

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

February 2, 1988

NRC INFORMATION NOTICE NO. 88-03: CRACKS IN SHROUD SUPPORT ACCESS HOLE
COVER WELDS

Addressees:

All holders of operating licenses or construction permits for boiling water reactors (BWRs).

Purpose:

This notice alerts addressees to the potential for cracks in the welds of the covers of the shroud support access holes within the reactor vessel. The cracks could result in weld failure with resulting formation of loose parts and core by-pass flow. The event described highlights the importance of inspecting the access cover welds. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to preclude similar problems from occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Jet pump BWRs are designed with access holes in the shroud support plate which is located at the bottom of the annulus between the core shroud and the reactor vessel wall. Each reactor vessel has two such holes which are located 180 degrees apart. These holes are used for access during construction and are subsequently closed by welding a plate over the hole. The covers and shroud support ledge are Inconel Alloy 600 material. The connecting weld material is also Inconel 600 (Alloy 182 or 82).

The high residual stresses resulting from welding, along with a possible crevice geometry of the weld, when combined with less than ideal water quality, present a condition conducive to intergranular stress corrosion cracking (ISGCC). This has been recognized by General Electric and, as a result, they have developed a remotely operated ultrasonic testing capability for detecting cracks in the cover plate welds. The first use of this custom ultrasonic testing fixture was at Peach Bottom Unit 3.

On January 21, 1988, intermittent short cracks were found in the weld heat-affected zone around the entire circumference of the covers at Peach Bottom Unit 3. It is estimated that cracking exists over 50% to 60% of the circumference with cusps as deep as 70% through the wall. It is believed that cover plate welds have not been inspected previously on any other BWR. It is possible that the cracking is generic and may, therefore, affect all BWRs with jet pumps.

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Discussion:

General Electric has identified three concerns if failure of the access hole cover plates is postulated due to weld cracking:

1. Loose parts - In the event of complete failure of the access cover weld during normal reactor operation, the slightly higher bottom head area pressure would lift the cover out of its recess. It would most likely fall to one side, but there is a potential for it to be swept into the recirculation pump suction line causing severe pump damage.
2. Core flow bypass (normal operation) - Loss of one or both cover plates would allow some recirculation system flow to bypass the core, from the jet pump discharge through the open access hole to the recirculation pump suction. This flow transient would be readily detectable and would require reactor shutdown.
3. Core flow bypass (Loss of Coolant Accident) - If the access hole cover plate welds were to fail as a direct consequence of a recirculation suction line break, the bypass path would prevent the emergency core cooling system from reflooding the core to the 2/3 level. The core spray system would be capable of maintaining adequate core cooling provided there has been no degradation in the core spray piping.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the technical contact listed below or the Regional Administrator of the appropriate regional office.


Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Warren Hazelton, NRR
(301) 492-0911

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-02	Lost or Stolen Gauges	2/2/88	All NRC licensees authorized to possess gauges under a specific or general license.
88-01	Safety Injection Pipe Failure	1/27/88	All holders of OLs or CPs for nuclear power reactors.
86-81, Supp. 1	Broken External Closure Springs on Atwood & Morrill Main Steam Isolation Valves	1/11/88	All holders of OLs or CPs for nuclear power reactors.
87-67	Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11	12/31/87	All holders of OLs or CPs for nuclear power reactors.
87-66	Inappropriate Application of Commercial-Grade Components	12/31/87	All holders of OLs or CPs for nuclear power reactors.
87-28, Supp. 1	Air Systems Problems at U.S. Light Water Reactors	12/28/87	All holders of OLs or CPs for nuclear power reactors.
87-65	Plant Operation Beyond Analyzed Conditions	12/23/87	All holders of OLs or CPs for nuclear power reactors.
87-64	Conviction for Falsification of Security Training Records	12/22/87	All nuclear power reactor facilities holding an OL or CP and all major fuel facility licensees.

OL = Operating License
CP = Construction Permit

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