August 20, 1985

Docket No. 50-293

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Mr. William D. Harrington
Senior Vice President, Nuclear
Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199

Dear Mr. Harrington

SUBJECT: NUREG-0737, ITEM II.K.3.22

Re: Pilgrim Nuclear Power Station

By letter dated May 28, 1985, you requested relief from your previous commitment to provide automatic suction switchover capability for the reactor core isolation cooling (RCIC) system at Pilgrim Station.

We have evaluated your request and we find that manual switchover of the RCIC section is acceptable because of the large amount of time that would be available to perform this function. Your request is, therefore, granted.

A copy of our Safety Evaluation is enclosed.

Sincerely,

Original signed by/

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Enclosure:
As Stated

cc w/enclosure:
See next page

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Mr. William D. Harrington
Boston Edison Company
Pilgrim Nuclear Power Station

cc:

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

NUREG-0737 ITEM II.K.3.22 REQUIREMENT

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 INTRODUCTION

The licensee, Boston Edison Company (BECo), in a letter dated May 18, 1985, requested relief from its previous commitment to implement the modifications required by TMI Action Plan Item II.K.3.22. This item requires automatic switchover of the reactor core isolation cooling (RCIC) system suction to the suppression pool whenever the condensate storage tank level is low.

2.0 EVALUATION

The Final Safety Analysis Report (FSAR) for Pilgrim Station discusses the relative importance of the RCIC system in preventing the excessive release of radioactive materials to the environs. As stated in FSAR Section 4.7.1 (Safety Objective), the RCIC system provides makeup water to the reactor vessel following reactor vessel isolation in order to prevent the excessive release of radioactive materials to the environs as a result of inadequate core cooling. Furthermore, the system must operate in time to maintain sufficient coolant in the reactor vessel so that the integrity of the radioactive material barrier is not compromised.

It should be noted that control of the reactor vessel water level is easier with RCIC than with HPCI because RCIC flow more nearly matches boil-off due to decay heat than does HPCI flow. Thus, RCIC is the preferred make-up

system for isolated conditions and automatic suction switchover would facilitate continuous operation. Additionally, RCIC operation substitutes for HPCI during the periods that HPCI is out of service.

The RCIC pump suction is normally lined up to the condensate storage tank, which is a non-seismic category I suction source. The modifications recommended by Item II.K.3.22 would automatically provide a seismic category I suction source (e.g., suppression pool).

The condensate storage at Pilgrim consists of two tanks, each of which contains 275,000 gallons. This provides 550,000 gallons, out of which 150,000 is reserved for the RCIC and High Pressure Coolant Injection (HPCI) systems. The reserve volume is established by standpipes which provide suction from CST to other services.

Current operating and emergency procedures require the manual transfer of RCIC suction from the CST to the suppression pool if a low CST or high Torus level alarm is received. The low CST level alarms at 172,800 gallons. At the maximum RCIC pump operation of 416 gpm, it would take approximately 6.9 hours of continuous RCIC pump operation at design capacity to deplete the condensate storage after a low CST level alarm is received. Therefore, there is adequate time for the operator to perform a manual alignment of suction from the suppression pool. Because the time available for operator action is long, the risk is small. Although not absolutely required, the modifications would be a desirable improvement in plant

operations, eliminate the possibility of an operator error, and minimize the number of actions the operator has to perform. However, the increased costs to provide this feature are not justified by the limited safety improvement this feature would provide.

Analysis of long-term events in NUREG/CR-2973, "Loss of Decay Heat Removal (DHR) Sequences at Browns Ferry Unit 1 - Accident Sequence Analysis," and NUREG/CR-3719, "The Effect of Small Capacity, High-Pressure Injection Systems on TQUV Sequences at Browns Ferry Unit 1," show that after approximately four hours RCIC is no longer needed and CRD flow will maintain sufficient injection to the vessel. In practice, RCIC would probably be tripped off or realigned to the CST-to-CST test mode for pressure control with CRD supplying makeup after several hours. This would negate the necessity for a RCIC suction switchover.

The addition of more hardware introduces another failure mechanism, and addition of automatic switchover could potentially reduce plant availability. The operator also could use LPCI and Core Spray Systems for reactor coolant make-up during low pressure conditions.

3.0 CONCLUSION

Our evaluation confirms that there would be ample time available for the operator to perform the manual switchover functions and appropriate procedures are in place to guide the operator's actions. While automatic switchover has certain benefits, such as reduced opportunity for operator

error, it also has unquantified detriments associated with switchover system failure. Although a rigorous cost benefit analysis was not performed, we have reasonable assurance that such an analysis would not justify requiring automatic switchover capability. Therefore, we find that manual switchover of RCIC suction is acceptable for the Pilgrim Station.

Principal Reviewer: G. Thomas

Dated: August 20, 1985