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SUBJECT: Requests temporary waiver of compliance w/Limiting Condition for Operation of Tech Spec Section 3.5.2 re ECCS boron injection tank charging sys to repair body-to-bonnet leak in valve 1-CS-356 in chemical & vol control sys.

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Donald C. Cook Nuclear Unit 1
License No. DPR-58
Docket No. 50-315
REQUEST FOR TEMPORARY REGIONAL WAIVER OF COMPLIANCE

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

Attn: A. B. Davis

March 28, 1991

Dear Mr. Davis:

The purpose of this letter is to request a temporary waiver of compliance with the Limiting Conditions for Operation (LCO) of Cook Nuclear Plant Unit 1 Technical Specification (T/S) Section 3.5.2, "ECCS Subsystems - $T_{avg} \geq 350^{\circ}F$."

1. REASON FOR THE REQUEST

We request that a regional waiver of compliance be granted for the T/S 3.5.2 LCO as it relates to the Unit 1 ECCS BIT charging system and, as a contingency measure, the T/S 3.1.2.2 LCO as it relates to the Unit 1 charging flowpath to the RCS. The time period over which this waiver is required is expected to be less than four hours and it is expected that the work could be performed within the accepted confines of T/S 3.0.3. Granting of a waiver of compliance for this period, however, will allow the required valve repairs to be completed without an unnecessary shutdown of the unit.

This waiver of compliance is necessary in order to repair a body-to-bonnet leak in valve No. 1-CS-536, installed in the Cook Nuclear Plant Unit 1 chemical and volume control system (CVCS). Valve 1-CS-536 is a normally closed valve located in the charging pump cross-tie between Units 1 and 2.

The CVCS cross-tie between Units 1 and 2 forms a part of the basis for our 10 CFR 50, Appendix R, safe shutdown capability. Use of the cross-tie allows charging flow from one unit to provide reactor coolant pump seal water injection and reactor coolant system (RCS) volume control in the opposite unit in the

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event of an Appendix R fire. Subsequent to the last Unit 1 refueling outage, a leak of an estimated 30 gpm was discovered developed in valve 1-CS-536 installed in the Unit 1 charging flow cross-tie line. In the event of a fire in Unit 1, current procedures would require valve 2-CS-536 to be opened in order to provide seal water injection and RCS volume control to Unit 1 from the Unit 2 charging system. Although the charging system is of sufficient capacity to provide the necessary seal injection flow and RCS volume control even with the existence of the identified leak, the magnitude of the leak cannot be exactly quantified. This reduces our ability to confirm that charging flow from the unaffected to the affected unit during a fire is adequate using our existing emergency and safe shutdown procedures. This is because existing safe shutdown procedures require verification of adequate seal injection flow using a flow indicating device which, when providing flow to Unit 1 from the Unit 2 charging system, would be upstream of 1-CS-536 (and therefore upstream of the leak). As a result when Unit 1 is the affected unit and is being supplied from Unit 2 the total cross-tie flow can be measured; but since the exact leak rate from valve 1-CS-536 cannot be determined, the actual seal water injection flow to Unit 1 cannot be verified. When supplying Unit 2 from Unit 1 the actual flow to Unit 2 can be verified, however, containing the leakage water becomes both a containment problem and a radiological problem. (This problem, in fact, would exist regardless of which unit is the fire affected unit.) The leak, therefore, must be repaired. Our intent is to repair valve 1-CS-536 during power operation in order to avoid an unnecessary shutdown of Unit 1 with the consequent thermal cycling of the RCS and reactor vessel. A simplified flow diagram of the affected portion of the CVCS is provided in the attachment to this letter.

2. CIRCUMSTANCES LEADING TO THE REQUEST

During the 1990 Unit 1 refueling outage, valve CS-536 was found to be leaking through. The valve was disassembled and upon inspection it was found that the valve seating surfaces were badly scratched. The valve seats were resurfaced, the valve reassembled, and post-maintenance testing (PMT) was performed in accordance with Attachments 1 and 2 to procedure MHI-2293. However, the specified PMT required only that the valve be cycled and the position indicator on the reach rod required for valve operation verified. The valve cycling portion of the PMT per Attachment 2 to MHI-2293 was completed on December 21, 1990, and was performed at a time when the charging pumps were not running. As a result, no pressure was applied to the valve when it was cycled and therefore valve leakage could not have been detected. A leak inspection performed per Procedure MHI-2293, Attachment 1 subsequent to the valve cycling PMT similarly failed to identify leakage from 1-CS-536.

This is because, even though the charging pumps were operating and the system pressurized, the valve was closed during the leak inspection since only the valve seat (the part repaired) was to be tested and the valve body to bonnet region (the source of leakage) was not pressurized. It was not until February, 1991 that, during performance of the Unit 2 CS-536 valve surveillance test, the proper conditions to identify the body-to-bonnet leak were created.

Failure to identify the 1-CS-536 body-to-bonnet leak during performance of the original PMT in December, 1990, is attributed to a lack of specificity in the criteria by which the PMT requirements were established. The PMT specified the testing to be performed to verify that the repair had eliminated the seat leakage. However, verification of proper restoration of the pressure boundary, i.e., no body-to-bonnet leakage, was not included in the PMT requirements. We are revising our process to better determine PMT necessary to verify operability following maintenance or repair. Additional detail will be provided as to PMT requirements for the actual maintenance or repair performed as well as to what PMT is required to demonstrate that the affected component functions as required. In addition, through a recently formed integrated scheduling group, specific requirements for when PMT must be completed and when a component can be considered operable following PMT (i.e.; PMT completion will become essentially a hold point for both outage and non-outage maintenance and repair). We believe implementing these changes in conjunction with planned additional training for individuals who are responsible for establishing PMT requirements will preclude future occurrences similar to the one involving 1-CS-536.

3. COMPENSATORY MEASURES

Our method for repairing valve 1-CS-536 during power operation is to establish a freeze seal in the four-inch line upstream of the valve, then, once the freeze seal is in place disassemble the valve, replace the valve bonnet, trim assembly and packing cartridges, reassemble the valve and return the system to its normal configuration. It is expected that the time during which we will need to rely on the freeze seal for pressure boundary retention will be less than four hours, with the repair activity itself expected to require less than one hour.

Proceeding with our planned repair method will result in the Unit 1 charging pumps ECCS flowpath being inoperable in terms of literal compliance with the existing T/S 3.5.2 requirements in that during the time valve 1-CS-536 is disassembled it does not provide its normal function as a primary system pressure boundary. The freeze seal, in essence, would replace valve 1-CS-536 as the means by which ECCS flowpath pressure boundary

integrity is maintained while the valve is repaired; however, the freeze seal is not seismically qualified and cannot be considered an ASME Code Class I component for the purpose of pressure boundary retention. In this instance, if no credit for the freeze seal is taken in complying with the pressure boundary integrity and the Unit 1 charging system is therefore considered inoperable, the T/S 3.5.2 LCO could not be met and initiation of unit shutdown in accordance with T/S 3.0.3 would be required.

We do not believe that this action is warranted in the instance described above since, once established, the freeze seal provides in a practical sense an adequate pressure retaining boundary and the charging system would still be functional. The key considerations addressed in establishing this position are the seismic adequacy of the installed freeze seal, the ability to maintain the freeze seal during an accident and the ability of the seal to withstand primary system pressure of approximately 2200 psi in maintaining RCS integrity and charging system functionality.

4. PRELIMINARY EVALUATION OF SAFETY SIGNIFICANCE

With regard to seismic qualification of the freeze seal and the ability to maintain the seal during an accident, there is no objective basis on which to assume the seal would remain intact during or after a seismic event. In addition, it is assumed that radiation levels in the area of the freeze seal during an accident would be too high to allow personnel to stay in the area to maintain the seal. However, these issues are not considered to be of significant concern since the time period during which the seal would provide primary system pressure retention (approximately four hours) is so short that the likelihood of a seismic event or other accident occurring when the seal is in place is negligible.

With regard to the ability of the freeze seal to withstand primary system pressure, test data is available in Battelle Laboratories Final Report, "Development of Guidelines for Use of Ice Plugs in Pipeline Maintenance and Hydrostatic Testing," dated November 15, 1982, and also EPRI Guide NP-6384-D titled, "Freeze Sealing (Plugging) of Piping: A Guide for Nuclear Power Plant Maintenance Personnel." Data shows that once a leak tight freeze seal is in place it is capable of providing pressure boundary retention for pressures in excess of 2200 psig. Tests have been performed on a 3 1/2-inch pipe where system pressure in the pipe was raised to 10,000 psi, the failure point for the pipe material. Although the pipe yielded at a point away from the freeze seal, the freeze seal itself remained intact. We intend to confirm the freeze seal leak tightness by monitoring drains installed downstream of the

seal. Once the seal is formed, it will be left in place for approximately one hour and then checked for leaks before beginning the required valve repairs. If leaks should develop through the seal while repairs are being performed, the system can be restored to its original configuration (i.e., valve 1-CS-536 reassembled with or without the leak repair completed) in a short enough period of time to preclude any adverse effects in the charging system.

In the unlikely event that sudden, gross leakage occurs, the charging system header would be isolated briefly in order to reduce system pressure and re-establish seal integrity. If this contingency action is required, the T/S 3.1.2.2 LCO for boron injection flow paths could not be fulfilled since the charging flow path to the RCS would be isolated (seal injection flow, however, would be maintained). In this instance literal compliance with the T/S would require initiation of a unit shutdown in accordance with T/S Section 3.0.3. We do not believe, however, that entry into T/S 3.0.3 is warranted in this case since the time period during which the charging flowpath would be isolated and freeze seal integrity re-established would be small (less than four hours). The likelihood of an event occurring during this short time which would require charging flow to the RCS is considered to be negligible. In addition, based on the freeze seal test results discussed above, we have a high degree of confidence that the seal will remain intact throughout the valve repair evolution and therefore this contingency action is not expected to be needed.

5. JUSTIFICATION FOR DURATION OF THE REQUEST

We believe that a leak test of the freeze seal is prudent prior to disassembly of the valve. Allowing one hour for the leak test and another 45 minutes to one hour for the repair of the valve would exceed the one hour T/S 3.0.3 criteria. Request for a four hour T/S waiver therefore would preclude entering T/S 3.0.3 which could necessitate initiation of the unit shut down and concommitant thermal cycling of the RCS and reactor vessel.

6. BASIS FOR CONCLUDING THAT THE CHANGE DOES NOT INVOLVE ANY SIGNIFICANT HAZARD

In evaluating the potential significant hazards considerations associated with the request for a temporary regional waiver of compliance, it was determined that because of the short time period during which the freeze seal functions as a pressure retaining boundary, the probability of an accident occurring during this time is negligible. In addition, as stated above, we have a high level of confidence that once established, the freeze seal

will provide adequate pressure boundary retention. Therefore, we consider that performing the valve 1-CS-536 repair under a waiver of compliance does not significantly increase the probability or consequences of any accident. The waiver of compliance does not represent a change in the facility or in the procedures as described in the FSAR nor does it represent a test or experiment not described in the FSAR. Further, this Temporary Waiver of Compliance does not:

A. Involve a significant increase in the probability or consequences of an accident previously evaluated; or

B. Create the possibility of a new or different kind of accident from any accident previously evaluated; or

C. Involve a significant reduction in a margin of safety.

On this same basis we do not consider that a significant reduction in safety margin would result from use of the freeze seal. Use of the freeze seal also does not create the possibility of a new or different type of accident from those previously analyzed.

7. BASIS TO SHOW THAT THIS REQUEST DOES NOT INVOLVE AN IRREVERSIBLE ENVIRONMENTAL CONSEQUENCES

This request does not involve a change in the installation or use of the facilities or components located within the restricted areas as defined in 10CFR20. We have determined that this Temporary Waiver of Compliance involves 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. Accordingly, this Temporary Waiver of Compliance meets the eligibility criteria for categorical exclusion set forth in 10CFR Section 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 granting of the temporary waiver of compliance.

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

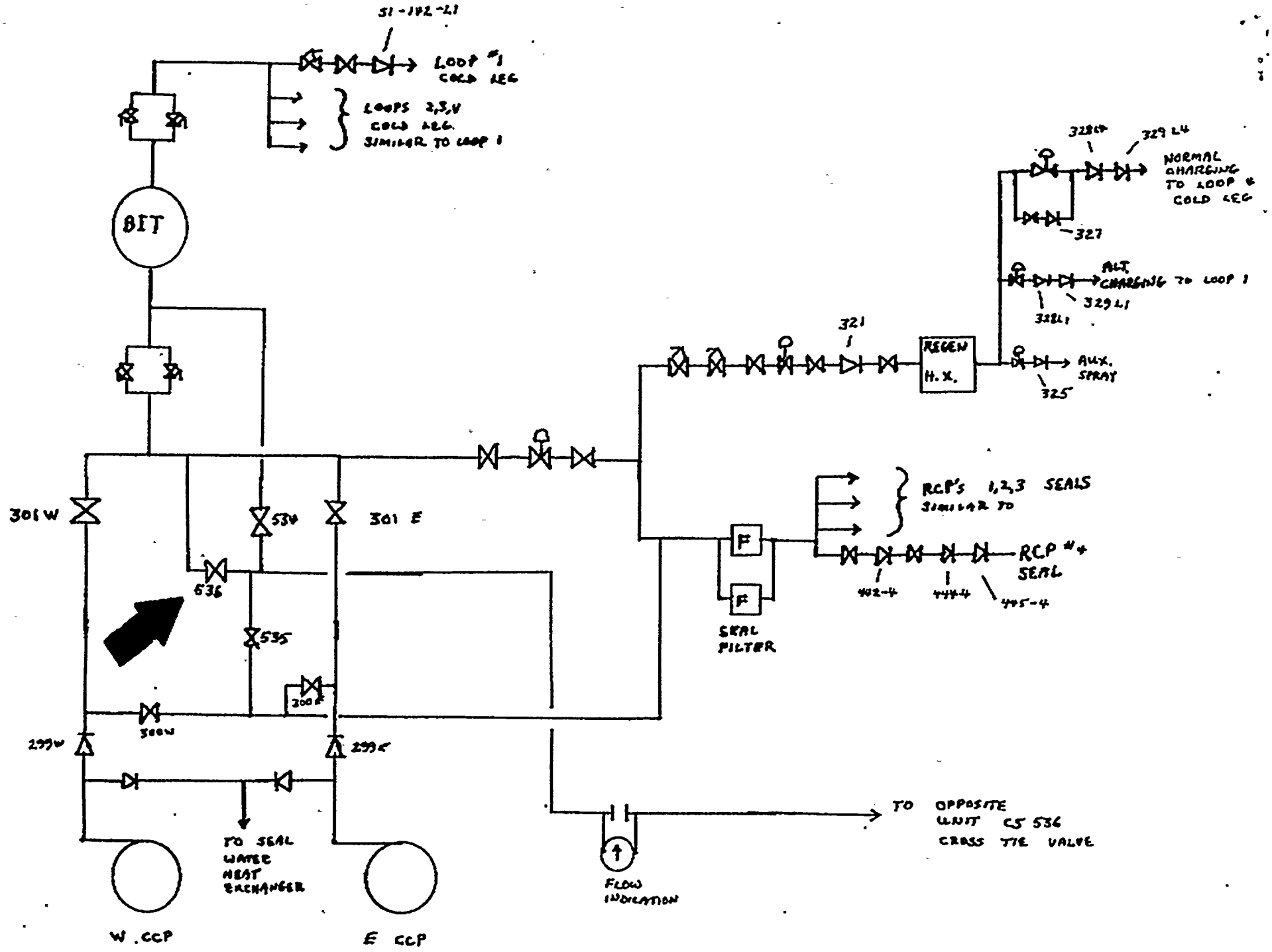
ldp

Attachment

cc: D. H. Williams, Jr.
A. A. Blind
J. R. Padgett
G. Charnoff
NRC Resident Inspector - Bridgman
NFEM Section Chief

ATTACHMENT TO AEP:NRC:1149

SIMPLIFIED FLOW DIAGRAM OF THE
UNIT 1 CVCS CROSS-TIE SYSTEM



CHARGING SYSTEM SIMPLIFIED FLOW DIAGRAM