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Considerations on GEN IV safety goals and how to implement them in future Sodium-cooled Fast Reactors (France)

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From a general perspective, generation IV (GEN IV) reactors should excel in safety, and as part of a continuous improvement process, provide safety enhancements with respect to GENIII reactors.
GENIII safety objectives are already very ambitious, notably regarding:
- Prevention of the severe accident;
- Mitigation of the severe accident in the frame of the fourth level of defense in depth;
- Response to external hazards, including natural hazards of extreme intensity.
Concerning GENIV sodium-cooled fast reactors (SFR), the achievement of these ambitious safety objectives and the reinforcement of the robustness of the safety demonstration, will be ensured:
- Firstly, by mastering the sensitive points of the SFR such as neutron reactivity potential of the core, chemical reactivity of sodium, inspection of structures under sodium.
- Secondly, by taking full benefit in the design of the favorable characteristics of the SFR such as large thermal inertia, large margin to boiling, natural convection capabilities and by providing high diversification and independence between safety systems associated to different levels of defense in depth.
The paper presents some of these possible ways of safety improvement for the future SFR.

Country/Int. Organization

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