

LIS ORIGINAL

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

SSINS No.: 6820
Accessions No.:
7912190650

April 7, 1980

IE Bulletin No. 80-08

EXAMINATION OF CONTAINMENT LINER PENETRATION WELDS

Description of Circumstances:

On March 20-23, 1979, an NRC inspection at Nine Mile Point Unit 2, identified that certain nondestructive examinations performed on containment penetration welds did not satisfy the applicable ASME Boiler and Pressure Vessel (B&PV) Code requirements. The welds in question were the primary piping containment penetration flued head (integral fitting) to outer sleeve welds which form a part of the containment pressure boundary. The examinations performed included ultrasonic and surface inspections of the outer surface.

Subsequent to the identification of this code problem at Nine Mile Point Unit 2, three welds previously found to be acceptable using ultrasonics were radiographed and two revealed indications in excess of the code allowable. The indications revealed by radiography were slag and lack-of-fusion. Preliminary NRC review indicates that the probable reason the indications were not detected by ultrasonics was due to masking from signals received from the backing bar. As a result of these findings, a complete re-examination program at Nine Mile Point Unit 2 was initiated wherein 10 of 17 welds previously examined and found to be acceptable using ultrasonics, were re-examined by radiography before rework and found to have indications exceeding ASME Code allowables.

Additional information concerning Beaver Valley Unit 2 and North Anna 3 and 4 has also shown cases of flued head piping penetration weld defects exceeding ASME B&PV Code acceptance criteria when radiographed. Original approved vendor procedures at Beaver Valley Unit 2 did not require volumetric examination. Radiography for information purposes disclosed the unacceptable indications at North Anna 3 and 4. Specification deficiencies have also been discovered at Millstone 3 and River Bend where radiography of these welds was not required.

The ASME B&PV Code requires radiography of the subject welds with specified exceptions. The licensees and their architect engineer (Stone and Webster) had specified ultrasonics as the volumetric examination method because, in their judgement, radiography was impractical for the penetration geometry. Radiography was successfully performed at North Anna 3 and 4 prior to the identification of this problem and at Beaver Valley 2 and Nine Mile Point 2 subsequent to NRC inspections. This experience indicates that radiography was meaningful and more practical than UT examination of these penetration welds when backing bars are present.

Action to be Taken by Licensee:

For all power reactor facilities with an operating license or a construction permit:

1. Determine if your facility contains the flued head design for penetration connections, or other designs with containment boundary butt weld(s) between the penetration sleeve and process piping as illustrated in Figure NE 1120-1, Winter 1975 Addenda to the 1974 and later editions of the ASME B&PV Code.
2. If an affirmative answer is reached for Item 1, determine the following:
 - a. Applicability of the ASME Code including year and addenda and/or Regulatory Guide 1.19,
 - b. Type of nondestructive examinations performed during construction,
 - c. Type of weld joint (including pipe material and size) and whether or not backing bars were used,
 - d. Results of construction nondestructive examinations, i.e., if repairs were required, this should be identified including extent of repairs and description of defects encountered during repair, if known.
3. For those facilities committed during construction to perform volumetric examination of such penetrations through SAR commitments which have not performed radiography, justify not performing radiography or submit plans and schedules for performing radiographic examinations.

Within 90 days of the date of this Bulletin, facilities with an operating license or a construction permit shall submit the information requested in Items 1, 2, and 3 of this Bulletin.

Reports shall be submitted to the Regional Director with a copy to the Director, Division of Reactor Construction Inspection, Washington, D. C. 20555.

Approved by GAO, B180225 (R0072); clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

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