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SUBJECT: Application for amends to Licenses DPR-58 & DPR--74,revising Tech Specs re controlled leakage.

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AEP:NRC:1070
10 CFR 50.90

Donald C. Cook Nuclear Plant Units 1 and 2
License Nos. DPR-58 and DPR-74
Docket Nos. 50-315 and 50-316
CONTROLLED LEAKAGE TECHNICAL SPECIFICATION CHANGE

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

Attn: T. E. Murley

October 17, 1989

Dear Dr. Murley:

This letter and its attachments constitute an application for amendment to the Technical Specifications (T/Ss) for the Donald C. Cook Nuclear Plant Units 1 and 2. Specifically, we are proposing to modify T/S 3/4.4.6.2 (Operational Leakage) and its associated Bases such that the requirements for controlled leakage are made more restrictive. The reason for the change and our 10 CFR 50.92 significant hazards analysis are found in Attachment 1. Attachment 2 contains the proposed revised T/S pages.

We believe the proposed changes 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.

This T/S change is intended to correct a deficiency in our present T/Ss so that the assumptions of the applicable accident analysis are adequately protected. As described in Attachment 1 to this letter, we have administratively implemented restrictions above the present T/S requirements that are protecting the accident analysis assumptions.

These proposed changes have been reviewed 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 the Michigan Department of Public Health.

A001

Attachment 1 to this letter includes AEP drawings OP-2-5129 and OP-2-5128A. In accordance with the restrictions as to use set forth on the AEP drawings, AEP hereby releases these documents to the NRC for its information and use in connection with this submittal. AEP also permits the NRC to reproduce the drawings as necessary to facilitate review and distribution of the drawings to meet NRC requirements.

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

Sincerely,

M. P. Alexich
Vice President

ldp

Attachments

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

ATTACHMENT 1 TO AEP:NRC:1070

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

Introduction

The Technical Specification (T/S) change proposed in this letter is intended to ensure the T/Ss accurately reflect the requirements of the safety analysis with regards to controlled leakage. To facilitate the review, we have included the following flow diagrams:

1) OP-2-5129
   CVCS Reactor Letdown and Charging

2) OP-2-5128A
   Reactor Coolant

Description of Change

As currently written, T/S 3.4.6.2.e (Operational Leakage) limits controlled leakage to 52 gpm. Surveillance requirement 4.4.6.2.1.c requires measurement of controlled leakage at least once per 31 days. Controlled leakage is defined in Section 1 of the T/Ss as "that seal water flow supplied to the reactor coolant pump seals." We are proposing to amend the subject T/S such that the controlled leakage limit is expressed as a line resistance, rather than a specific flow rate. The seal line resistance will be measured at least once per 31 days when the pressurizer pressure is within 20 psi of its nominal full pressure value. The seal line resistance measured during the surveillance must be greater than or equal to 2.27 E-1 ft/gpm^2. The seal line resistance, R_{SL}, is determined from the following expression:

$$R_{SL} = \frac{2.31\ (P_{CHP} - P_{SI})}{Q^2}$$

where: P_{CHP} = charging pump header pressure, psig

P_{SI} = 2112 psig (Unit 1 low pressure operation)

= 2262 psig (Unit 1 high pressure operation)

= 2262 psig (Unit 2 operation)

2.31 = conversion factor $(12\ in/ft)^2/(62.3\ lb/ft^3)$

Q = total seal injection flow, gpm

Additionally, we have added an exemption from the requirements of T/S 4.0.4 for entry into Modes 3 and 4, deleted a footnote from T/S 3.4.6.2 Action (c) involving reporting requirements for reactor coolant pressure boundary leakage, and modified the Bases section to reflect the controlled leakage requirement change.

Reason for Change

The change to the controlled leakage requirements results from our conclusion that the present limit of 52 gpm cannot by itself ensure compliance with the assumptions of the safety analysis. For the LOCA analyses with minimum safeguards assumptions, the fuel vendors assume that all of the flow that is diverted from the boron injection tank (BIT) line by the seal injection line is unavailable for core cooling. (Although a portion of the seal water is injected into the reactor coolant system, there is no T/S limit on this flow and therefore all of the seal flow is assumed unavailable for core cooling.) The fuel vendor analyses assume a seal line hydraulic resistance of 0.227 ft/gpm^2. Surveillance requirement 4.4.6.2.1.c is intended to verify that the actual seal line resistance is greater than or equal to this value. It is complemented by T/S 4.5.2.h (ECCS Subsystems), which, as discussed in T/S Bases 3/4.5.2 and 3/4.5.3, assures that the BIT throttle valves are adjusted such that: a) total pump flow does not exceed runout conditions when the system is in its minimum resistance configuration, b) the proper flow split exists between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and c) the total ECCS flow to all injection points is equal to or above that assumed in the ECCS-LOCA analyses.

The nominal developed head of the charging pump at runout (550 gpm) is approximately 1431 feet. Therefore, the flow diverted through the seal line under Emergency Core Cooling System (ECCS) operation at 0 psig is:

$$Q = (1431 \text{ ft}/0.227 \text{ ft/gpm}^2)^{1/2}$$

$$= 79 \text{ gpm}$$

As a result, T/S 4.5.2.h specifies a nominal pump runout flow rate of 550 gpm with a simulated seal flow of 80 gpm and a maximum of 470 gpm through the BIT. During normal operation, the Unit 2 pressurizer pressure is maintained at a nominal pressure of 2235 psig. The resulting pressure at the seal injection point in the reactor coolant pump is approximately 2260 psig. Assuming normal letdown (75 gpm), the charging pump discharge pressure should be at least 2413 psig. The corresponding seal injection flow rate is:

$$Q = ((2413 - 2260) \text{ psi}/(0.227 \text{ ft/gpm}^2) * (12 \text{ in/ft})^2/(62 \text{ lb/ft}^3))^{1/2}$$

$$= 40 \text{ gpm}$$

The current T/S only specifies a maximum flow rate. The T/S does not provide any limits on RCS or pump discharge pressure that correspond to the flow limit. As seen in the example above, the 52 gpm limit would be nonconservative with the charging pump head assumed in the example.

The Westinghouse Standard T/Ss specify a controlled leakage limit in gpm. The Standard T/S surveillance requirement specifies that the modulating valve (corresponding to Cook Nuclear Plant valve QRV-251, shown at location J-5 on drawing OP-2-5129) must be fully open. Although this is an enhancement over the present Cook Nuclear Plant T/S, it presents operational difficulties since it requires valve QRV-251 to be fully opened in order to perform the test. Since QRV-251 is the main valve used to throttle charging flow during normal operations, it is not generally fully open. The operator must carefully adjust QRV-200 (shown at location H-3 on drawing OP-2-5129) to maintain the necessary charging flow and pressurizer level during the test.

Since we have recognized that the present T/S is inadequate, we have implemented administrative controls to ensure that the controlled leakage surveillance accurately reflects the safety analysis assumptions. Controlled leakage, as measured during the surveillance, is administratively limited to 40 gpm. We are presently performing the surveillance outlined by the Standard T/S, except that we measure the charging pump header pressure to ensure it is consistent with the 40 gpm controlled leakage limit and the resistance assumed in the Westinghouse analysis.

Our proposed T/S change ensures that the accident analysis assumptions are protected while eliminating the difficulty associated with the Standard T/S surveillance. The actual line resistance is determined rather than a simple flow rate. In performing the surveillance, we are currently planning to measure pump discharge pressure using pressure instrument QPI-250, since it reads out in the control room. The instrument is in the pump discharge header downstream of QRV-251. This is conservative since it predicts a lower system resistance and therefore will make it more difficult to pass the test. Also, since pump discharge pressure is measured downstream of QRV-251, there is no need to fully open the valve, as the standard T/S requires. (The instrument is shown at location K-4 on drawing OP-2-5129). Seal line flow will be determined by summing the flow indicated in the control room by instruments QFI 210, 220, 230, and 240, that indicate the seal flow to reactor coolant pumps 1 through 4, respectively. (The instruments are shown at location B-4 on drawing OP-2-5128A.) The conversion from pressurizer pressure to seal injection point pressure (P_{ST}) was calculated using a methodology provided to us by Westinghouse. This methodology accounts for pressure effects such as the difference in elevation between pressurizer programmed level and the seal injection

points. The Westinghouse equations were applied to programmed RCS conditions (temperature and pressurizer level) for both units at various power levels. The values for P_{SI} specified in the proposed T/Ss correspond to 100% power operation since this conservatively results in the largest value of P_{SI}. Two values for P_{SI} are specified for Unit 1, corresponding to the two discrete pressurizer pressure values (2235 psig and 2085 psig) which are supported by the Unit 1 reduced temperature and pressure program (Reference Unit 1 T/S Amendment 126).

The seal line resistance, as determined by the proposed surveillance requirement, is applicable at full pressure conditions. This is because the pressure at the seal injection point, which cannot be directly measured, has been calculated assuming full pressure operation. This is recognized by the Standard T/S, which specifies the LCO and the surveillance requirement at a pressurizer pressure of 2235 $\pm$ 20 psig. (In practice, full pressure operation is the most limiting because it requires the lowest line resistance to provide adequate flow to the reactor coolant pump seals.) We have added a footnote to the LCO and worded the proposed surveillance requirement such that it is clear that the T/S is applicable with average pressurizer pressure at its full pressure value. (We have maintained the 20 psi tolerance from the Standard T/S, since pressurizer pressure may fluctuate slightly around its nominal value.) We have also added a T/S 4.0.4 exemption for T/S 4.4.6.2.1 for entry into Modes 3 and 4. The 4.0.4 exemption will allow entry into Modes 3 and 4 before the controlled leakage surveillance is completed. This change is consistent with the Standard T/S. As discussed above, the surveillance is to be performed with the RCS fully pressurized. This condition is typically established in Mode 3. While the RCS pressure is changing, it may be necessary to adjust seal flow to the reactor coolant pumps using needle valves CS-438 -1, -2, -3, and -4. (These valves are shown on drawing 2-5128A at B-4.) A change in needle valve position alters the system resistance, rendering obsolete any resistance measurements taken beforehand.

We are also proposing to delete a footnote associated with T/S 3.4.6.2 Action (c) that involves reporting of reactor coolant pressure boundary leakage pursuant to T/S 6.9.1. The reportability requirements of T/S 6.9.1 have been modified because of changes to the LER rule (10 CFR 50.73), and T/S 6.9.1 no longer contains requirements related to reporting of pressure boundary leakage. This change is therefore purely administrative in nature, intended only to remove a superseded reference from the T/Ss.

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 any accident previously analyzed or evaluated, or

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

Criterion 1

We are proposing to modify the T/S surveillance requirement for controlled leakage such that it accurately reflects the assumptions of the LOCA analysis. The present T/S wording is vague, and does not by itself ensure consistency with the analysis. The revised surveillance requirement places additional restrictions on the plant, and would be expected to increase, rather than decrease, safety. The proposed addition of a T/S 4.0.4 exemption for Modes 3 and 4 and the clarifications that the specification is applicable with the RCS fully pressurized are a reduction to the current requirements, but are consistent with performing the surveillance with the RCS fully pressurized, and are similar to the Standard T/S requirements. Since there are no substantive differences between the Cook Nuclear Plant controlled leakage configuration and that reflected by the Standard T/S, the change would not be expected to decrease safety. For these reasons, we believe the change does not involve a significant increase in the probability or consequences of a previously analyzed accident, nor should it involve a significant reduction in a margin of safety.

Criterion 2

The only change to plant operations is the method of measuring controlled leakage. The proposed method requires no changes in plant equipment lineups. Data is recorded from existing instrumentation, and then is mathematically manipulated to ensure the resistance is in compliance with the accident analysis assumptions. Since the change involves no new modes of plant operation, nor any physical changes to the plant, the change should not create the possibility of a new or different kind of accident from any accident previously analyzed or evaluated.

Criterion 3

See Criterion 1 above.

Lastly, we note that the Commission has provided guidance concerning the determination of significant hazards by providing examples (48 FR 14870) of amendments considered not likely to involve significant hazards consideration. The first example refers to changes that are purely administrative in nature. This example is applicable to the deletion of the footnote referring to the reporting requirements of T/S 6.9.1. The second example refers to changes that constitute an additional limitation, restriction, or control not presently included in the T/Ss: for example, more stringent surveillance requirements. The proposed surveillance requirement, as described above, is more restrictive than the present surveillance requirement. The additional restrictions are intended to ensure compliance with the accident analysis assumptions. The sixth Federal Register example refers to changes that may result in some increase to the probability or consequences of a previously analyzed accident, but the results of which are within clearly established acceptance limits. The T/S 4.0.4 exemption and limiting of applicability to a fully pressurized RCS we have proposed are similar to the Standard T/Ss, and therefore fit the stated example.