



Boston Edison

Pilgrim Nuclear Power Station
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I&E Bulletin 80-13

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BECo Ltr. #2.97.033
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U.S. Nuclear Regulatory Commission
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INSPECTION OF CORE SPRAY PIPING INTERNALS AT PILGRIM

- References:
1. BECo Letter No. 96-091, "Pilgrim Station 1996 On-line and 1997 Refueling Outage 11 Inservice Inspection Plan", dated October 30, 1996.
 2. NRC Bulletin 80-13 Reporting of Core Spray Piping Inspection Findings, (FAX) dated February 21, 1997

This letter provides our 30-day report of the results of core spray piping and sparger inspections and evaluations of flaw indications. This information is provided for NRC review and approval prior to restart of Pilgrim Nuclear Power Station, as required by NRC Bulletin 80-13. Pilgrim is scheduled to be ready for resumption of reactor operation on March 29, 1997.

In Reference (1), Boston Edison Company (BECo) provided the NRC with its plan for performing core spray system inspections (internal to the reactor pressure vessel) during refueling outage (RFO) #11 in accordance with BWRVIP-18 guidelines and NRC Bulletin 80-13. Pursuant to Bulletin 80-13, on February 21, 1997, we reported the inspection findings to the NRC Resident Inspector, NRC Region I, and NRR staff (Reference 2). In a telephone conference call on March 3, 1997, we updated information on the inspection findings, discussed the results of our inspections, answered NRC staff questions, and agreed to submit the inspection results and evaluations for NRC review. This letter and the attached GE report provide inspection results and flaw evaluations.

No indications were found during visual examination of the piping, spargers, and brackets included in Reference (1). Ultrasonic examination of core spray piping revealed six welds with flaw indications. The core spray inspection methodology and results are presented in Attachment 1. The flaw evaluations are presented in Attachment 2 (GE Report, GE-NE-B13-

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01869-028, Rev. 0). The flaw evaluation methodology is presented in GE-NE-B13-01869-02, Rev. 1 (an appendix to GE-NE-B13-01869-028, Rev. 0.)

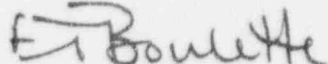
We evaluated the crack growth rate of the P5 welds and the impact of leakage through the cracks upon the core spray flow. Our evaluation concluded the leakage through the cracks would be negligible for two cycles and would not impact the core spray flow required to maintain core cooling. Further, our evaluation of the other flaw indications presented in the GE report concluded core spray system integrity and performance are not compromised for continued operation of Pilgrim during the next fuel cycle (12). BECo will submit its plans for reinspection and repair of the core spray piping internal to the reactor vessel to the NRC three months prior to the start of RFO# 12.

We request NRC review and approval of core spray piping flaw evaluations to allow restart of Pilgrim Station on March 29, 1997.

If you have any questions regarding the information contained in this letter, please contact Walter Lobo at (508) 830-7940.

Commitment

BECo will submit its plans for reinspection and repair of the core spray piping internal to the reactor vessel to the NRC three months prior to the start of RFO# 12


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Attachment 1: Core Spray Internal Piping and Sparger Examination Methodology and Results

Attachment 2: GE Report, GE-NE-B13-01869-028, Rev. 0.

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ATTACHMENT #1



Boston Edison

PILGRIM NUCLEAR POWER STATION

REFUELING OUTAGE 11

CORE SPRAY INTERNAL PIPING AND SPARGER

EXAMINATION METHODOLOGY

AND

RESULTS

MARCH 1997

TABLE OF CONTENTS

1. Background
2. Scope of Examination
3. Inspection Results

Figure: Core Spray Piping Configuration

CORE SPRAY INTERNAL PIPING AND SPARGER EXAMINATION
METHODOLOGY AND RESULTS

1. Background

NRC IE Bulletin 80-13 identified instances of cracking in core spray spargers in BWR facilities. The bulletin required inspections of core spray spargers and piping between the inlet nozzle and the vessel shroud during each refueling outage until further notice. In the event cracks are identified, an evaluation is required to be submitted to the NRC for review and approval prior to return to operation.

The Boiling Water Reactor Vessel and Internals Project has developed guidelines, "BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines" (BWRVIP-18), dated July 1996. The guidelines describe locations in the core spray piping and spargers where inspection is needed, extent of inspection and reinspection for each location, flaw evaluation procedures, and reporting of inspection results.

2. Scope of Examination

By letter dated October 30, 1996, BECo provided its plan to conduct the following examinations during the 1997 refueling outage:

- a. Remote ultrasonic examination of accessible portions of circumferential piping welds between the core spray tee box and the shroud penetration (~ 44 welds) in accordance with BWRVIP-18 guidelines. Welds inaccessible to the ultrasonic test (UT) method were visually examined to the extent possible using the enhanced visual test (EVT-1) method.
- b. VT-1 examination of spargers to 1 mil resolution in accordance with Bulletin 80-13 requirements.
- c. VT-1 examination of sparger brackets to 1 mil resolution in accordance with BWRVIP-18 guidelines.

The above inspection elements were intended to provide the most thorough assessment possible of the core spray piping configuration shown in the enclosed figure.

BECo modified the scope and examination techniques previously used to perform inspections of the core spray internals pursuant to Bulletin 80-13. This modification followed the industry guidance contained in BWRVIP-18 guidelines. The scope and examination techniques previously used for the core spray spargers did not change and followed the guidelines in IEB 80-13. Using the BWRVIP-18 guidance for the inspection and scope of the core spray internal downcomer piping, a baseline inspection of all welds was performed. For those welds that were not accessible using UT, BECo followed the BWRVIP-18 guidance for enhanced visual examination (EVT-1) which is capable of achieving a resolution of 0.5 mil.

The inspection methods used by BECo focused on areas of the core spray piping that are likely to experience intergranular-stress corrosion cracking (IGSCC).

Of the 44 accessible core spray welds, 27 were examined exclusively by ultrasonic, 14 exclusively by visual, and 3 by a combination of visual and ultrasonic methods. The

P8a and P4d welds (total of 8) were not ultrasonically qualified on mockup samples and were, therefore, visually examined. The P3 (total of 4) and two of the P4a welds were not accessible to the scanner and were also visually examined. Three welds did not receive sufficient ultrasonic coverage (90%) and were also visually examined.

Welds excluded from the scope of examination due to access are the P9 (internal to the collar) and thermal sleeve welds upstream of the P1 (thermal sleeve to T box). The P9 weld is inaccessible to visual and UT examination. This weld is one of four typical welds and is located under the collar in the core spray piping just before it enters the shroud.

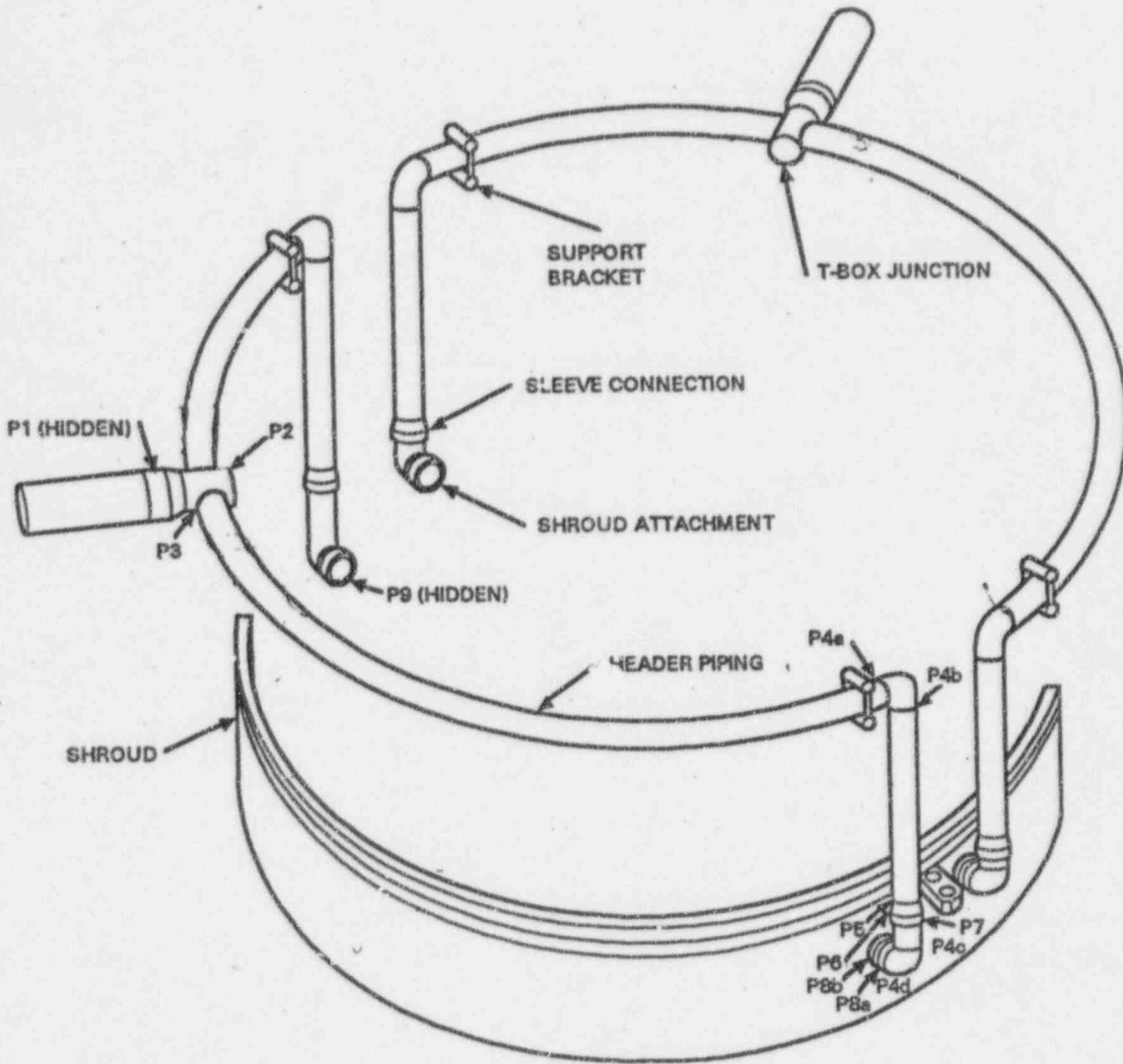
The accessible core spray piping welds internal to the reactor pressure vessel were ultrasonically examined where possible and visually examined when ultrasonic examination was ineffective. The ultrasonic examination was performed with a remote scanner that was positioned with a submarine device. The ultrasonic procedure used was qualified on mockup samples provided by the Boiling Water Reactor Vessel and Internals Project (BWRVIP), which provides assurance of the capabilities of the examination. The visual examination was performed using enhanced methods which require cleaning the weld surface and sensitivity sufficient to resolve a 0.5 mil diameter wire resolution.

3. Inspection Results

The core spray piping brackets and the core spray spargers and brackets were visually examined to a 1 mil wire resolution, as required by IE Bulletin 80-13. No indications were found.

UT examinations conducted in accordance with BWRVIP-18 identified flaw indications in six welds as shown in Table 1 of GE Report No. GE-NE-B13-01869-028, Rev. 0 (attached).

The remaining core spray piping welds were examined using enhanced visual techniques. No indications were found.



Core Spray Piping Configuration

ATTACHMENT 2

GE Report, GE-NE-B13-01869-028, Rev. 0.