

August 26, 1983

Docket No. 50-293

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

Dear Mr. Harrington:

SUBJECT: IGSCC INSPECTION ORDER CONFIRMING SHUTDOWN

Re: Pilgrim Nuclear Power Station

The Commission has issued the enclosed subject Order related to intergranular stress corrosion cracking (IGSCC) inspection for the Pilgrim Nuclear Power Station.

A copy of this Order is being filed with the Office of the Federal Register for publication.

Sincerely,

Original signed by/

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

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Enclosure:  
Order

cc w/enclosure:  
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Mr. William D. Harrington  
Boston Edison Company  
Pilgrim Nuclear Power Station

cc:

Mr. Charles J. Mathis, Station Mgr.  
Boston Edison Company  
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Mr. Robert M. Hallisey, Director  
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600 Washington Street, Room 770  
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Results of these and other inspections pursuant to IE Bulletins 82-03 and 83-02 have revealed extensive cracking in large-diameter recirculation and residual heat removal system piping. In almost every case, where inspections were performed, IGSCC was discovered and, in many cases, repairs, analysis, and additional surveillance conditions were required. In view of the foregoing and the fact that the facility is similar in design to plants where IGSCC has occurred, there is a significant potential for IGSCC to exist in this facility and this facility may not fully satisfy all applicable 10 CFR Part 50 General Design Criteria. Therefore inspection is required to determine the extent of IGSCC and to ascertain, if necessary, the degree of remedial action.

By letter dated July 21, 1983, the staff, pursuant to 10 CFR 50.54(f), requested the licensee to provide a justification for continued operation of the facility prior to completing the inspections of IE Bulletin 83-02. The licensee responded by letters dated August 4, 10, and 22, 1983. The licensee also attended a public meeting held in Bethesda, Maryland on August 8, 1983. In the correspondence and meetings, the following issues were discussed with the licensee: (1) costs and impacts of accelerating the inspection schedule; (2) an augmented leakage monitoring program; (3) visual inspection for leakage during shutdown; and (4) informing the reactor operators of the concern about pipe cracks and the greater potential need to implement LOCA emergency procedures and leak detection procedures.

The following information was provided by the licensee. Ultrasonic examinations of selected pipe welds in the Recirculation and Residual Heat Removal (RHR) systems were conducted during the refueling outages which commenced in 1980 and 1981 and, according to BECo, satisfied the sensitivity requirements of IE Bulletin 83-02.

The inspection firm that conducted the examinations during both refueling outages has subsequently validated three examination teams in accordance with IE Bulletin 83-02, and one team in accordance with IE Bulletin 82-03.

The procedures used during the 1981 outage were discussed with the NRC staff prior to utilization.

It should also be noted that of the personnel who had been validated to either IE Bulletin 83-02 or IE Bulletin 82-03, six took part in the 1980 and 1981 examinations.

As of this time, 23 recirculation system piping welds have been examined during two outages, using the modified equipment, technique and procedure criteria.

It is therefore BECo's position that inspections capable of detecting IGSCC have been performed since 1980 and that the scope of these inspections was comparable to that required by IE Bulletin 83-02. The 1980 and 1981 examination results revealed no unacceptable indications.

In April 1982, BECo conducted the ten year hydrostatic pressure test of the Class I piping systems in Pilgrim Station. The hydrostatic pressure tests were conducted in accordance with the requirements of ASME Section XI, 1977 edition, winter 1978 addenda. No unacceptable leakage was observed during the hydrostatic pressure test of the Class I systems.

In June 1983, Pilgrim Station was twice voluntarily removed from service to investigate the source of drywell leakage. During these investigations, BECo personnel visually examined the recirculation system for any evidence

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of leakage. Both investigations determined the source of the leakage to be from mechanical joints. An inspection of this type was also conducted in late July 1983. In attempting to be responsive to concerns regarding IGSCC, BECo changed their procedures to instruct operating personnel to be in a shutdown condition within 24 hours if an increase in unidentified leakage in excess of 2 gallons per minute occurs within a period of 24 hours or less. This procedure augments the Technical Specification that unidentified leakage shall not exceed 5 gallons per minute. Regarding performing some of the IEB 83-02 inspections during an unscheduled outage of undefined length, BECo considered inspecting some welds between now and their scheduled refueling outage using Ultrasonic Test (UT) techniques for detection and discrimination if they incur an outage that is predicted from the beginning to be 10 days or more in cold shutdown. The number of welds to be inspected would be established so that inspection activities would not be on the critical path for the shutdown.

In response to concerns regarding leak rate measurement capability, BECo proposed a more restrictive administrative limit. The present Technical Specifications permit power operation for seven days after the sump sampling system is made or found inoperable. The new limit would require that the sump sampling system be returned to operable status within three days, or a shutdown shall be initiated and the reactor shall be in cold shutdown within 24 hours.

In view of the previously observed cracking at other similar operating facilities, the public health, safety and interest requires that (1) the licensee's earliest practicable date for conducting UT inspections be confirmed, (2) the proposed compensatory measures be modified as provided in Section III, and (3) prior to startup the scope of the inspections be expanded as provided in Section III of this Order and appropriate remedial actions be taken.

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Accordingly, I have determined that the public health, safety and interest require that these actions should be implemented by an immediately effective Order, and that the required compensatory measures required provide reasonable assurance that the facility can operate safely prior to conducting the inspections.

### III.

Accordingly, pursuant to sections 103, 161i, 161o, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 50, IT IS HEREBY ORDERED EFFECTIVE IMMEDIATELY THAT:

- A. Notwithstanding the current Technical Specifications for the facility and during the interim period prior to the conduct of the inspection discussed in III.C below, the following compensatory measures shall be implemented:
1. The reactor coolant system leakage shall be limited to a 2 gpm increase in unidentified leakage within any 24 hour period (leakage shall be monitored and recorded once every 4 hours). Should this leakage limit be exceeded, the unit shall immediately start an orderly shutdown. The unit shall be placed in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours.
  2. The primary containment sump collection and flow monitoring system shall be operable. With the primary containment sump collection and flow monitoring system inoperable, restore the inoperable system to operable status within 24 hours or immediately initiate an orderly shutdown and be in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours.

3. A visual examination for leakage of the reactor coolant piping shall be performed during each plant outage anticipated to be 48 hours or more. The examination shall be performed consistent with the requirements of IWA-5241 and IWA-5242 of the 1980 Edition of Section XI of the ASME Boiler and Pressure Vessel Code. The system boundary subject to the examination shall be in accordance with IWA-5221.
  4. All systems/subsystems of the ECCS shall be operable as defined in the plant Technical Specifications. With any one system/subsystem of the ECCS inoperable, restore the inoperable system/subsystem to operable status within 72 hours or immediately initiate an orderly shutdown. The unit shall be placed in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours.
  5. Within 24 hours of receipt of this Order, the licensee shall initiate refresher training on leak monitoring and LOCA mitigation to all licensed personnel who would be expected to manipulate reactor controls or supervise control room activities.
- B. The licensee shall shutdown the facility to conduct UT examinations of reactor coolant system piping as soon as practicable but no later than December 10, 1983.
- C. The facility shall remain in cold shutdown until the Director, Office of Nuclear Reactor Regulation, finds that the licensee has satisfactorily completed the following actions or has provided adequate justification for not completing a given action.

1. To the extent practicable, the licensee shall conduct an ultrasonic examination of 100%, but in no case less than the number specified in Attachment A to the July 21, 1983 50.54(f) letters, of the welds involving 304 stainless steel piping of greater than or equal to 4" in the following systems or portions thereof:
  - a. Recirculation System
  - b. ASME Code Class 1 Portion of the Residual Heat Removal System
  - c. ASME Code Class 1 Portion of the Core Spray System external to the Reactor Vessel
  - d. ASME Code Class 1 Portion of the Reactor Cleanup System
2. Within 10 days of the date of this Order or prior to the commencement of the inspections required by this Order, whichever is later, the licensee shall provide to the Director, Office of Nuclear Reactor Regulation, a list of the welds specified above that it does not intend to inspect during this current outage together with a suitable technical justification for not conducting such inspections at this time. This list should identify each weld not being inspected by system, location and size.
3. All UT personnel conducting these inspections shall have received appropriate training in IGSCC inspection using cracked thick-wall pipe specimens. All Level II and III UT operators shall have successfully completed the performance demonstration tests described in IEB 83-02. The footnote on page 4 of IEB 83-02, which allowed qualification under IEB 82-03, Revision 1, is no longer applicable.
4. Based on the results of the inspections, the licensee shall take appropriate corrective actions.

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5. The licensee shall provide a report of the results of the inspection and the corrective actions taken. This report should also include the susceptibility matrix for welds examined (e.g., stress rule index and carbon content). The written report shall be submitted to the Director, Office of Nuclear Reactor Regulation, Washington, D. C. 20555, under oath or affirmation, under provisions of Section 182a, Atomic Energy Act of 1954, as amended, with copies to the appropriate Regional Administrator and the Director, Office of Inspection and Enforcement. Other reports generated, such as may be required by Technical Specifications, shall also be provided.
- D. The Director, Office of Nuclear Reactor Regulation, may relax or rescind any of the above conditions in writing for good cause shown by the licensee.

#### IV.

The licensee may request a hearing on this Order within 20 days of the date of publication of this Order in the Federal Register. Any request for a hearing shall be addressed to the Director, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555. A copy shall also be sent to the Executive Legal Director at the same address. A REQUEST FOR HEARING SHALL NOT STAY THE IMMEDIATE EFFECTIVENESS OF THIS ORDER.

If a hearing is to be held, the Commission will issue an Order designating the time and place of any such hearing.

If a hearing is held concerning this Order, the issue to be considered at the hearing shall be whether, on the basis of the matters set forth in Section II of the Order, the licensee should comply with the requirements set forth in Section III of this Order. This Order is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Harold R. Denton, Director  
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland  
this 26th day of August, 1983.