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SUBJECT: Application for amend to License DPR-74,changing Tech Spec 3/4.7.1.5, "Steam Generator Stop Valves."

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AEP:NRC:1123

Donald C. Cook Nuclear Plant Unit 2
Docket No. 50-316
License No. DPR-74
TECHNICAL SPECIFICATION CHANGE REQUEST
STEAM GENERATOR STOP VALVES

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

Attn: T. E. Murley

May 14, 1990

Dear Dr. Murley:

This letter and its attachments constitute an application for a technical specification (T/S) change for Donald C. Cook Nuclear Plant Unit 2. Specifically, we propose to change T/S 3/4.7.1.5, "Steam Generator Stop Valves," such that full valve closure is within eight seconds when tested pursuant to Specification 4.0.5. The reasons for the change and our evaluation concerning significant hazards consideration are provided in Attachment 1. The proposed revised T/S pages are included in Attachment 2. Attachment 3 contains the analysis of main steam line break inside containment. This letter also proposes changes to T/S Table 3.3-5 5.h, 6.h, and 7.c. These are the steam line isolation response times required for the accident analyses. Additional editorial changes have been made to T/S Table 3.3-5. Specifically, to the extent possible, symbols have been written in words for clarification.

We believe that the proposed change will not result in (1) a significant change in the types of effluents or a significant increase in the amounts of any effluent that may be released offsite, or (2) a significant increase in individual or cumulative occupational radiation exposure.

The change has been revised by the Plant Nuclear Safety Review Committee and by the Nuclear Safety and Design Review Committee.

In compliance with the requirements of 10 CFR 50.91(b)(1), copies of this letter and its attachments have been transmitted to Mr. R. C. Callen of the Michigan Public Service Commission and to Michigan Department of Public Health.

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This document has been prepared following Corporate procedures that incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature of the undersigned.

Sincerely,

M. P. Alexich
Vice President

MPA/eh

Attachments

cc: D. H. Williams, Jr.
A. A. Blind - Bridgman
R. C. Callen
G. Charnoff
NFEM Section Chief
A. B. Davis - Region III
NRC Resident Inspector - Bridgman

ATTACHMENT 1 TO AEP:NRC:1123

REASONS AND 10 CFR 50.92 ANALYSIS FOR
CHANGES TO THE DONALD C. COOK NUCLEAR PLANT
UNIT 2 TECHNICAL SPECIFICATIONS

Introduction

The primary purpose of the steam generator stop valves (main steam isolation valves [MSIVs]) is to prevent excessive blowdown of the steam generators. There are four technical specifications (T/Ss) for Donald C. Cook Nuclear Plant Unit 2 associated with the closure time of the MSIVs. T/S 4.7.1.5.1 requires that each MSIV be demonstrated operable by verifying full closure within five seconds. The three other T/Ss are the steam line isolation response time requirements listed in T/S 3.3.2.1 Table 3.3-5, "Engineered Safety Features Response Times." These are listed below.

Item 5.h	Steam line isolation resulting from steam flow in two steam lines - high coincident with Tavg--low-low (less than or equal to 10.0 seconds)
Item 6.h	Steam line isolation resulting from steam line pressure - low (less than or equal to 8.0 seconds)
Item 7.c	Steam line isolation resulting from containment pressure--high-high (less than or equal to 7.0 seconds)

Evaluation

The Cook Nuclear Plant safety analyses that assume actuation of the MSIVs and steam line isolation include the following events: steam line break core response, steam line break mass/energy releases for inside containment integrity analysis, steam line break mass/energy releases for outside containment equipment qualification analysis, feedline break, steam generator tube rupture (SGTR), and loss of coolant accident (LOCA). The LOCA analyses do not assume actuation times for the MSIVs, but conservatively assume steam line isolation occurs at reactor trip. The other safety analyses listed above assume an overall engineered safety features (ESF) response time for steam line isolation from the time that the isolation setpoint is reached until valve closure. Thus, the actual valve stroking time is not directly assumed, but is a part of the overall ESF response time which includes signal processing delays.

Steam Line Break Core Response

The Unit 2 licensing basis analysis assumed an ESF response time for steam line isolation consistent with the T/S requirements. However, an analysis has recently been performed to support the proposed transition from ANF to Westinghouse 17x17 VANTAGE-5 (V-5)

fuel which assumed an ESF response time which includes an additional three seconds for steam line isolation with respect to the T/S requirements. This analysis is applicable for both V-5 and ANF fuel types, including a full core of ANF fuel, as long as the T/S limits on core parameters (e.g., moderator coefficient) are met. The results of this analysis demonstrate that the acceptance criteria for the event are met. Thus, a three-second increase in the T/S steam generator stop valve closure and steam line isolation ESF response times is supported by the analysis. This analysis was submitted in AEP:NRC:1071E dated February 6, 1990.

Steam Line Break M/E Releases Inside Containment

An analysis has recently been performed to support the proposed transition to Westinghouse 17x17 V-5 fuel for Unit 2 which includes an additional three seconds for steam line isolation with respect to the T/S requirements (WCAP-11902, Supplement 1, contained as Attachment 3 to this letter). This analysis bounds both Units 1 and 2 and is applicable for both V-5 and ANF fuel types, including a full core of ANF fuel, as long as the T/S limits on core parameter assumptions (e.g., moderator coefficient) are met. Thus, the mass/energy release input to the containment response analysis remains valid and a three-second increase in the T/S MSIV closure and steam line isolation ESF response times is supported by the analysis.

Steam Line Break M/E Releases Outside Containment

The current licensing basis mass/energy release data for use in outside containment equipment qualification for the Cook Nuclear Plant Units 1 and 2 are provided in WCAP-10961. Units 1 and 2 are covered by the WCAP Category 3 and Category 1 analyses respectively. The mass/energy release calculations assumed an ESF response time for steam line isolation consistent with the T/S requirements. Our current equipment qualification analysis was supplied by Impell (AEP:NRC:0775AJ).

The effect of increasing the steam line isolation time is to slightly increase the steam flow at any given time following isolation while slightly delaying the onset of superheated steam releases. All cases analyzed in the WCAP would be expected to be similarly affected by this small additional delay. The WCAP Category 1 cases 1, 16 and 59, all large break cases (4.6 ft^2), were identified as limiting by Impell and used to bound both Units 1 and 2. These limiting cases were reanalyzed by Westinghouse assuming an overall steam line isolation time which includes an additional three seconds with respect to the T/S requirements. AEPSC evaluated the effects of this mass and energy release rate change on the steam enclosure temperatures and concluded that the instruments remained inside their analyzed limits. The effect of longer MSIV closure time simply shifts the temperature peak slightly outward in time, but does not increase its severity. Therefore, the increase in MSIV closure time would not affect the choice of which steam line break size was limiting.

Feedline Break

For Unit 2, an analysis has recently been performed to support the proposed transition to Westinghouse 17x17 V-5 fuel which assumed a steam line isolation time which included an additional three seconds with respect to the T/S requirements. This analysis is applicable for both V-5 and ANF fuel types, including a full core of ANF fuel, as long as the T/S limits on core parameter assumptions (e.g., moderator coefficient) are met. The results of this analysis demonstrate that the acceptance criteria for the event are met. Thus, a three-second increase in the T/S MSIV closure and steam line isolation ESF response times is supported by the analysis.

Steam Generator Tube Rupture

The SGTR accident analysis for Cook Nuclear Plant Units 1 and 2 was reviewed to determine the impact of an increase in the MSIV closure and steam line isolation times by three seconds. In the SGTR analysis, the primary-to-secondary break flow was assumed to be terminated at 30 minutes after accident initiation, but the operator actions to terminate the break flow were not explicitly modeled in the analysis. The operator actions include isolation of the ruptured steam generator, which requires the closure of the ruptured steam generator MSIV. Since MSIV closure is not explicitly modeled in the analysis and an additional three seconds to close the ruptured steam generator MSIV is relatively short compared to the assumed total recovery time of 1800 seconds, it is concluded that the increased time for MSIV closure and steam line isolation will not affect the conclusions of the FSAR SGTR analysis nor the conclusions of the recent analyses completed for uprated power plus revised temperature and pressure operation.

A review was performed by AEPSC of the off-site radiological dose consequences of adding three seconds to the steam generator stop valve closure time. The additional three seconds would result in an injection of 210 pounds of additional reactor coolant to an initial total mass of reactor coolant of 125,000 pounds assumed in the FSAR for a SGTR. This corresponds to a fractional increase of 0.00168 for the total reactor coolant mass transferred to the steam generator. With the off-site doses being proportional to the amount of activity released, and assuming that all of the reactor coolant transferred to the ruptured steam generator is released, the off-site doses would also increase by 0.00168. This minute fractional increase in the off-site doses cannot be differentiated from the graphs of the dose consequences for a SGTR accident. Based on this review, it has been concluded that the additional three seconds do not impact the FSAR environmental consequences of a SGTR.

Small and Large Break LOCA

The small break and large break loss-of-coolant (SBLOCA and LBLOCA respectively) analyses are not adversely affected by increased MSIV closure and steam line isolation times. The SBLOCA and LBLOCA analyses assume that steam generator isolation occurs immediately after the reactor trip low pressurizer pressure setpoint is reached. By isolating the steam generators at the time of reactor trip, the stored energy in the secondary is conservatively greater than what would exist if the analyses modelled a later steam generator isolation. For the SBLOCA analysis, the higher energy in the secondary is conservative since the primary-to-secondary heat transfer rate is reduced. In the LBLOCA analysis, the earlier steam generator isolation time increases the secondary-to-primary heat transfer, which is conservative. Therefore, an increase in MSIV closure and steam line isolation times by three seconds does not have an impact on SBLOCA and LBLOCA analyses.

LOCA Blowdown Forces, Hot Leg Switchover to Preclude Boron Precipitation, Post-LOCA Long-Term Core Cooling Subcriticality, and Post-LOCA Long-Term Core Cooling Minimum Flow

Reactor vessel and loop LOCA blowdown forces, hot leg switchover to preclude boron precipitation, post-LOCA long-term core cooling subcriticality, and post-LOCA long-term core cooling minimum flow are not adversely affected by the proposed change. Increasing MSIV closure and steam line isolation times does not adversely affect the normal plant operating parameters, the safeguards systems actuations or accident mitigation capabilities important to a LOCA, or the assumptions used in the LOCA-related analyses. In addition, the proposed change does not create conditions more limiting than those assumed in the LOCA analyses.

Justification for Request and Significant Hazards Consideration

We believe that increasing the MSIV closure time by three seconds will not adversely impact public health and safety. An increased steam line isolation response time has been evaluated with respect to the Cook Nuclear Plant Unit 2 safety analyses. Based upon previously performed analyses, the steam line break core response, steam line break mass/energy releases for inside containment integrity analysis, feedline break, SGTR, and LOCA analyses support an increase in the MSIV closure time isolation times of three seconds with respect to the T/S requirements. For steam line break mass/energy releases outside containment, limiting cases have been reanalyzed assuming a steam line isolation time three seconds longer than the current T/S requirements. Also, revised mass/energy data were evaluated by AEPSC, resulting in the conclusion that the increase in MSIV closure time would not affect the choice of which steam line break size was limiting.

10 CFR 50.92 Criteria

Per 10 CFR 50.92, a proposed amendment will not involve a significant hazards consideration if the proposed amendment does not:

1) involve a significant increase in the probability or consequences of an accident previously analyzed,

2) create the possibility of a new or different kind of accident from an accident previously analyzed or evaluated, or

3) involve a significant reduction in a margin of safety.

Our evaluation of the proposed change with respect to these criteria is provided below.

Criterion 1

Based on the safety analyses performed by Westinghouse for the steam line break core response, steam line break mass/energy releases for inside containment integrity, steam line break mass/energy releases outside containment, feedline break, SGTR, and LOCA, we believe that the proposed T/S change to increase the steam line break isolation response time and the steam generator stop valve closure time by three seconds will not involve a significant increase in the probability or consequences of a previously analyzed accident.

Criterion 2

The three-second increase for the steam line isolation response time will not change the design or operation of the plant. Therefore we believe that this change will not create the possibility of a new or different kind of accident from any previously analyzed or evaluated.

Criterion 3

Based on the safety analyses performed by Westinghouse for the steam line break core response, steam line break mass/energy releases for inside containment integrity, steam line break mass/energy releases outside containment, feedline break, SGTR, and LOCA, we believe that the proposed T/S change increasing the steam line break isolation response time and the steam generator stop valve closure time by three seconds will not involve a significant reduction in a margin of safety.

Lastly, we note that the Commission has provided guidance concerning the determination of significant hazards by providing certain examples (48 FR 14870) of amendments considered not likely to involve significant hazards consideration. The sixth of these examples refers to changes which may result in some increase to the probability of occurrence or consequences of a previously analyzed accident, but the results of which are within limits established as acceptable. For the reasons detailed above, we believe this change falls within the scope of this example. Therefore, we believe this change does not involve significant hazards consideration as defined in 10 CFR 50.92.