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

February 4, 1991

Docket No. 50-293

Mr. George W. Davis
Senior Vice President - Nuclear
Boston Edison Company
Pilgrim Nuclear Power Station
RFD #1 Rocky Hill Road
Plymouth, Massachusetts 02360

Dear Mr. Davis:

SUBJECT: LICENSEE RESPONSE TO IE BULLETIN 79-08 AND ACCEPTABILITY OF SINGLE CHECK VALVES AS CONTAINMENT ISOLATION FOR PILGRIM (TAC NO. 56317)

By letter dated April 25, 1979, and in supplemental responses dated August 21, 1979, and October 24, 1984, you provided information for staff review on the subject bulletin and containment isolation. Staff review of these documents was inadvertantly set aside and I apologize for the delay in our response. Your submittals have now been reviewed and the following evaluation is provided.

In regards to the various correspondence on this subject, three systems, the Reactor Building Component Cooling Water (RBCCW), Instrument Air/Nitrogen Supply to Drywell, and the Torus Make-up Systems, have a single check valve identified as an isolation barrier. When these systems are compared to the current criteria in the Standard Review Plan (SRP) and the General Design Criteria (GDC), each system would fail to meet at least one of the criteria. However, Pilgrim is not required to meet today's standard since the plant was designed prior to the issuance of the GDCs and the SRP.

Available guidance provided by General Electric Company at the time of the development of the Pilgrim design is contained in a design specification report issued September 18, 1969. Attached, as Enclosure 1, are several pertinent pages from that report that discusses the level of containment isolation needed for several classes of lines. In particular, the applicable section is provided below.

> Lines which penetrate but do not open into the drywell, and whose external branches do not terminate in dead end service capable of withstanding drywell design conditions, shall utilize one remotely operable isolation valve or one (1) check valve (example: Closed cooling water lines.)

We have concluded that this document supports the licensee's contention that the original design basis allowed for the use of only a single check valve. However, it also requires that the drywell portion of the system be a closed system. Since the reference specifically mentions the RBCCW as an example, there is no doubt that this system was considered as a closed system inside containment. The instrument air system being of similar design is also considered as a closed system. Therefore, we concluded that both systems meet the original design basis by providing two barriers: one check and a closed system inside

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containment and is therefore acceptable for the Pilgrim design. Although the system does not meet our rigid criteria of a closed system, we believe that the differences represent an acceptable deviation.

The Torus Make-up System is slightly different from the previous two systems. The line does communicate with the suppression pool and therefore cannot be considered in the same class as the other two lines. However, the original design basis allows a single check valve if there is also a water seal. The licensee has interpreted this criteria to allow the suppression pool to be considered as a water seal. Therefore, a double barrier protection is achieved.

The staff agrees with the licensee from the point of view that a leak from the suppression pool is significantly less severe than a leak from the containment air space. However, we believe a water seal should either result in a leakage into containment or that the water source be "clean" radiologically. Neither situation exists with respect to this line. However, because of the low potential consequences associated with this deviation, we believe that a formal back fit analysis would show that a requirement to add an isolation valve is unjustified. Therefore, this deviation should be considered as an acceptable isolation arrangement for the Pilgrim plant.

Sincerely,

Original signed by
Ronald Eaton, Senior Project Manager
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Enclosures:
As stated

cc: See next page

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4.3.1 (Continued)

On reactor system supply lines, where feed continuity is required, the two isolation valves shall be check valves which close automatically on reverse flow. A block valve, for maintenance use, shall be provided between the reactor system and the inboard check valve.

On reactor system outflow lines, the inboard isolation valves shall be closed by a power supply which is separate from that utilized by the outboard valve. The inboard valve shall close automatically upon selected isolation signals, whether or not the valve is normally closed during power operation. The outboard valve, if normally closed during power operation is not required to close automatically. If the outboard valve is normally open during power operation, this valve shall automatically close upon selected isolation signals.

Instrument lines and control rod drive hydraulic system lines are exceptions to the above criteria because they terminate in closed systems. The control rod drive hydraulic system control valves are also considered as isolation valves. No additional isolation valves are required for these lines. Reactor instrumentation lines shall utilize one excess flow check valve located outside the drywell and block valve which is provided for maintenance use. Where practical, instrumentation lines shall be 1-inch in diameter, or greater, to minimize the possibility of instrument line rupture.

Automatic valves in reactor system lines shall be capable of closure from appropriate isolation signals in a time such that the reactor fuel would not be damaged as a result of overheating if the line beyond the valve were to rupture. Unless otherwise specified, the closure time shall be 3 to 10 seconds for the main steam line isolation valves. Unless otherwise specified, all other gate isolation valves shall close at the rate of 12 inches of valve stem travel per minute minimum, and all other globe isolation valves shall close at the rate of 4 inches per minute minimum.

All valves in series shall be provided with a test connection between the valves. Bypass valves are not permitted unless they are also automatic isolation valves.

4.3.2 <u>Isolation Valves In Other Lines Penetrating the Primary Containment</u>

Isolation valves on other lines penetrating the primary containment (but not the reactor system) shall be located outside the primary containment.

4.3.2 (Continued)

Lines which open into the drywell, and whose external branches do not terminate in dead end service, capable of withstanding drywell design conditions, shall utilize two (2) isolation valves in series. The isolation valves shall be capable of remote operation from the control room and local control station if required by contract, or automatic operation by selected signals from the Reactor Protection System (example: Drywell vent lines).

Lines which open into the drywell and suppression chamber, and whose external branches terminate in dead end service capable of withstanding drywell design conditions, shall utilize one locally operated block valve. No isolation valve is required (example: Drywell & Suppression Chamber pressure instrumentation lines).

Lines which penetrate but do not open into the drywell, and whose external branches do not terminate in dead end service capable of withstanding drywell design conditions, shall utilize one remotely operable isolation valve or one (1) check valve (example: Closed cooling water lines).

Lines which open into the suppression chamber, and whose branches do not terminate in dead end service capable of withstanding suppression chamber design conditions, shall utilize one remotely operated or self-actuated valve (example: High pressure coolant injection system and reactor core isolation cooling system).

Exceptions to the above are suppression chamber vacuum relief lines, which utilize self-actuated and power operated valves in series, and lines which are considered extensions of the containment (core spray, residual heat removal and high pressure coolant injection) shall utilize no automatic isolation valves.

Unless otherwise specified, the above isolation valves shall close at the rate of 12 inches of valve stem travel per minute minimum.

All valves in series shall be provided with a test connection between valves. By-pass valves are not permitted unless they are also automatic isolation valves.

4.3.3 <u>Isolation Valves in Lines Penetrating the Secondary Containment</u>

Two (2) isolation valves in series shall be provided on reactor building ventilation ducts, except for the controlled leakage ventilation system ducts. Both valves shall close automatically from appropriate signals and shall also be capable of remote manual closure from the control room or locally if required by contract. Lines that do not open into the building, either directly or through equipment vented to the building, require no isolation valves. Other lines penetrating the building shall be provided with seals or isolation valves as necessary to limit the building in-leakage rate to the specified value.

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4.4.4 Primary Containment Electrical Penetrations

Electrical penetrations shall be in accordance with the Primary Containment Penetration Specification.

4.5 Primary and Secondary Containment Venting and Vacuum Relief Systems

4.5.1 Primary Containment Venting

During startup, the primary containment will have to be vented to provide pressure relief due to drywell temperature changes. Venting shall be accomplished through the suppression chamber and drywell vents which discharge to the standby gas treatment system or directly to the secondary reactor containment ventilation exhaust.

4.5.2 Primary Containment Vacuum Relief

The primary containment vacuum relief system shall [illegible] e utilized to limit the negative pressure that the containment may be subjec[illegible] z post-accident conditions, or normal operations.

Vacuum relief air is automatically supplied to the suppression chamber if the internal pressure drops to a negative 0.50 psi. Drywell makeup air is supplied from the suppression chamber through the suppression-chamber-to-drywell vacuum breakers. The pressure suppression chamber vacuum relief device draws air from the secondary containment. Two (2) vacuum breakers in series shall be utilized in each of two (2) parallel lines to the reactor building. One valve will be actuated by a differential pressure signal, the second valve will be self-actuating.

4.5.3 Secondary Containment Venting

Pressure relief panels, or other venting devices, shall be provided for the secondary containment to prevent structural damage to the support structures in the event of a line rupture within the building. The panel design pressure shall be equal to, or less than, the internal positive pressure specified for the secondary containment.

4.5.4 Primary Containment Cooling

The primary containment cooling (spray) system shall be in accordance with the Residual Heat Removal System P&ID.

4.6 Primary and Secondary Containment Testing Requirements

4.6.1 Primary Containment Leak Rate Test

The primary containment shall be subjected to a leak rate test to demonstrate that the leak rate does not exceed that specified in paragraph 4.1.6.2. Provisions shall

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