

N3. Enriched Boric Acid Promises Greater Flexibility For PWRs

Boric acid is widely used in PWRs as a chemical shim. It is added to the reactor cooling water along with lithium hydroxide, which counterbalances the pH of the boric acid.

Studies have indicated that there are many potential benefits in replacing the natural boric acid with boron 10 enriched material. Thus, research has tended to indicate that high pH (7.4 or greater) can reduce the precipitation and subsequent activation of nickel ferrite. By keeping the nickel ferrite in solution the radiation exposure associated with nickel ferrite activation is greatly reduced. Use of enriched boric acid makes it possible to operate at a pH of 7.4 for the entire fuel cycle, instead of just the last few months.

A further benefit could be that high pH may eliminate or delay the initiation of primary water stress corrosion cracking in steam generator tubes.

Other benefits of utilizing enriched boron are that the amount of heat tracing required are minimized or eliminated. It also has potential for extended fuel cycles without major modifications.

As utilities look to extend plant life, enriched boric acid will allow for reduced concentrations to provide an overall less corrosive environment for the plant.

For more, see Jost, M.L., Nucl. Eng. Intl., Vol. 34, No. 423, October 1989, p.47.