FR22: IAEA-CN-291/445

Rebuttal

The authors would like to thank the reviewers for their valuable suggestions. The responses from the authors are as given below

Comments of Reviewer 1:

This paper studies about sodium interaction with thermal insulation and effects of reaction products on the structural material. Exposed specimen indicated a reduction in threshold fracture toughness compared to that of unexposed ones. In the case of actual plants, exposed area seems to be limited. Therefore, impact of experimental results on the plants is expected to be discussed.

Authors Response:

* Preliminary investigations indicated dealloying of SS316LN specimen near to the interaction zone
* Reduced initiation fracture toughness
* Further long-term exposures are planned, for establishing the rate of dealloying, leaching saturation limits and also to understand the influence of exposure time on crack growth in Paris regime
* Results of the above studies include thickness of de-alloyed layer, modified Paris constants, threshold fracture toughness, will aid as inputs for damage tolerant design of sodium piping for existing and new plants

Comments of Reviewer 2:

The paper presented the investigation of sodium interaction with thermal insulation and the effects of the reaction products on the structural materials. No special scientific origins were concluded.

Authors Response:

Yes, as the reviewer rightly pointed out, these are preliminary studies towards understanding the nature of compounds that form during sodium insulation interaction and their influence on crack growth structural material however some important qualitative conclusions were arrived at as given below

* Peak intensities of the ternary oxides of sodium, iron and other elements in the XRD plots, indicate that their presence outnumbered binary oxides, supporting the fact that their formation results in lower Gibbs free energy
* Absence of compounds of transition metals in combination of silica and alumina in the samples retrieved from the surface of the SS specimen indicate silicates and aluminates are stable and will not contribute to dealloying of SS.