**IAEA-CN-291: ANSWERS TO THE REVIEWERS’ COMMENTS**

A judge has requested some **changes** to your paper **ALFRED FLOW BOCKAGE ANALYSIS**.

Comment:

Dear authors, please find below the comments from the peer review.

**Reviewer 1**: No suggestions for improvements.

Thank you.

**Reviewer 2**: The paper is well written and interesting. However, I have a few important remarks which deserve attention.

*Section 1*: The authors refer to previous work on ALFRED fuel assemblies blockage simulations, but they are apparently not aware of the work of Mathur et al. (NED, 2020) which deals with the same kind of analyses on internal blockages in grid spaced fuel assemblies for ALFRED.

Thank you for your help. Mathur et al. (NED,2020) reference was added in the manuscript in section1.

*Section 3*: The authors claim that the SST k-omega model is the most used turbulence model in CFD. Are you sure about this statement? Can you provide evidence? I suggest to rephrase this to the fact that k-omega is widely used in...

Thank you and sorry for the possible misunderstanding. We rephrased the sentence as “k-omega is widely used in…”.

Section 3: On the use of the SST k-omega model: The SST k-omega model is an isotropic model, whereas it is well known that the flow in grid spaced fuel assemblies exhibits secondary flows and should be treated by anisotropic turbulence models for accurate prediction.

I would like to answer as stated in the manuscript:

“Although the model is isotropic, the structural feature of the model to predict in a good way flow separation and recirculation gives a good confidence in applying the model to compute thermal hydraulics in fuel subassemblies”.

*Section 5*: The authors refer to and use the Cheng and Todreas correlation [17]. Did you check whether this value changed in the upgraded version of the correlation published in 2018?

Thanks for your suggestion, the fuel bundle has a Re number of about 50,000 (higher than the Ret value of the CT updated correlation). In this case, the estimated friction factor does not change from the previous correlation. Anyway, the C&T reference was updated in the paper.

*Section 5*: Conclusions are drawn with respect to the size of the flow recirculation. I would suggest to check whether this is sensitive to applying other turbulence models, especially anisotropic models, e.g. non-linear or RSM models.

Thank you for your precious suggestion. In section 5 of the manuscript, we added a clarification sentence “It must be underlined that these results are obtained with the use of an isotropic turbulence model (SST k-omega) and the application of a RSM second order model could change quantitatively the results. Nevertheless, the present study is a preliminary assessment of the flow blockage in the ALFRED FA.”

*Section 6*: Did the comparison of numerical simulations to experiments give a good agreement? To my experience, prediction of blockage experiments with CFD is difficult and does often not give good comparison. It will be good to spend a short paragraph on the main conclusions from [10].

A sentence was added in the manuscript after the reference to comparison of numerical simulations to experiments: “In this latter case, the comparison between experimental data and CFD numerical simulation was qualitatively good in the prediction of the perturbed region downstream the blockage with an overprediction of the temperature peak”

**Reviewer 3**: The paper is well written. Some additional details on the applicability of a 30% and 50% blockage, and the impact of the geometry of the blockage would improve the paper. Overall: Please upload revised paper incorporating the comments above. If you have additional new relevant data, you are welcome to include these.

Thank you, additional details on the applicability of the blockage were added in section 4.

You may apply the modifications to your paper and submit the modified version (together with any additional files) for review.

In order to do that please proceed to your paper page: