

June 13, 2003

Mr. Frederick I. Rippee  
1510 SE 71<sup>st</sup> Avenue  
Hillsboro, OR 97123

Dear Mr. Rippee:

I am responding to your electronic mail (e-mail), sent May 1, 2003, to the web site of the U.S. Nuclear Regulatory Commission (NRC). In your e-mail, you identify concerns and questions about the recent experience of small leaks from the bottom mounted instrumentation (BMI) penetrations on the reactor vessel at South Texas Project (STP), Unit 1, and the proposed repairs to those penetrations.

Cracks in two (2) BMI penetrations at STP, Unit 1, resulted in the leakage of borated reactor coolant into the annulus region between the tube made of Alloy 600 and the carbon steel reactor vessel bottom head (see images on the NRC web site at (<http://www.nrc.gov/reactors/operating/ops-experience/bottom-head-penetration-leakage.html>)). The inspections completed thus far have not detected wastage or general corrosion of the reactor vessel bottom head. STP Nuclear Operating Company, the licensee, plans to do additional inspections during the repair of the leaking penetrations to ensure that wastage of the reactor vessel head bottom head has not occurred. The NRC staff is closely following the inspections and analyses being performed by the licensee in their attempt to determine the cause of the cracks discovered on the STP, Unit 1, BMI penetrations. Details of the inspections performed to date are provided on the NRC web site in the handouts from a meeting held on June 5, 2003. The web site will continue to be updated to provide information about the licensee's inspections and their investigation into the cause of the cracks. These efforts will support the decisions by the licensee, nuclear industry, and the NRC regarding the appropriate inspections of penetrations at STP, Unit 2, and other pressurized water reactors.

As you mentioned in your e-mail, the licensee is currently planning to repair the penetration by removing part of the affected BMI tubes and welding a new tube to the exterior of the bottom head (the half-nozzle repair described in the licensee's presentations available on the NRC web site). The licensee will submit information regarding the repair to the NRC for review, and the repair method will need to be approved by the NRC staff prior to the unit returning to operation. The licensee's proposed repair, analysis, and inspection plans will need to consider the associated operating conditions that exist following the repair, including borated water entering into the annulus region and contacting the carbon steel reactor vessel. This issue is discussed in the handouts provided by the licensee for the meeting held on June 5, 2003.

Another e-mail dated April 9, 2002, was attached to your May 1, 2003, e-mail and provided a discussion regarding the probable cause of nozzle cracking and corrosion in reactor vessel upper heads such as what occurred at Davis-Besse. It appears that we did not respond to that e-mail and for that I apologize. As you mentioned, the nuclear industry and NRC staff have reached a consensus view that the most likely cause of problems with reactor vessel upper heads is related to primary water stress corrosion cracking (PWSCC). We appreciate your observations and challenge to that hypothesis. A significant amount of information about the activities of the nuclear industry and NRC regarding reactor vessel upper heads and PWSCC is available on the NRC web site. Additional inspections of reactor vessel upper head penetrations are being conducted as required by Orders issued by the NRC in February 2003. These inspections and ongoing research by the nuclear industry and the NRC will continue to increase our understanding of the material behavior of the upper head penetrations. The lessons learned from the inspections and research will form the bases for revisions to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code and NRC requirements defined in Title 10 of the *Code of Federal Regulations*. The planned actions will be revised if the inspection results or research activities identify concerns other than PWSCC as significant contributors to the cracking of reactor vessel upper head penetration nozzles.

If you have any further concerns or questions about our response to your concerns, please contact Bill Reckley at (301) 415-1323 or by e-mail at [wdr@nrc.gov](mailto:wdr@nrc.gov).

Sincerely,

***/RA/***

Robert A. Gramm, Chief, Section 1  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

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Sincerely,

*/RA/*

Robert A. Gramm, Chief, Section 1  
 Project Directorate IV  
 Division of Licensing Project Management  
 Office of Nuclear Reactor Regulation

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