

International Conference on Fast Reactors and Related Fuel Cycles: Safe Technologies and Sustainable Scenarios (FR13)

Paris – March 4-7, 2013

Closing Session

Peter Lyons, U.S. Department of Energy

Summary of Safety Design Criteria Panel Session I

Panel Members: L. Ren (China), G. Bruna (France), P. Chellapandi (India), R. Nakai (Japan), I. Ashurko (Russia), T. Sofu (USA), J. Yllera (IAEA)

The panel, representing a diverse set of member states with fast reactor programs, presented and discussed various considerations related to Safety Design Criteria (SDC). Most of the discussion centered on SDC for the Sodium Fast Reactor (SFR), but more generally, the discussion could be applied to all fast reactor (FR) concepts.

The details of a recent effort conducted by the multi-lateral Generation IV program to develop SDCs for the SFR were discussed. The SFR SDC were derived from the Generation IV program goals and were developed in a manner that was consistent with the hierarchy found in the IAEA safety standards. Important to this effort was that the SDC took into account the unique aspects of the SFR. This resulted in a number of current Light Water Reactor based criteria being modified and additional criteria specific to SFR were added. The SDC were viewed as a good first step, but needed vetting with other stakeholder organizations and needed more specific definition.

The panelists shared their national views on the need for SDCs, especially for Generation IV reactors. A common theme was that there needed to be a clear differentiation between the criteria for Generation III reactors and Generation IV reactors. Otherwise, it would be difficult to show how safety is being improved in the Generation IV systems.

Other common themes emerging from the discussion included:

The SDCs are very important for both the designer and regulator and a dialog between the two is necessary to come to a common understanding.

While the safety principles should be common, the technology specific SDC should consider the unique aspects of the FR, including coolant, fuel, fuel assembly geometry, and other unique aspects.

The SDCs need to address both accident prevention and consequence mitigation

The SDCs need to include Fukushima lessons learned especially criteria related to complete loss of electrical power, loss of heat sink, and the design basis for external events.