



## **Joint GIF – IAEA Workshop on**

### **Safety Design Criteria for Sodium-Cooled Fast Reactors**

*26 – 27 February 2013*

*International Atomic Energy Agency Headquarters – Vienna, Austria*

#### **TERMS OF REFERENCE**

##### **Background**

Sodium-cooled Fast reactors (SFR) have brought in the last decades to a high level of maturity by the design, construction and operation of experimental and prototype reactors, such as the Fast Flux Test Facility (FFTF) in USA, the small size Prototype Fast Reactor (PFR) in the United Kingdom, the prototype PHÉNIX in France, the BN-350 in Kazakhstan, the demonstration plant BN-600 in Russia, JOYO and MONJU in Japan, the commercial size SUPERPHÉNIX in France, etc.

Several countries are currently engaged in SFR design and construction projects. In China, the 65 MW(th) (20 MW(e)) pool-type China Experimental Fast Reactor (CEFR) reached criticality for the first time on 25 July 2010 and was connected to the grid on 21 July 2011. Fast reactors commercialization in China will follow with the realization of the demonstrative plant CFR-1000 expected to be developed also thanks to international collaborations. Construction works for the India's 500 MW(e) Prototype Fast Breeder Reactor (PFBR) at Kalpakkam are well under way: the commissioning is planned for 2013. Based on the PFBR project achievements, the Indian programme for fast reactors deployment foresees the construction of several CFBR units around 2020-2025 and the development of the future FBRs with metallic fuel and higher breeding ratio beyond 2025. In the Russian Federation, which operates in Beloyarsk the currently most powerful commercial fast reactor BN-600, the construction of the BN-800 on the same site is progressing. Construction completion and start-up of the commissioning phase are planned for 2014. Russian Federation has also recently launched the Federal Target Programme "New generation nuclear power technologies for 2010-2015 with outlook to 2020" aimed, in particular, at the development of the advanced SFR BN-1200, and the new Multipurpose Research Na-cooled Fast Reactor called MBIR. Under its Strategic Energy Technology Plan (SET-Plan), Europe has recently defined the technological pathway for developing fast neutron reactors, which includes the SFR concept as a first track aligned with Europe's prior experience. The related demonstration and implementation programme ESNII (European sustainable nuclear industrial initiative) foresees the realization in France of the GENIV SFR prototype called ASTRID. Japan has been developing the 1500 MW(e) GEN-IV JSFR (Japan sodium-cooled fast reactor) in the frame of its Fast Reactor Cycle Technology (FaCT) project and Republic of Korea is carrying out a broad R&D programme in support of the 600 MW(e) SFR KALIMER.

Besides the national projects, relevant international initiatives have been established in last years in order to promote cooperation among countries with development programmes for advanced SFR. The most relevant are the ones carried out under the auspices of the Generation IV International forum (GIF) and the International Atomic Energy Agency (IAEA).

GIF and IAEA have jointly committed to collaboration between the programmes and to share information in selected areas of mutual interest. One of the key areas of emphasis in both the GIF and the IAEA programmes is the safety of SFR and in particular the harmonization of safety approach, safety requirements and safety design criteria for the GENIV SFRs under development worldwide. The first GIF – IAEA joint SFR workshop, titled “Operational and Safety Aspects of Sodium-Cooled Fast Reactors” was held 23-25 June 2010 at IAEA. This was followed by a second Workshop titled “Safety Aspects of Sodium-cooled Fast Reactors”, held 30 November – 1 December 2011 at IAEA. More recently the IAEA has organized the following other events on safety of SFR:

- Technical Meeting on Impact of the Fukushima event on current and future fast reactor designs, Dresden (Germany), 19-23 March 2012
- IAEA/JAEA International Workshop on prevention and mitigation of severe accidents in Sodium-cooled Fast Reactors”, Tsuruga (Japan), 11-13 June 2012

Finally, the IAEA is organizing an “*International Conference on Fast Reactors and Related Fuel Cycles: Safe Technologies and Sustainable Scenarios (FR13)*”, Paris, 4-7 March 2013; the conference include a track on “*Fast reactor safety: post-Fukushima lessons and goals for next-generation reactors*” and a panel on “*Safety Design Criteria*”.

In all these contexts, it has been underlined the need to develop safety design criteria for innovative (GENIV) SFR which should be harmonized - to the maximum extent - at international level and become part of IAEA recommendations within the set of Safety requirements for innovative SFRs.

### **Objectives of the Meeting**

The main objectives of the meeting are to:

1. Present and share information on the work carried out by GIF, the IAEA and the member states on the definition of safety design criteria for SFR, including safety approach and requirements on general plant design;
2. Present the document prepared by the GIF-SFR Task Force on Safety Design Criteria;
3. Present and discuss safety design concepts of SFRs under development in member states, with particular emphasis on design measures against Design Basis Accidents and Design Extended Conditions, as well as the associated safety evaluations and supporting R&D;
4. Draft a room document which should be the basis of the discussion for the Panel on Safety Design Criteria of the FR13 Conference in Paris .
5. Discuss the results and agree the future actions of the 3<sup>rd</sup> Joint GIF-IAEA Workshop on Safety of Sodium-Cooled Fast Reactors;

### **Programmatic Context**

The Technical Meeting/Workshop is being held under Project 1.1.5.3 (*Support for fast reactor research, technology development and deployment*), 1000021, Task 04 (*Support synergies with 1.1.4 (INPRO), as appropriate, in activities on reactor technology*) of the IAEA’s Programme & Budget 2012–2013.

## **Expected participants**

GIF will provide the final list of participants from their side, including the Chairman, the Technical Director/s and representatives of the SFR task Force on Safety design Criteria.

Non-GIF countries:

2 participants from India (IGCAR and BHAVINI)

1 participant from Germany

Full list of participants is provided separately.

The list of participants from the IAEA offices includes:

- Messrs. A. Bychkov, J.K. Park, T. Koshy , S. Monti, J. Phillips (full list of participants is separate)
- Representatives of other IAEA departments and representatives of the INPRO Group.

## **Location**

The meeting will be held at the Headquarters of the IAEA in Vienna, Austria,

**Press Briefing Room** (Building M), International Atomic Energy Agency (IAEA)

Vienna International Centre. Wagramer Strasse, 5, 1400 Vienna, Austria

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