

Conversion to Enriched Boric Acid Operation (EBA)

Enables the control of higher neutron fluxes

Most effective approach to fulfill requirements resulting from advanced fuel concepts involving extended cycles and high discharge burn-up

Challenge

Increased fuel economy like higher fuel burn-up, longer fuel cycles or higher enriched nuclear fuel results in increased demands on the moderation and primary coolant chemistry. The concentration of B-10 boric acid is limited at natural boric acid (NBA), leading to higher boric acid concentrations in the primary coolant and long operation phases at an unfavorable pH. Higher boric acid concentrations increase the risk of axial offset anomalies caused by precipitation of boron compounds on the fuel cladding and dose rate build-up.

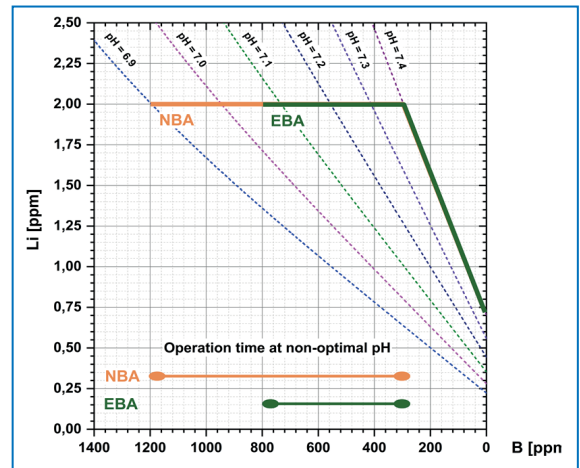
Solution

Our experience in introducing Enriched Boric Acid (EBA) operation as an advanced reactivity control measure enables operators of nuclear power plants to control higher neutron fluxes. EBA allows the operation of the entire PWR fuel cycle at favored pH values of 7.2 - 7.4 which mitigates corrosion product formation. Thus, the application of EBA provides advantages in enhancing life time of several components and increasing operational safety, lowering the total boron concentration or facilitating dose rate reduction programs in PWRs and VVER nuclear power plants.

Customer benefits

- Moderating high neutron population (introduction of MOX fuel)
- Reduced total boron concentration enabling elevated pH (300°C) strategies
- Decreased amount of boric acid waste
- (Facilitating) dose rate reduction (ALARA)
- Reduced volume of borated water system tanks

Your performance is our everyday commitment

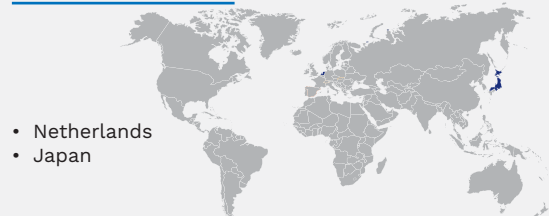


pH progression with natural and enriched boric acid

Concept of shifting process

- Detailed analysis ensuring consideration of all relevant systems
- No impact on plant safety at any time of the change-over process
- Plant operation is impacted as low as possible
- No extension of plant outage for refueling or for maintenance
- Minimizing costs for B-10 and produced waste
- Ensure safe shutdown reactivity in safety relevant parts

References



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