Reviewer comments and author responses

Authors would like to thank both reviewers for their comments and also would like to thank them for their kind appreciation and encouragement. The authors thank all referees for recognizing the importance of the present work in sodium-cooled fast reactor technology. For ease in reading the rebuttal, the referee comments are categorized as comment (C) and our response (R).

Reviewer # 1

"The manuscript is well written and nice to read. Only one request:"

(C) Please when mentioning the mesh, provide the y+ values of the cell adjacent to the walls and check whether they are in line with the applied high Re turbulence model.

(R) The value of y^+ maintained for the mesh produced for the study is updated in the manuscript.

Reviewer # 2

"This paper gives a good summary of work done to optimize the design of secondary side of a sodium-sodium IHX. While the paper may be accepted as is, the author's may choose to address the following points to further the impact of the paper:"

(C) Are there any expected uncertainties resulting from using an isothermal model to represent a highly non-isothermal system?

(R) As indicated by the reviewer, IHX represents a highly non – isothermal system due to heat exchange between primary and secondary sodium in the shell and tube heat exchanger. However, the thermal implications on the hydraulic properties of liquid sodium (on the primary and secondary sides) are insignificant for the given ΔT of ~ 40^oC. Moreover, the present study focuses on the hydraulic analysis of the bottom header of IHX and does not include any heat transfer. However, it is planned to carry out a CFD simulation for thermal hydraulics analysis for the IHX bottom header.

(C) It would be interesting know how the pressure losses across the secondary side of the IHX change as the vertical baffle height changes.

(R) The present study's primary objective was to obtain the flow distribution of secondary sodium by introducing a verticle baffle. However, it is agreed that the pressure losses, which is an essential factor in such vital and significant component, need to be inspected. The study of pressure loss distribution and variation with baffle height is to be considered for the next phase of research.

(C) Is there any consideration to move the vertical baffle from the 18th row to the ~20th row. It seems this has the potential to help the velocity distribution match the desired shape even better.

(R) The authors are thankful to the reviewer for the valuable comments. Currently, the study includes only the present configuration of the baffle positioned in 18th row. Based on the observation and suggestion by the reviewer, it is planned to execute this study further with a baffle positioned at ~20th row.

(C) It is somewhat difficult to distinguish the curves in figure 3. This may be due to the resolution of the plot/pdf, but adding different colors, linestyles, or more distinct markers to the plot may help.

(R) The figure in the manuscript is changed with colored line styles according to the reviewer comments.

(C) Is there any future work associated with this research.

(R) As indicated earlier by the reviewer, it is planned to carry out CFD simulations with heat transfer considerations and new positioning of the baffle plate from the 18th to 20th row.