Review of the Project Group:
Group Code: ESBWR 33
Full title: Economic Simplified Boiling Water Reactor

Intended learning outcome (ILO)	Grade (0-3)	Explanation for the grading of the evidences of achieving respective ILO. Suggestions for improvements and other comments
1. *Collect information on* General design specification of the nuclear power plant with selected reactor type (Task 1, ILO1, ILO2)	3	One would expect more general info about the BWR and the motivation to build ESBWR (efficiency and cost reduction). Maybe there should be more information about the active core, especially fuel material, cladding, control & safety rods in the general information section. This way the reader will know that for example the fuel rods are shortened, but will not see the fuel length and material to get general information and could compare the concept with other reactors. Maybe the information about the enrichment would be nice to mention (ESBWR uses natural/low enriched uranium). Overall general description is provided. It would be nice to distinguish between the safety and control rod drive mechanisms, but that is just a small comment. Overall, one could say that the design key elements were discussed. Additional minor improvements might be added.
2. *Describe* Operational principles of the power plant. (Task 2, ILO1, ILO2)	3	**Not a single citation!** The reactivity control systems are nicely described, there is comparison with other BWRs. On the other hand, it would be nice to add additional information about the refueling, spent fuel pool, the problem with power oscillations, how to density of water and void fraction affects the neutron moderation/power distribution and what are the main issues of BWRs when talking about the normal operation. Since the IAEA document is the main source, one would expect the information about the flow maximization and other features (see document [1] – IAEA Status Report). Additional evidences and minor improvements may be added, but the learning outcome was achieved.
3. *Explain* Safety features of the power plant. (Task 3, ILO1, ILO2)	3	**Missing citations!** Comparison of the text about the safety features is in some parts very similar to the IAEA Status Report, yet there are no references. The part about the ECCS would maybe require some figure/picture to be easier for the reader to understand the problematics. It would be nice to describe the

		passive safety systems in more detail, for example how they provide heat removal/reactivity control/prevent fission products from escaping. Still, the learning outcome was achieved.
4. *Calculate* Selected core parameters (Task 4, ILO3)	3	See Table 4.1 – What is active fuel height? Fuel could denote fuel pellet, fuel rod, fuel assembly, active core diameter or equivalent diameter. Still, the value is 5.88 m so it is equivalent core diameter. The references to reactor documentation should be added. When writing physical properties and physical quantities, one should add the unit. Maybe it would be nice to add the used Haaland formula. The pressure-drop, enthalpy, temperature and void fraction calculations provide sufficient description of reactor main parameters, but one would expect more flow characteristics commentary. For example, to describe the behavior of the 0 % power curve at the mass flux of 900 – 1000 kg/m^2s, why the curves never intersect etc. Overall the provided evidences are sufficient to conclude that intended learning outcome has been achieved.
5. *Calculate* CHF margins in a hot channel (Task 5, ILO4a)	2	The parameters mentioned above were calculated and described smoothly. When it comes to calculating the critical heat flux, it would be really beneficial to include the critical heat-flux and real heat-flux density distribution figure and to plot the ratio between them (CPR). From this one could easily understand the critical heat-flux behavior and how it depends on other properties of the hot channel. By doing this, the learning outcome would really be sufficient.
6. *Calculate* Maximum cladding and fuel pellet temperature (Task 6, ILO4b)	3	When finding the highest temperature of the fuel and cladding, sufficient description was provided to show that the learning outcome was achieved. The heat transfer equations were provided with material properties and step-by-step calculation.