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BECo. Ltr. #81-155

Mr. Darrell G. Eisenhut, Director  
Division of Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

License No. DPR-35  
Docket No. 50-293

NUREG-0313, Rev. 1 - Technical Report  
Material Selection & Processing Guidelines  
for BWR Coolant Pressure Boundary Piping

Reference a.) BECo.'s Letter 77-180 of  
December 12, 1977 to the  
NRC's Mr. D. K. Davis,  
Acting Chief Operating  
Reactor Branch #2

Dear Sir:

In your letter of February 26, 1981 you requested that Boston Edison Company (BECo.) review all ASME Code Class 1 & 2 pressure boundary piping, safe ends and fitting material including weld metal at Pilgrim Nuclear Power Station (PNPS) to determine if it meets the guidelines set forth in NUREG 0313, Rev. 1.

Most of the questions addressed in NUREG 0313, Rev. 1 have been answered in our letter 77-180, Ref. a.). Additional questions are addressed in Enclosure A. Since the developmental items identified in Rev. 1 of NUREG 0313 are for future improvements and are not required for present plant safety we intend to use the NUREG 0313, Rev. 1 as a guideline for operating practice to avoid intergranular stress corrosion cracking (IGSCC) in pressure boundary piping.

Since IGSCC is not a safety issue and our present surveillance practices would give timely warning of possible impending leakage we are not proposing to replace non-conforming materials in service sensitive lines. We will examine methods such as heat sink welding and induction heating stress improvement with a view to using them to reduce the possibility of IGSCC.

Should you have any additional questions on this subject, please do not hesitate to contact us.

Very truly yours,

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Attachment

## Attachment A

Summary of review performed in accordance with NUREG 0313, Rev. 1.

### Item #1

Implementation of material selection, testing and processing of materials.

### Response #1

We have classified our pressure boundary lines into service sensitive and non-service sensitive with conforming and non-conforming materials. Most of this is described in our Letter 77-180, Ref. a.), changes and updates are detailed later in this enclosure.

### Item #2

Incorporation of methods to minimize stresses and IGSCC.

### Response #2

BECO. has supported research into methods for avoiding IGSCC at welds and intend to apply proven methods into future repairs or to reduce potential for IGSCC at critical welds.

### Item #3

List lines that are service sensitive

### Response #3

In accordance with criteria given in Section IV B of NUREG 0313, Rev. 1 BECO. lists the following lines as service sensitive:

- A) Core Spray
- B) Recirculation Riser
- C) Pipe Extension/Stud Tubes remaining from recirculation bypass.
- D) CRD Return Lines
- E) Recirculation Inlet Lines at safe ends where crevices exist.
- F) Shutdown heat exchanger lines.

### Item #4

List non-conforming lines that are service sensitive.

### Response #4

Non-conforming lines that are service sensitive:

- A) Core Spray Lines - The lines between the first valve and the outboard isolation valve remains Type 304, between the vessel and the first valve the line was replaced with ASTM 333, Grade B carbon steel during the 1977 refueling outage.
- B) Recirculation Risers - These are 12" lines and are of Type 304 stainless steel.
- C) Recirculation Bypass Stubs and Caps - These are 4" schedule 80 lines, Type 304 stainless steel with welded inconel caps. The remainder of the line was removed during the 1977 refueling outage.
- D) CRD Return Lines - These lines were removed during the last outage.
- E) Recirculation Inlets and Safe Ends - The gap between safe end and thermal sleeve is approximately 1/8" deep. However, the end of the thermal sleeve is less than 2 pipe diameters from the outlet of the elbows at the top of the recirculation risers. The velocity distribution across the vertical diameter of the pipe at the elbow exit will be non uniform, higher at the top of the pipe than the bottom. This non uniform distribution will persist for up to 5 diameters downstream and when it impinges on the thermal sleeve will continually flush the gap region. Thus we consider that impurities will not gather in significant amounts under the safe ends at PNPS, and thus the safe ends at the recirculation inlets need not be subjected to augmented ISI.
- F) Shutdown Heat Exchanger Lines (RHR Lines) - The portion of these lines attached to the recirculation loops and out to the outboard isolation valves are of Type 304 stainless steel. The remainder of these lines are carbon steel.