

Talking Points on Reactor Vessel Cladding Cracking

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- 1) As part of the required periodic inspections performed at nuclear power plants, the inside of the reactor vessel is examined.
- 2) The reactor vessel is primarily constructed of low alloy steel. The inside surface of the reactor vessel has a thin layer of stainless steel, called cladding, that provides a corrosion resistant surface. The low alloy steel portion is relied on for the structural integrity of the vessel.
- 3) Vermont Yankee initially identified cracks in their reactor vessel cladding surfaces during the 1992 refueling outage. These cracks were observed visually and have been identified at other plants.
- 4) Between the 1992 and the 2002 refueling outages, Vermont Yankee examined the surface of their reactor vessel cladding in accordance with industry guidance (GE RICSIL 539, dated November 5, 1991), and determined that none of the cladding cracks had propagated into the low alloy steel pressure retaining portion of the reactor vessel. Reactor vessel weld ultrasonic examinations performed during the Spring 2004 refueling outage at Vermont Yankee again indicated that none of the examined cladding cracks had propagated into the low alloy steel portion of the reactor vessel.
- 5) The primary mechanism believed responsible for the cracking of the cladding is known as stress corrosion cracking, an aging mechanism that affects stainless steel materials. Cracking of the cladding is not expected to propagate into the low alloy steel reactor vessel since this material is resistant to stress corrosion cracking.
- 6) The American Society of Mechanical Engineers (ASME) Code states that flaws that lie entirely in the cladding do not need to be evaluated. The NRC staff believes that the current condition of the cladding does not represent a problem with respect to integrity of the reactor vessel for plant startup after completion of Spring 2004 refueling outage.
- 7) It is noted that reactor vessel cladding cracking is not unusual, however, due to the current political situation associated with the Vermont Yankee power uprate, the NRC staff wants to ensure that the public is informed of issues that could be of potential interest.