

## **N262. The Safety of French Pressurized Water Reactors: A Regulator's Perspective**

Standardization is a key feature of France's pressurized water reactors. For the safety authority, this essential fact is the starting point for all in-depth safety assessments.

One of the most important safety issues is about reactor pressure vessel head penetration cracking, which were first observed in September 1991, and were found to be due to a stress corrosion phenomenon which affects the material (Alloy 600) from which the penetrations are made.

By the end of 1992, out of 18 reactors checked, 13 were shown to be affected, with 5% of the penetrations showing the anomaly. The same anomaly has since been observed on sister reactors built elsewhere in the world. The cracking, in its current form, does not compromise safety. Nonetheless, it requires certain measures to be taken:

- Extended inspections on the entire population of plants.
- Temporary repairs as soon as cracks are detected.
- Development of final solutions.

EdF has placed an order for 13 new vessel heads fitted with penetrations made from an improved material (Alloy 690) and is working to perfect a process to replace the affected penetrations.

The strategy put forward by EdF in response to the three measures was examined at the beginning of this year by DSIN (Direction de la Sûreté des Installations Nucléaires) and its technical support units. DSIN accepted it with the notable proviso that the temporary repair criteria be strengthened.

*Taken from, "Facing up to the Future: The Safety of French Pressurized Water Reactors - A Regulator's Perspective," by A.C. Lacoste, Nuclear Engineering International, pp. 51-53, Dec. 1993.*