



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005

May 5, 2003

MEMORANDUM TO: Russell L. Bywater, Senior Resident Inspector

FROM: Dwight D. Chamberlain, Director **/RA/ DDC 5/5/03**  
Division of Reactor Safety

SUBJECT: CHARTER FOR THE NRC SPECIAL INSPECTION TEAM AT  
SOUTH TEXAS PROJECT - REVIEW OF LICENSEE ACTIONS  
RELATED TO REACTOR VESSEL BOTTOM MOUNTED  
INSTRUMENTATION PENETRATION LEAKAGE

On April 12, 2003, at South Texas, Unit 1, indications were discovered of potential reactor coolant system pressure boundary leakage at two Alloy 600 reactor vessel bottom-mounted instrumentation (BMI) penetrations. The residue from this leakage was subsequently found to contain both boric acid and long-term radionuclides, confirming the source to be the reactor coolant system. Because of uncertainties in the characteristics of the degradation that caused the leakage, the potential generic implications and the risk significance of a breach in the bottom head of the reactor vessel, a special inspection team is being chartered. Although the risk significance of the BMI penetration leakage may be low at South Texas Project, the uncertainties associated with the cause and the potential generic implications warrant a special inspection team review. You are hereby designated as the team leader.

A. Basis

On April 12, 2003, during a refueling outage at South Texas, Unit 1, the licensee performed a bare metal inspection of the reactor vessel bottom head under its Generic Letter 88-05 boric acid inspection program. The inspection revealed potential leak indications at the penetration interface for the bottom-mounted instrumentation Penetrations 1 and 46. The reactor vessel contains 58 (0.6 inch inside-diameter) BMI penetrations used for housing flux monitoring instrumentation. The tube material is Alloy 600, with a J-groove weld configuration and Alloy 82/182 weld material. The quantity of leakage residue at both penetrations was very small, characterized as equivalent to about half the quantity of one aspirin tablet for Penetration 1 (approximately 150 milligrams for Penetration 1 and 3 milligrams for Penetration 46). The licensee sent samples of leakage residue to an outside laboratory for chemical analysis. The results of the initial chemical analysis confirmed that the residue from the penetrations contained boron and some long half-life radionuclides, indicating that the leakage was from the reactor coolant system. The residue removed from Penetration 1 was characterized as "gummy," whereas, the residue from Penetration 46 was characterized as "hard." The licensee stated that there had been no indications of

reactor coolant system leakage at the BMI penetrations during previous outage examinations.

The NRR staff, in concert with Region IV, is maintaining ongoing communications with the licensee and will evaluate the need for any generic communications. During a conference call conducted April 24, 2003, among the licensee, NRR, and Region IV, the licensee committed to submit a letter committing to determine the root cause of the condition, identify the extent of the condition, identify and implement corrective actions, and to meet with NRC to review their actions prior to restart of Unit 1. The letter was issued on April 24, 2003.

A special inspection team will be dispatched to better understand the cause of the leakage, the extent of the condition, potential generic implications, and the corrective actions proposed by the licensee.

Initial risk analyses of the condition, performed by Region IV SRAs and NRR, have been mostly qualitative because of the uncertainty in the extent of the degradation.

#### B. Scope

Specifically, the team is expected to perform data gathering and fact-finding in order to address the following:

1. Develop a chronology of BMI penetration inspection scope and results.
2. Review records associated with the installation of bottom-mounted instrumentation penetrations during original construction and identify techniques and materials used for BMI installation.
3. Review the licensee's program for inspection of pressure boundary leakage associated with the reactor vessel, including inspection techniques and scope, periodicity, and the results of past inspections.
4. Review the licensee's root and probable cause determination for completeness and accuracy including review of any relevant plant-specific and industry (foreign and domestic) operating experience.
5. Review and assess the adequacy of the licensee's evaluation of extent-of-condition as it relates to other penetrations in Unit 1, as well as Unit 2.
6. Review the licensee's risk determination including the operational aspects of recovery from a bottom head loss-of-coolant accident.
7. Review and assess the adequacy of NDE qualification techniques.
8. Review and assess the licensee's prompt and long-term corrective actions to address the root and probable causes of the condition. Assess the adequacy of

repair activities and independently verify information submitted in support of NRC review of any code repairs.

9. Review the circumstances associated with the leaking bottom-mounted instrument penetrations and identify potential generic safety concerns in a timely manner to regional management.

C. Team Members

- Matt Mitchell, Senior Materials Engineer
- Dr. Steve Doctor, Contractor
- Wayne Sifre, Reactor Inspector
- Neil O'Keefe, Senior Resident Inspector
- Mike Runyan, Part Time Risk Assessment Support

D. Guidance

This memorandum designates you as the special inspection team leader. Your duties will be as described in Inspection Procedure 93812, "Special Inspection." The team composition has been discussed with you directly. During performance of the special inspection activities assigned to them, designated team members are separated from their normal duties and report directly to you. The team is to emphasize fact finding in its review of the circumstances surrounding the event, and it is not the responsibility of the team to examine the regulatory process. Safety concerns identified that are not directly related to the event should be reported to the Region IV office for appropriate action.

You should notify the licensee and the team should begin inspection activities on or before May 6, 2003, based on the licensee's schedule of activities. You should conduct an entrance with the licensee at the appropriate time at the site. The inspection should be completed prior to restart of Unit 1 with a report documenting the results of the inspection, including findings and conclusions, issued within 30 days of the public exit meeting. While the team is active, you will provide periodic status briefings to Region IV management.

This Charter may be modified should the team develop significant new information that warrants review. Should you have any questions concerning this Charter, contact Dwight Chamberlain, Director, Division of Reactor Safety, at (817) 860-8180.

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