UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the matter of	)	Docket No. 50-213
	)	
CONNECTICUT YANKEE ATOMIC POWER COMPANY	)	
	)	
	)	
HADDAM NECK PLANT	)	

EXEMPTION

I.

The Connecticut Yankee Atomic Power Company (CYAPCO or the Licensee) is the holder of Operating License No. DPR-61 which authorizes operation of Haddam Neck Plant. The License provides, among other things, that the Haddam Neck Plant is subject to all rules, regulations, and Orders of the Commission now or hereafter in effect.

The plant is a single-unit pressurized water reactor at the Licensee's site located in Middlesex County, Connecticut.

II.

On March 25, 1986, (CYAPCO) reported that the results of analyses of a small limited range of break sizes in one loop of reactor coola system (RCS) for which safety injection flow during only the high p recirculation mode may be insufficient to provide adequate core co By letter dated April 10, 1986, CYAPCO identified measures to provide adequate core cooling in the event of a small-break loss-of-coolant accident (LOCA).

CYAPCO's proposed immediate corrective action measures included the use of the high pressure safety injection (HPSI) system, the residual heat removal (RHR) system and certain operator actions. However, CYAPCO noted that two valves, which are used during the HPSI recirculation mode, do not meet the prescribed single failure requirements.

Provisions requiring consideration of single failures in this context are set forth both in GDC 35 and the Interim Acceptance Criteria. GDC 35 provides, in applicable part, as follows:

> A system to provide abundant emergency core cooling shall be provided ... to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

Further, the Interim Acceptance Criteria, to which Haddam Neck was originally evaluated, provide as follows:

> The combination of systems used for analyses should be derived from a failure mode and effects analyses, using the single failure criterion. (Interim Acceptance Criteria for Emergency Core Cooling Systems for Light Water Power Reactors, Appendix A, Part 3, 36 FR 12249.)

III

For the following cases, a small break LOCA with a break size between 0.02 ft^2 and 0.045 ft^2 in the number 2 cold leg between the charging entry nozzle and the reactor vessel or in the charging line downstream from the inline check valve, adequate recirculation flow might not be delivered to the core. If the break is less than 0.02 ft^2, the charging pumps provide adequate makeup flow, and if the break is greater than 0.045 ft^2, the reactor coolant system (RCS) would depressurize rapidly enough to use the RHR pumps. By letter dated April 10, 1986, CYAPCO proposed a HPSI pump recirculation mode to provide adequate flow to the core for the above cases of small break LOCAs until CYAPCO could identify and establish a permanent resolution. By letter dated April 22, 1986, CYAPCO requested a temporary

exemption from the single failure criteria for two valves outside of containment that would be used under procedurally defined conditions to respond to small break LOCAs. On April 23, 1986, the staff and CYAPCO met to discuss this exemption. During this meeting, CYAPCO agreed there were several actions that could be taken to improve the emergency procedures the operators would follow to respond to such events. By letter dated April 25, 1986, CYAPCO formalized several commitments made during this meeting, including the conduct of special training to assure operator awareness of both the actions to be taken and the reasons behind those actions.

To operate a HPSI in a high pressure recirculation mode, the HPSI system must be realigned from the RWST to the RHR pump discharge. This requires closing valve SI-MOV-24 to isolate the RWST, and opening valve RH-MOV-784 to align suction from the RHR system which draws from the containment sump. These valves do not meet the prescribed single failure requirement. These valves are outside of containment and can be aligned manually if necessary. Even if these valves cannot be aligned, the HPSI or charging pumps could inject water from the RWST at a rate sufficient to cool the core for several hours. The operator will assure the core is being adequately cooled by monitoring the core exit thermocouples and reactor vessel level instrumentation. The injection from the RWST at low flow can provide adequate time for the operator to depressurize the RCS, allowing the RHR pumps to be used in the recirculation mode.

The licensee has recently tested the valves in the HPSI suction line and determined them to be operable. Also, CYAPCO has committed to impose a monthly surveillance and cycling requirement for these valves to provide assurance of valve operability. Additionally, during this refueling, CYAPCO conducted a 100% ultrasonic examination of the welds in the piping between the last check valve in loop 2 charging and the RCS main loop, including the joint to which the piping segments are connected. The probability of breaks in this piping is greatest at the weld locations. This examination provides further evidence that the probability of a break occurring in this piping remains remote.

Based on all of the above, the staff concludes that the measures taken by CYAPCO will provide reasonable assurance that adequate core cooling for a small break LOCA at the Haddam Neck Plant can be accomplished.

The NRC staff's consideration of the safety aspects of the requested exemption has been discussed in detail above. The high pressure recirculation mode using the charging pumps has been found to be deficient for a narrow spectrum of breaks, whereas the safety benefits derived from using the HPSI pumps recirculation mode represent a capability for a much broader range of postulated breaks. CYAPCO has estimated that the implementation of the proposed interim response measure (use of HPSI pumps during recirculation) decreases the overall core melt frequency associated with small and medium break LOCAs at Haddam Neck by approximately 27 percent over the original design. Thus, the licensee has concluded that the granting of the requested exemption will be a net benefit to plant safety.

CYAPCO has significantly upgraded their accident analyses for the Haddam Neck Plant in the past few years. This upgrade involved reanalyses of large and small break LOCA events, and non-LOCA events, including analyses performed in connection with the response to TMI Action Plan Items II.K.3.5, II.K.3.30, and II.K.3.31. In the recently completed probabilistic safety study (PSS) for the Haddam Neck Plant, CYAPCO identified the ECCS system sensitivity to breaks in loop 2 or the charging line during the recirculation phase of a small break LOCA. The present condition was identified as a result of CYAPCO's own initiatives to reevaluate Haddam Neck's LOCA analyses. Once identified, CYAPCO has shown diligence and willingness to resolve this safety issue. In the proposed immediate corrective action, CYAPCO identified a non-conformance with the prescribed single failure requirement. CYAPCO promptly evaluated this non-conformance and provided an exemption request with a basis for operation while in non-conformance with the single failure requirement. The staff has concluded that CYAPCO has been expeditious in its efforts to satisfy the ECCS requirements, including the IAC.

Based on its review, the staff concludes that issuance of this temporary exemption will have no significant effect on plant safety. Further, the licensee has shown good faith in rectifying the problem and in attempting to comply with the Commission's regulations as promptly as practicable.

IV

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will have no significant impact on the environment (51 FR 15708).

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a)(2)(v), the requested temporary exemption is authorized by law and will not endanger life or property or the common defense and security. Therefore, the Commission hereby grants the temporary exemption from the requirements of General Design Criteria 35 of Appendix A to 10 CFR Part 50 and the Interim Acceptance Criteria for valves RH-MOV-784 and SI-MOV-24 for the period of cycle 14 operation. By September 1986, CYAPCO shall provide a description of the long-term resolution of this issue and a schedule for completion of any plant modifications. Thereafter, the Director of the Office of Nuclear Reactor Regulation may extend the period of this exemption for good cause shown.

A copy of the Safety Evaluation dated April 28, 1986, related to this action is available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and at the local Public Document Room, located at the Russell Library, 123 Broad Street, Middletown, Connecticut 06457. A copy may be obtained upon written request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director Division of PWR Licensing-B.

This Exemption is effective upon issuance.

Date at Bethesda, Maryland this 28th day of April 1986.

FOR THE NUCLEAR REGULATORY COMMISSION

Frank J. Miraglia

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