December 20, 2005

Mr. Gary C. Park, Chairman
ASME Subcommittee on Nuclear Inservice Inspection
Monticello Nuclear Generating Facility
Monticello, MN 55362

Dear Mr. Park,

Operating experience has demonstrated that Alloy 82/182/600 materials exposed to primary coolant water (or steam) at the normal operating conditions of pressurized water reactor (PWR) plants have cracked due to primary water stress corrosion cracking (PWSCC). A number of domestic and foreign experiences demonstrate that Alloy 82/182 materials used to make dissimilar metal (DM) butt weld connections in the reactor coolant pressure boundary (RCPB) of PWR plants are susceptible to PWSCC. These incidents of PWSCC have been identified through the discovery of boric acid deposits from through-wall leaks or by ultrasonic examination. Some of these events have involved circumferential cracking.

The current rules for inservice inspection of DM butt welds are contained in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Section XI of the ASME Code requires that DM butt welds with nominal pipe size 4 inches and larger be ultrasonically examined once every 10-year interval. Section XI also requires that ultrasonic examination procedures, equipment, and personnel be qualified by performance demonstration in accordance with the requirements of Section XI, Appendix VIII. There is enough operating experience of leakage and cracks/flaws to support the position that current ASME Code inspection requirements need improvement for managing PWSCC. The Nuclear Regulatory Commission (NRC) considers this issue to be safety significant.

In recognition of this issue, the Materials Reliability Program (MRP) recently issued MRP-139, Rev. 0, “Primary System Piping Butt Weld Inspection and Evaluation Guideline,” as mandatory requirements under the Nuclear Energy Institute (NEI) initiative, NEI-03-08. The NRC staff provided comments on MRP-139 to NEI in an October 12, 2005 letter. Among other comments NRC staff recommended that the industry consider developing a plan for codification of inspection and evaluation guidelines including flaw evaluation methodologies, inspections, inspection schedules, and mitigation techniques.

The topic of codification of DM butt weld inspection and flaw evaluation rules was discussed at the November 2005 ASME Code, Section XI, meetings in Greensboro, NC. We understand that agreement was reached to codify rules for flaw evaluation and certain mitigation techniques and that the decision to codify inspection requirements is still pending further consideration. We believe that codifying inspection requirements should not require significant resources or seriously impact MRP. A good deal of industry participation on MRP-139 took place in reaching agreement on the inspection rules.

Many stakeholders for nuclear power, including the NRC, rely on the ASME Code to set the standards for maintaining pressure boundary integrity. Given the operating experience with PWSCC and the serious challenges posed by potential failure of the RCPB, we believe that it is essential that an appropriate regulatory footprint be established for inspection of DM butt welds. I am requesting that the ASME Section XI take the actions necessary to develop the needed improvements to the existing Code requirements. It is our preference that these inspection requirements be developed by the ASME Code. If the Code requirements are found acceptable by the NRC, they will be incorporated by reference into our regulations. NRC staff will fully support and participate in the effort I am requesting to ensure that differences are eliminated or at least minimized. If ASME cannot support development of improved requirements for DM butt welds, NRC may need to pursue other means to codify the needed requirements in its regulations.

Sincerely,

/RA/ R. W. Borchardt for

J. E. Dyer, Director
Office of Nuclear Reactor Regulation

cc: K. R. Balkey, Chairman, BNCS
J. Ling, Associate Executive Director, ASME Codes and Standards
K. Ennis, Director, Nuclear Codes and Standards
P. McCullough, V.P. Accreditation, Institute of Nuclear Power Operations
G. L. Vine, Executive Director, Washington Representative, EPRI
R. L. Dyle, Southern Company

References: See next page

REFERENCES:

1. NRC Information Notice 2000-017, “Crack in Weld Area of Reactor Coolant System Hot Leg Piping at V. C. Summer,” October 18, 2000
2. NRC Information Notice 2004-11, “Cracking in Pressurizer Safety and Relief Nozzles and in Surge Line Nozzle,” May 6, 2004
3. NRC Bulletin 2004-01, “Inspection of Alloy 82/182/600 Materials Used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors,” May 28, 2004
4. Materials Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guideline (MRP-139), July 2005
5. M.E. Mayfield, NRC, to A. Marion, NEI, letter on MRP-139, October 12, 2005 (ML052720290)

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