10 CFR 50.59 is inappropriate and would not have identified this event as a consequence. In the overall objective of ensuring an incident of this type does not recur, TVA has taken steps as defined in the May 13, 1988 letter to NRC.

NRC

"The NRC agrees that licensees should make efforts to reduce the activity in their effluents; however, applicable requirements have to be followed when changes are made. The licensee acknowledges that they made a change to their process. The licensee's statement that the change was not inconsistent with the FSAR is valid when considering the overall goal of reducing waste in effluents. Nevertheless, the FSAR clearly states that the waste stream is not normally processed, and the change caused all of the waste to be processed through the CDWE. This change was a significant change to a system described in the FSAR, and the adverse chemical reaction which occurred during waste solidification resulted in unnecessary radiation dose to radwaste operators."

TVA

As stated previously, TVA does not acknowledge that a change was made to the process. No change was made in a system as described by the FSAR. The FSAR does not state that the waste stream is not normally processed; the FSAR (section 11.2.4) states, "Normally no treatment is required for removal of radioactivity." More frequent processing did not cause the adverse chemical reaction. No significant change to the system occurred. While certainly undesirable, radiation dose to radwaste operators resulting from the exothermic reaction of the detergent and vendor's solidification agent was well within limits prescribed by TVA and NRC. TVA has taken actions detailed in the May 13, 1988 letter to address the possibility for recurrence of this type of problem.

NRC

"This staff position is consistent with the guidance provided to the licensee in IE Circular No. 80-18: 10 CFR 50.59, Safety Evaluations for Changes to Radioactive Waste Treatment Systems which states that for any change in a facility radioactive waste system as described in the FSAR, a safety evaluation is required in accordance with 10 CFR 50.59."

TVA

Inspection and Enforcement Circular No. 80-18 primarily addresses how to perform safety evaluations when changes in the design and/or operation are made to radwaste treatment systems, not whether a safety evaluation is required. There were no changes made to the physical system or to the operational aspects of the system; therefore, guidance provided by this circular is not germane to this discussion.

NRC Conclusion

"For the above reasons, the NRC staff concludes that the violation occurred as stated."

TVA

In conclusion, the actions taken by TVA with regard to processing laundry and hot shower drains were conservative and permissible; did not constitute a change in the facility or procedures as described in the FSAR; and, accordingly, did not require a review under 10 CFR 50.59. The exothermic reaction leading to the discussed event did not result from the more frequent processing of the laundry and hot shower drains. Actions have been taken to preclude this type of event from recurring. TVA concludes that no violation of 10 CFR 50.59 occurred as associated with these issues.