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Ranking of nuclear facilities by assessing potential radiation impact on the environment

This research proposes a systematic method to assess and compare nuclear reactor units and other facilities in regard to their potential environmental impact in case of accidental releases. The strategy employed involves computing the radioecological risk, which accounts for the likelihood of an accident, the quantity of radioactive substances that could be discharged, and the influence of such release on the environment.

The tree layer of a pine forest was used as a reference natural community to assess the effects of radiation exposure. The tree layer has been selected as an ideal indicator of changes in the environment, due to its high sensitivity to such occurrences. By employing the radiation exposure index, the researchers aim to accurately characterize the effects of radioactive fallout resulting from these accidents.

Through the implementation of the method, the research team has managed to assess the risk levels of a diverse range of reactor units. This includes such designs like the VVER-1000, VVER-1200, PWR-890, BWR-1412, and EPR-1600. The subsequent radioecological ranking allowed for a comprehensive comparison of these units in terms of their impact on the reference natural community.

Notably, the findings of the study highlighted the VVER-1200 reactor, a new generation design, as the safest option concerning the potential risks posed to biota. This result showcases the positive advancements in reactor technology and reinforces the importance of prioritizing safety measures and innovations in the nuclear power industry.

Overall, this research contributes valuable insights into the field of nuclear power and provides a robust framework for assessing and comparing reactor units, enabling informed decision-making and risk mitigation strategies within the industry.

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