May 3, 2010

MEMORANDUM TO: David L. Rudland, Acting Chief
Component Integrity Branch
Division of Engineering
Office of Nuclear Regulatory Research

FROM: Howard J. Rathbun, Mechanical Engineer ***/RA/***
Component Integrity Branch
Division of Engineering
Office of Nuclear Regulatory Research

SUBJECT: SUMMARY OF PUBLIC MEETING BETWEEN THE NUCLEAR REGULATORY COMMISSION STAFF AND REPRESENTATIVES OF THE NUCLEAR POWER INDUSTRY REGARDING EXCAVATE AND RE-WELD REPAIR/MITIGATION TECHNIQUE FOR PIPING

On April 29, 2010, Nuclear Regulatory Commission (NRC) staff met with representatives of the Electric Power Research Institute (EPRI), Structural Integrity Associates (SIA), Entergy, and Dominion Power at a Category 2 public meeting at the NRC's Church Street office in Rockville, Maryland. The purpose of this meeting was to discuss the new Excavate and Re-Weld Repair/Mitigation (EWR) technique being considered for nuclear power plant piping. A summary of the meeting concerning these activities is provided below.

**Summary**

Mr. Sims of Entergy provided an overview of the EWR technique, which involves removal of a significant portion (approximately 50%) of the wall thickness of a dissimilar metal weld from the outer diameter, and replacement with an alloy that is less susceptible to primary water stress corrosion cracking (PWSCC). The EWR can be performed pre-emptively as a PWSCC mitigation technique, or upon discovery of an existing flaw as a repair. In addition, the EWR can be applied to a partial arc of the weld, or to the full weld circumference.

Next, Mr. Riccardella of SIA then discussed the development of design requirements, including the fundamental mitigation/repair concept, the extent of excavation, residual stress and crack growth considerations, and ASME Code requirements. Mr. Smith of SIA followed with a discussion of materials and welding considerations, including cavity excavation, tooling and welding challenges. Mr. Riccardella of SIA discussed inspection requirements prior to during and following the excavation and re-weld process. Finally, Mr. Willis of EPRI discussed the industry's plans to study the technique's feasibility, including mockup fabrication, testing and analysis.

Throughout the meeting, NRC staff members provided feedback to the industry representatives on the proposed EWR technique. The two most significant technical issues raised by the NRC staff involved i) potential stress concentrations at the ends of partial arc repairs and ii) chromium dilution at the re-weld interface with the existing pipe segments creating a PWSCC-susceptible propagation path. The industry representatives indicated that they will investigate these concerns.

The industry is currently completing a feasibility study on the EWR technique to determine if it is viable for mitigation and repair purposes in nuclear power plant piping. This feasibility study will be complete by late summer 2010. At that point, if the feasibility study is successful, the industry will notify the NRC staff of its intentions to move forward with formal review and approval of the method.

Enclosures:
1. List of Attendees
2. Agenda
3. EPRI: Excavate and Weld Repair (EWR) Concept
4. NRC: Excavate and Re-Weld Mitigation/Repair Technique for Piping

Throughout the meeting, NRC staff members provided feedback to the industry representatives on the proposed EWR technique. The two most significant technical issues raised by the NRC staff involved i) potential stress concentrations at the ends of partial arc repairs and ii) chromium dilution at the re-weld interface with the existing pipe segments creating a PWSCC-susceptible propagation path. The industry representatives indicated that they will investigate these concerns.

The industry is currently completing a feasibility study on the EWR technique to determine if it is viable for mitigation and repair purposes in nuclear power plant piping. This feasibility study will be complete by late summer 2010. At that point, if the feasibility study is successful, the industry will notify the NRC staff of its intentions to move forward with formal review and approval of the method.

Enclosures:
1. List of Attendees
2. Agenda
3. EPRI: Excavate and Weld Repair (EWR) Concept
4. NRC: Excavate and Re-Weld Mitigation/Repair Technique for Piping

**DISTRIBUTION:**

| | | | |
|---|---|---|---|
| DE r/f | S. Richards, RES | T. Lupold, NRR | M. Evans, NRR |
| Public | R. Tregoning, RES | R. Hardies, NRR | J. Tsao, NRR |
| M. Case, RES | M. Kerr, RES | J. Collins, NRR | |

**ADAMS Accession No.: ML101230121**

| OFFICE | RES/DE/CIB | SUNSI REVIEW | RES/DE/CIB |
|---|---|---|---|
| NAME | H. Rathbun | H. Rathbun | D. Rudland *(H. Rathbun for)* |
| DATE | 05/03/10 | 05/03/10 | 05/03/10 |

**OFFICIAL RECORD COPY**