

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
AMENDMENT REQUEST NUMBER
DUKE POWER CORPORATION
OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

1 INTRODUCTION

In accordance with 10 CFR 50.90, on April 5, 1999, Duke Power Corporation (Duke or the licensee) submitted a license amendment request (LAR) seeking to amend the facility operating licences DPR-38, DPR-47, and DPR-55. The licensee proposes to revise Chapter 15 of the Updated Final Safety Analysis Report (UFSAR) concerning the thermal-hydraulic transient analysis methodology for Oconee Units 1, 2, and 3 (Oconee). On May 25, 1999, the staff approved a new Chapter 15 transient analysis methodology discussed in topical report DPC-NE-3005-PA.

In the April 5, 1999 submittal, the licensee proposed to update the necessary TS sections, incorporating the design-bases assumptions, limitations, and results in the new thermal-hydraulic transient analyses. The reload licensing report also contained the relevant changes to the Oconee UFSAR and the Core Operating Limit Report (COLR). The UFSAR and the COLR presented background information and documented the new thermal-hydraulic methodology. Duke indicated that the UFSAR and the COLR for Oconee Unit 2, Cycle 18 are for information only and it was not seeking NRC approval for the updates.

On May 27, July 6, and October 7, 1999, Duke submitted supplements to the initial April 5, 1999, license amendment request (LAR). The May 27, 1999 supplement contains, in part, dose analysis methodology to be reviewed by other NRR branches. The July 6, 1999 supplement contains changes to the COLR for Unit 1 in which the licensee withdrew proposed changes to the requirements relating to the reactor coolant system (RCS) loop average temperature (Tave). The October 7, 1999, supplement contains the licensee's response to questions from the staff.

2 EVALUATION

The licensee proposes changing the TS limiting conditions for operation (LCO) 3.4.10, 3.7.4, and 3.9.7, and TS Section 5.6.5. Duke also would amend surveillance requirements (SR) 3.4.1 and the Bases sections corresponding to the revised or added LCOs. The following sections present the licensee's proposed changes and justifications, and the staff's evaluation.

2.1 Changes to SR 3.4.1

Licensee's Proposal and Justification:

LCO 3.4.1 requirements specify the initial conditions used in the departure from nucleate boiling transient (DNB) analyses. The safety analyses includes three and four reactor coolant pump (RCPs) operation, and the pressure, temperature and flow rates assumed in the analyses are specified in the core operating limits report (COLR). SR 3.4.1 ensures that the DNB

parameters are monitored and remain within the limits specified in the COLR for three or four RCP operations.

In the current TS, a note in SR 3.4.1 states, "With three RCPs operating, the limits are applied to the loop with the lowest loop averaged temperature." Duke proposed to add "for the condition where there is a 0°F ΔT_c setpoint," to the end of the SR 3.4.1.2 note. The ΔT_c is the difference between the inlet temperatures of loops A and B and the operator supplies the ΔT_c setpoint. The setpoint dialed into the integrated control system (ICS) is compared with the actual ΔT_c inputs from loops A and B. The ΔT_c control is designed to equalize the loop cold-leg temperatures and prevent unequal radial flux distribution.

If four RCPs are operating, both loops would have to meet the temperature limit given in the COLR. When three RCPs are operating, under the current SR 3.4.1.2 requirements, only the loop with the lower loop averaged temperature would have to meet the RCS temperature limits. However, according to the licensee's analysis, if three RCPs are operating, the loop with the lowest loop averaged temperature is required to meet the loop averaged temperature limit only if the 0°F ΔT_c setpoint is dialed into the ICS. If three RCPs are operating and the setpoint is not at 0° ΔT_c , or if four RCPs are operating regardless of the ΔT_c setpoints, then both RCS loops must be within the loopTave limits specified in the COLR. Duke determined that the proposed note is more restrictive than the current requirement.

Staff Evaluation:

The proposed change to SR 3.4.1.2 limits when the note in SR 3.4.1.2 is applicable. With three RCPs operating, the licensee would have to ensure that both loops meet the temperature limits specified in the COLR, except when the 0°F ΔT_c setpoint is dialed into the ICS. Therefore, the note in SR 3.4.1.2 is applicable for a special case only. In general, for both loops, the loop averaged temperatures would have to be compared to the temperature limits specified in the COLR whether three or four RCPs are operating. The staff agrees with the licensee that the proposed changes are more restrictive and accepts the proposed change to SR 3.4.1.2.

2.2 Changes to LCO 3.4.10, "Pressurizer Safety Valves"

Licensee's Proposal and Justification:

A. Pressurizer Safety Valves Lift Setting

The TS LCO 3.4.10 currently states, "Two pressurizer safety valves (PSVs) shall be OPERABLE with lift setting of ≥ 2475 psig and ≤ 2525 psig." The licensee has proposed to revise the lift setpoints to 2425 psig \leq PSV lift setpoint ≤ 2575 psig. The difference in the lift setpoints results from increasing the setpoint tolerance from ± 1 percent to ± 3 percent of the nominal lift pressure of 2500 psig.

Duke pointed out that the higher allowable value for the normal lift setting is consistent with the licensing basis analyses documented in DPC-NE-3005-PA. The licensee stated that increasing the pressurizer lift setpoint by 3 percent affects the reactor coolant peak pressure during

pressurizing transients. For Oconee, the start-up accident and rod ejection transients are the two most limiting overpressure transients. For these two limiting pressurization transient analyses, the pressurizer safety valves were modeled to actuate at +3 percent above the nominal lift pressure. The licensee stated that the resulting peak pressure remained within the design pressure limit of 2750 psig.

In justifying the lowered trip setpoint for the PSVs from 2475 to 2425 psig, the licensee stated that the nominal high-pressure reactor trip setpoint is 2355 psig. Therefore, with the -3 percent allowance, the PSV setpoint would remain above the nominal reactor high-pressure trip setpoint and the PSVs would not actuate before the high-pressure scram had occurred. The licensee also stated that, "Although there is an appearance of an increase in the probability of a PSV to open, based on analysis results it is expected that the PSVs will be challenged to the same extent regardless of whether the setpoint drift is -1 percent (2475 psig) or -3 percent (2425 psig)." Duke also stated that, "increasing the PSV drift to ± 3 percent will not delay reactor trip, nor will it in effect increase the probability of opening a PSV."

For the rod ejection and the uncontrolled rod withdrawal from power transients, reactor scram does not prevent the PSVs from lifting. Duke evaluated the impact of the lowered lift off pressure on these two DNB transients. The licensee concluded that the analyses showed that, for both events, the DNB limit is not violated.

The licensee reported that even though the PSV setpoint tolerance requirement has been changed to ± 3 percent for the purpose of demonstrating operability, SR 3.4.10.1 will still require the PSV lift settings to be within ± 1 percent of the nominal value following testing. Duke concluded that even though the proposed change will increase the allowable PSV setpoint drift, the transient analyses take this into account.

B. SR 3.4.10.1

The licensee also proposed to add the statement "following testing, lift settings shall be within ± 1 percent," to SR 3.4.10.1. According to Duke, the ± 1 percent tolerance requirements for the valve, "as left," minimizes the potential valve drift and the higher tolerance of ± 3 percent will provide relief from unnecessary reporting requirements.

Staff Evaluation

The licensee evaluated the impact of the increased PSV lift tolerance (from ± 1 percent to ± 3 percent), and the results of the reactor transient analyses remained within the applicable acceptance criteria. Duke also determined that the likelihood of the PSV opening would not increase significantly as result of the lower tolerance of -3 percent. Since the licensee performed the relevant transient analyses using the ± 3 percent tolerance range for the PSV lift setpoint, the staff finds the proposed change will still ensure that the PSVs will perform their intended function.

2.3. LCO 3.7.4 "Atmospheric Dump Valves (ADV) Flow Paths" and SR 3.7.4.1

Licensee's Proposal and Justification:

The licensee proposed to add a new LCO 3.7.4 to the current Oconee TSs. The new LCO would require the atmospheric dump valve (ADV) flow path to be operable for each steam generator during MODES 1, 2, 3 and 4, when the steam generator is relied upon for heat removal. The ACTION statement requires that if one or more ADV flow paths are inoperable, (1) the reactor must be in MODE 3 in 12 hours, and (2) the reactor must be in MODE 4 in 24 hours without the steam generator providing heat removal. In addition, the corresponding surveillance SR 3.7.4.1, requires cycling "the valves that comprise the ADV flow paths" every 18 months.

The licensee stated that in the current thermal-hydraulic methodology described in topical report DPC-NE-3005-PA, both ADV flow paths are credited in the steam generator tube rupture (SGTR) analysis. In the SGTR analysis, the ADVs are credited to depressurize the reactor and control water level in the ruptured steam generator 40 minutes after the event. According to the licensee, the turbine bypass valves (TBVs) are not credited in the new SGTR analysis methodology.

For Oconee, all of the valves in the ADV flow paths are locally chain-operated. The bypass and block valves and their associated piping form the main steam line pressure boundary and they are designated as seismically qualified QA-1 category. However, the throttle and isolation valves and their associated piping in the ADV flow paths are not seismically qualified and are not part of the safety system category. In a December 16, 1999, submittal, Duke committed to include the remainder of the ADV flow path in their QA-5 program. According to the licensee, this quality assurance program will apply testing and maintenance quality control consistent with the testing and maintenance requirements for QA-1 safety systems and components. Duke pointed out that the ADVs are located on the turbine deck just outside the control room. The ADVs are easily accessible and clearly visible and, therefore, can be manually operated to function if needed.

Staff Evaluation:

Since the components in the ADV flow paths will be required to perform safety functions, the proposed ADV TS LCO 3.7.4 will enhance and contribute to the reliability of the systems, structures and components (SSC) in the ADV flow path. In topical report DPC-NE-3005-PA, the staff reviewed the SGTR analysis and approved the thermal-hydraulic methodology that credited the ADVs for plant depressurization during the SGTR event.

Parts of the ADV flow path are seismically qualified and the licensee is committed to including the components in the ADV flow path to a quality assurance program level developed for the testing and maintenance of SSCs that are required to perform safety functions. If the QA-1 program (QA-5 for Oconee) is properly executed or implemented, the improved monitoring, testing and maintenance will increase the reliability of the ADVs. In SGTR analysis, it is conservative to credit the ADVs for depressurization when performing dose analysis. Therefore, the staff accepts the proposal to add LCO 3.7.4 to the Oconee TSs. Duke confirmed that the use of the ADVs is conservative and ADVs will be credited only for the SGTR analysis.

2.4 LCO 3.9.7 "Unborated Water Source Isolation Valves"

Licensee's Proposal and Justification:

Duke has proposed to add a new LCO 3.9.7 to the current Oconee TSs. The new TS LCO requires that each valve used to isolate an unborated water source be secured in a closed position. The LCO is applicable during MODE 6 and separate condition entry is allowed for each unborated water source isolation valve. The ACTION statements are shown in the table below.

Condition	Required ACTION	Completion Time
A. _____ NOTE _____ Required Action A.3 must be completed whenever Condition A is entered.	A.1 Suspend CORE ALTERATIONS. <u>AND</u>	Immediately
	A.2 Initiate actions to secure valve in closed position <u>AND</u>	Immediately
One or more valves not secured in closed position	A.3 Perform SR 3.9.1.1	4 hours

The corresponding surveillance SR 3.9.7.1 requires that each valve that isolates an unborated water source be verified closed every 31 days. The licensee stated that the LCO prevents an unplanned boron dilution during MODE 6 and the SR ensures that the subject valves are in the closed position.

Staff Evaluation:

The proposed LCO will formalize the administrative procedure that currently ensures that unborated water sources are isolated from the reactor cavity during MODE 6. The proposed change increases the safety of the refueling process because it reduces the likelihood that an inadvertent boron dilution event will occur during MODE 6. In addition, the proposed LCO 3.9.7 is also consistent with the Standard Technical Specification (STS) LCO 3.9.2 for the Westinghouse. The staff accepts the proposed LCO 3.9.7, since it will enhance reactivity management during refueling.

2.5 TS Section 5.6 "Reporting Requirements"

Licensee's Proposal and Justification

The licensee proposed to revise TS Section 5.6.5, " Core Operating Limits Report (COLR)." TS Section 5.6.5 lists the COLR reference documents that specify the analytical methods used to determine the COLR parameters. Duke proposed to, (1) update the revisions of some of the listed reference documents, (2) replace incorrectly referenced documents with the applicable

references, and (3) add the date of the approving safety evaluation reports (SERs) in the referenced documents.

Staff Evaluation:

Duke has reviewed and revised the COLR reference list, deleting erroneous references and substituting more relevant references for them. The staff finds the proposed changes in TS Section 5.6.6 acceptable because the changes are administrative, the COLR references have been approved by the staff and for the new references, the licensee addressed NRC limitations and restrictions for the approved methodologies.

3 CONCLUSION

Duke has revised the Chapter 15 transient analysis methodology in the UFSAR for Oconee and the NRC approved the new methodology in Duke's topical report DPC-NE-3005-PA. The LAR proposes to incorporate the assumptions and results from the new thermal-hydraulic transient analyses into the Oconee TSs. The staff has reviewed the licensee's submittal and found the proposed TS changes acceptable.

Duke also amended the TS Bases for Oconee Units 1, 2, and 3. The staff finds the proposed Bases changes acceptable, since the new or revised Bases discuss the reasoning behind the TS requirements proposed in this amendment request.

On the basis of the review, the staff approves the amendment request as stated and concludes 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.
3. The issuance of the amendment will not be inimical to the common defense and security or to the health and safety to the public.

4.0 REFERENCES

1. Letter from W.R. McCollum, Jr., Site Vice President for Oconee Nuclear Site, Duke Energy Corporation, to the NRC Document Control Desk, October 7, 1999.
2. Letter from W.R. McCollum, Jr., Site Vice President for Oconee Nuclear Site, Duke Energy Corporation, to the NRC Document Control Desk, July 6, 1999.
3. Letter from W.R. McCollum, Jr., Site Vice President for Oconee Nuclear Site, Duke Energy Corporation, to the NRC Document Control Desk, May 27, 1999.
4. Letter from M.S. Tuckman, Executive Vice President of Nuclear Generation, Duke Energy Corporation, to the NRC Document Control Desk, April 5, 1999.
5. DPC-NE-3005-PA, "UFSAR Chapter 15 Transient Analysis Methodology," Duke Power Corporation, Oconee Nuclear Station, August 1999.
6. Letter from John F. Stolz, Operating Reactors Branch #4, Division of Licensing, Nuclear Regulatory Commission, "NUREG-0737 ITEMS II.K.3.1-AUTOMATIC PORV ISOLATION AND II.K.3.2-REPORT ON PORVs FOR OCONEE NUCLEAR STATION," to Mr. Hal B. Tucker, Vice President-Nuclear Production, Duke Power Corporation, November 22, 1989. The letter transmitted attachment, "SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION OF B&W LICENSEES' RESPONSES TO NUREG-0737 ITEM II.K.3.2."
7. Note from David E. LaBarge, Senior Project Manager for Oconee Nuclear Site, Nuclear Regulatory Commission, "Power Operated Relief Valve Relationship to New Pressurizer Safety Valve Pressure Setpoint Tolerance (TAC Nos. MA5153, MA 5154, and MA5155)" to the NRC Document Control Center, November 30, 1999. (Dockets e-mail from Duke Power Corporation.)