

NRC Perspectives on PWR Materials Issues

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Abstract

There are several common characteristics to the materials degradation issues that the U.S. nuclear industry and U.S. Nuclear Regulatory Commission deal with on a regular basis. First, typical issues in the materials degradation area are highly complex issues which often require the integration of a number of technical specialties and practical experience to resolve successfully. Second, these issues, particularly when they involve the reactor coolant pressure boundary, almost always generate a great deal of attention from all levels within the NRC, as well as industry personnel, members of the general public, and even international utilities and regulators. Communicating effectively with all of these stakeholders to keep them informed about the progress that is being made toward resolution is critical. Finally, the dedication exhibited by staff who work diligently to come up with the right answers when problems are identified is a key factor in our ability to resolve issues and continue to protect the public health and safety.

This presentation will discuss four current materials-related topics which are of significant interest to the NRC:

1. Pressurized Water Reactor Reactor Pressure Vessel Internals Aging Management
2. Reactor Pressure Vessel Head Penetration Cracking at Davis-Besse
3. Outside Diameter Cracking of Stainless Steel Piping
4. Developments in Repair and Mitigation Technology

An overview of the historical background of each topic is provided along with a characterization of the current status and the next steps in addressing each item.

In conclusion, several important common themes are highlighted relative to the resolution of these, and other, materials degradation-related issues. First, when the NRC is presented with a piece of operating experience regarding a materials degradation issue, it is evaluated from the perspective of a plant-specific issue and for its generic implications for the U.S. nuclear fleet as a whole. Second, whenever these events occur, frequent, accurate, and timely communication between an affected utility, industry representatives, and the NRC staff is critical in ensuring the successful resolution of an issue. Finally, having the industry and individual licensees take steps to proactively address an issue which may reasonably be expected to manifest itself at U.S. facilities before it become an emerging crisis is an important step in materials degradation management. The NRC's perception is that a trend toward this has been observed as the industry's materials programs have matured over the years.