



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENCLOSURE 3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 166 TO FACILITY OPERATING LICENSE NO. DPR-77
AND AMENDMENT NO. 156 TO FACILITY OPERATING LICENSE NO. DPR-79

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

By application dated November 2, 1992, the Tennessee Valley Authority (the licensee) proposed amendments to the Technical Specifications (TS) for the Sequoyah Nuclear Plant (SQN) Units 1 and 2. The requested changes would revise the Refueling Operations, Reactor Vessel Water Level Applicability Statement, of TS Limiting Condition for Operation 3.9.10 by removing the requirement to maintain at least 23 feet of water above the top of the reactor pressure vessel flange when the control rods are being latched and unlatched during refueling operations. The minimum water level requirement would continue to be in effect for core alterations, but not when the control rods are being latched and unlatched.

In addition, a statement would be added to indicate that the 23-foot minimum water level requirement is applicable when moving irradiated fuel assemblies within the containment. A corresponding surveillance requirement change would specify that Surveillance Test 4.9.10 (to determine that the 23-foot water level requirement is satisfied) would be performed for core alterations and movement of irradiated fuel within the containment, but not for movement of control rods. An administrative change to remove the reference to TS 3.0.3 would also be removed.

2.0 EVALUATION

TS 3.9.10 requires at least 23 feet of water be maintained over the top of the reactor pressure vessel flange during movement of fuel assemblies or control rods within the reactor pressure vessel during refueling operations (Mode 6). If this water level is not satisfied, then all core operations involving movement of fuel assemblies or control rods within the pressure vessel must be suspended immediately. This movement of control rods includes activities that are necessary to unlatch and latch the control rods (specifically, the control rod drive units). Unlatching of the control rod drive units must be performed at the beginning of the refueling outage as part of the reactor vessel

internals disassembly process so that the Upper Internals Assembly can be removed from the reactor vessel, which then allows access to the fuel assemblies. Similarly, as part of the reactor vessel reassembly process, the control rod drive units must be relatched once refueling has been completed and the Upper Internals Assembly has been placed over the fuel assemblies.

In order to connect the Upper Internals Assembly lifting rig to the Upper Internals Assembly, water level must be approximately 13 feet or less above the flange. This is an administrative requirement that does not change as a result of this proposed amendment. As a result of the various level requirements, the sequence of activities presently required during refueling operations is to flood the cavity to at least 23 feet above the flange to unlatch the control rod drive units, drain down to 13 feet or less to attach the lifting rig to the upper internals assembly, and then reflood the cavity to 23 feet to remove the upper internals and move fuel. At the end of core reload, the reverse sequence is necessary - replace the upper internals assembly with water level at the level required to move fuel (23 feet), drain down to 13 feet to remove the upper internals assembly lifting rig, flood up to 23 feet to latch the control rod drive units, and then drain down to normal reactor vessel level.

The magnitude of these flood up, drain down, reflood, and drain down activities has a significant impact on the duration of the refueling outage, and compounds its complexity. The proposed change would allow the water level to be brought to an appropriate level where unlatching of the control rod drive units and attachment of the lifting rig can be accomplished at the beginning of an outage (13 feet). Then, the flood up to at least 23 feet would not be required until movement of the irradiated fuel assemblies was scheduled. The same benefit would result at the end of an outage by eliminating the need to reflood to 23 feet after draining down to 13 feet. This would reduce the duration of these activities by 4 to 6 hours.

The accident analysis that is related to the requirement to maintain 23 feet of water above the reactor vessel flange is the fuel handling accident that results in major damage to an irradiated fuel assembly. The cause of this accident is postulated as the dropping of an irradiated fuel assembly, resulting in the rupture of the cladding of all fuel rods in the assembly. To mitigate the consequences of such an accident, the TS require 23 feet of water above the reactor vessel flange, which is also the minimum water level that is required when fuel assemblies are transported in and out of the reactor vessel. This depth of water provides for removal of 99 percent of the iodine gas activity assumed to be released during a fuel handling accident. The proposed TS change continues to require that the water level be at least 23 feet during all activities and conditions for which dropping of an irradiated fuel assembly is possible.

There is, however, no potential for such an accident to occur during control rod drive assembly latching and unlatching, since such evolutions take place while the upper internals assembly is in place over the core. This

configuration prevents full withdrawal of control rods and access to the fuel assemblies. Therefore, only a small amount of control rod motion to verify that the drive is latched or unlatched is possible. At the most, this movement could only result in friction between the control rods and the fuel assemblies, but it cannot create significant forces that could damage the fuel rods and release the gap activity. Therefore, the 23-foot water level requirement serves no safety purpose during control rod latching and unlatching evolutions. Other potential considerations, such as personnel radiation exposure, shutdown margin changes, or other operational activities, are not related to the water level requirement.

With implementation of the proposed TS change, water level will be administratively controlled in accordance with radiological considerations and operational activities associated with refueling operations, consistent with such activities as those associated with the upper internals lifting rig. The radiological considerations will be the primary input for determining the appropriate water level based on ALARA principles, minimizing hot particles, and control of airborne radioactivity.

The licensee also proposed removal of the reference to TS 3.0.3 from the action statement for TS 3.9.10. TS 3.0.3 requires a plant shutdown and cooldown if certain conditions exist. Since the plant is already in the refueling mode, this specification cannot apply. Other conditions that would be appropriate, suspension of core alterations, are already specified in the same action statement.

The licensee also proposed a corresponding change to TS 4.9.10 to remove the requirement to determine water level for movement of control rods and to add wording to indicate that water level verification is needed for core alterations and movement of irradiated fuel assemblies within the containment. These changes are consistent with the proposed change to TS 3.9.10.

The proposed changes incorporate guidance from the latest revision to the Standard Technical Specifications (MERITS, NUREG-1431) to remove the 23-foot minimum water level requirement from the TS for latching and unlatching control rod drive units, clarify that the 23-foot water level requirement (and surveillance test) is applicable to other core alterations and when moving irradiated fuel assemblies in the containment, and removes a TS 3.0.3 exception that is not applicable to the plant conditions. Based on this analysis, the staff finds the proposed changes acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the Surveillance Requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (57 FR 58252). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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AMENDMENT NO. 166 FOR SEQUOYAH UNIT NO. 1 - DOCKET NO. 50-327 and
AMENDMENT NO. 156 FOR SEQUOYAH UNIT NO. 2 - DOCKET NO. 50-328
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