

# *FBNR Letter*

## **FIXED BED NUCLEAR REACTOR – FBNR**

<http://www.rcgg.ufrgs.br/fbnr.htm>  
[Farhang.Sefidvash@ufrgs.br](mailto:Farhang.Sefidvash@ufrgs.br)



Dear coworkers and potential coworkers around the world,

As the number of coworkers is increasing, we are issuing a circular letter to communicate about the matters of general interest to the FBNR project. Please consider this as a personal letter to yourself. Those who are not involved in the project as yet may participate at any appropriate moment. The project has manifold aspects including scientific, technological, economical, political, and sociological.

A new era of nuclear energy is emerging. The International Atomic Energy Agency has committed itself to “Help to ensure that nuclear energy is available to contribute in fulfilling energy needs in the 21<sup>st</sup> century in a sustainable manner; and to bring together both technology holders and technology users to consider jointly the international and national actions required to achieve desired innovations in nuclear reactors and fuel cycles.”- IAEA-TECDOC-1362.

The objective is to develop an innovative nuclear reactor to be inherently safe, passively cooled, small, modular, and simple in design with integrated primary circuit. Safety is achieved by design, and has reduced adverse impact on environment. It is to meet the requirements of GEN IV and IAEA-INPRO as being economic, safe, proliferation resistant and sustainable.

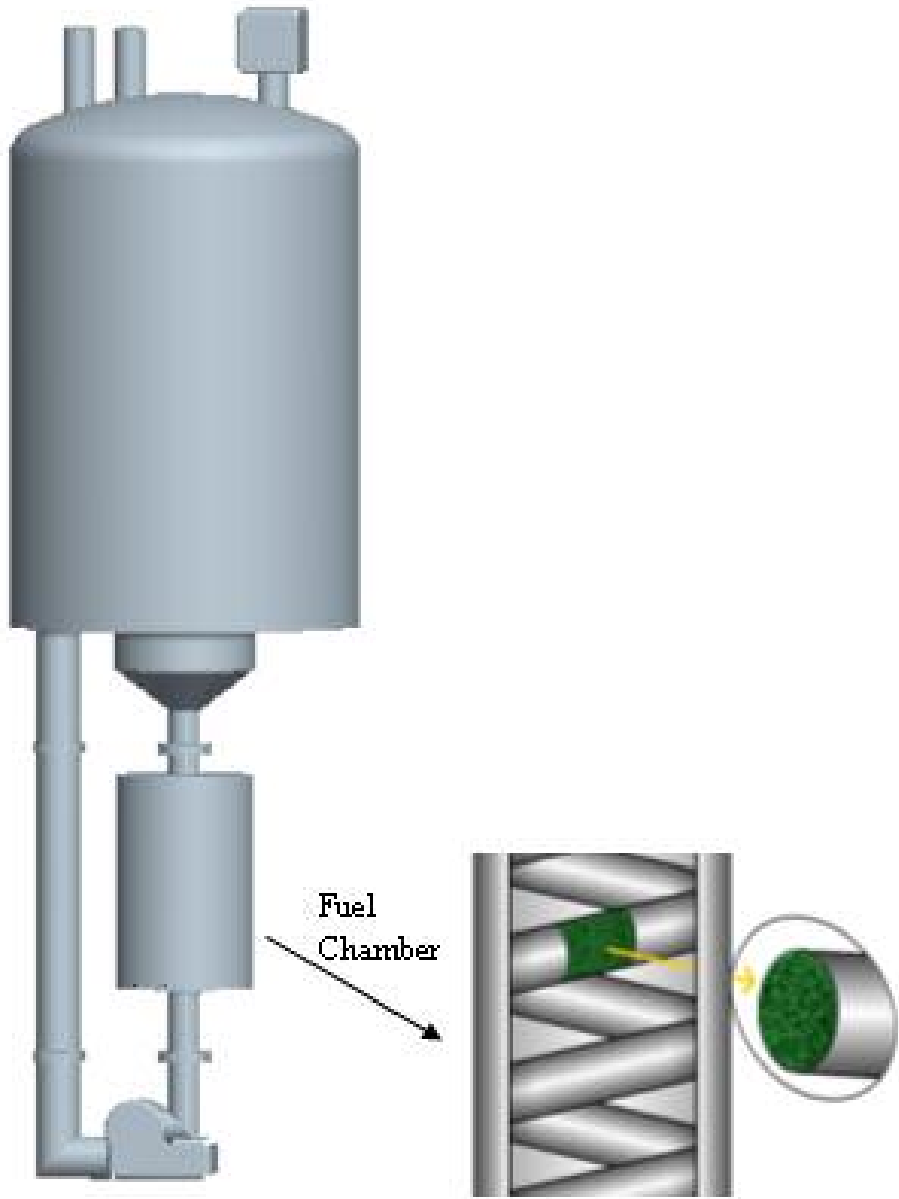
The FBNR may be called People’s Reactor. It is intended to be developed by the peoples for the peoples of the world in the spirit of cooperation and service to humanity. It is intended to be a near term deployment project. Let us form an international consortium to develop this reactor where all members are stakeholders.

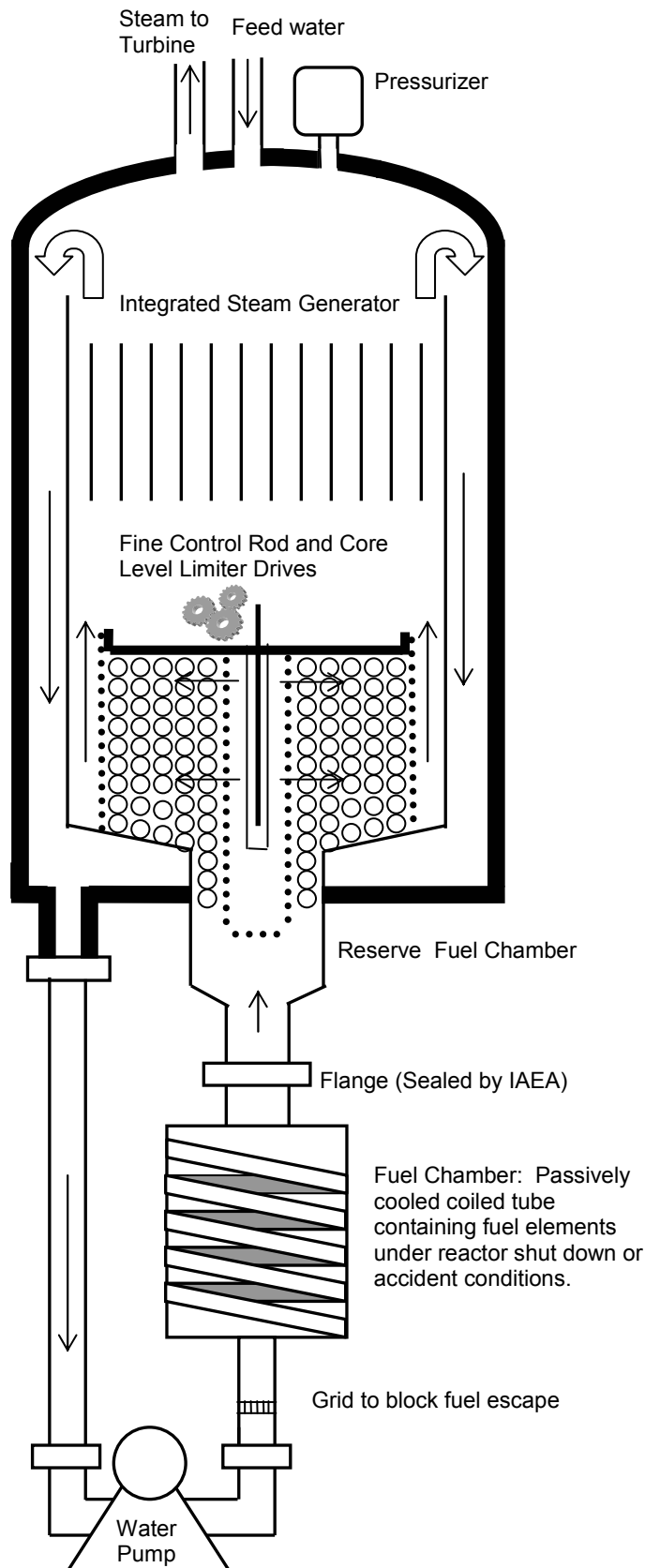
An IAEA Coordinated Research Project (CRP) includes FBNR in its program. **Participate in the project.**

**FBNR Letter 14**                      **December 2, 2004**

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*Schematic Design of the Fixed Bed Nuclear Reactor- FBNR.*





The FBNR is conceived to be an inherently safe and passively cooled reactor.

The 15 mm diameter spherical fuel elements made from TRISO type coated particles are cooled by water under 160 bar pressure.

The flow by the pump drives the fuel elements from the fuel chamber into the reactor core via reserve fuel chamber. The walls of reserve fuel chamber is made of a high neutron absorbing alloy.

The long term reactivity is controlled by adjusting the core height through the core level limiter. The short term reactivity is controlled by the fine control rod located at the centre of the module.

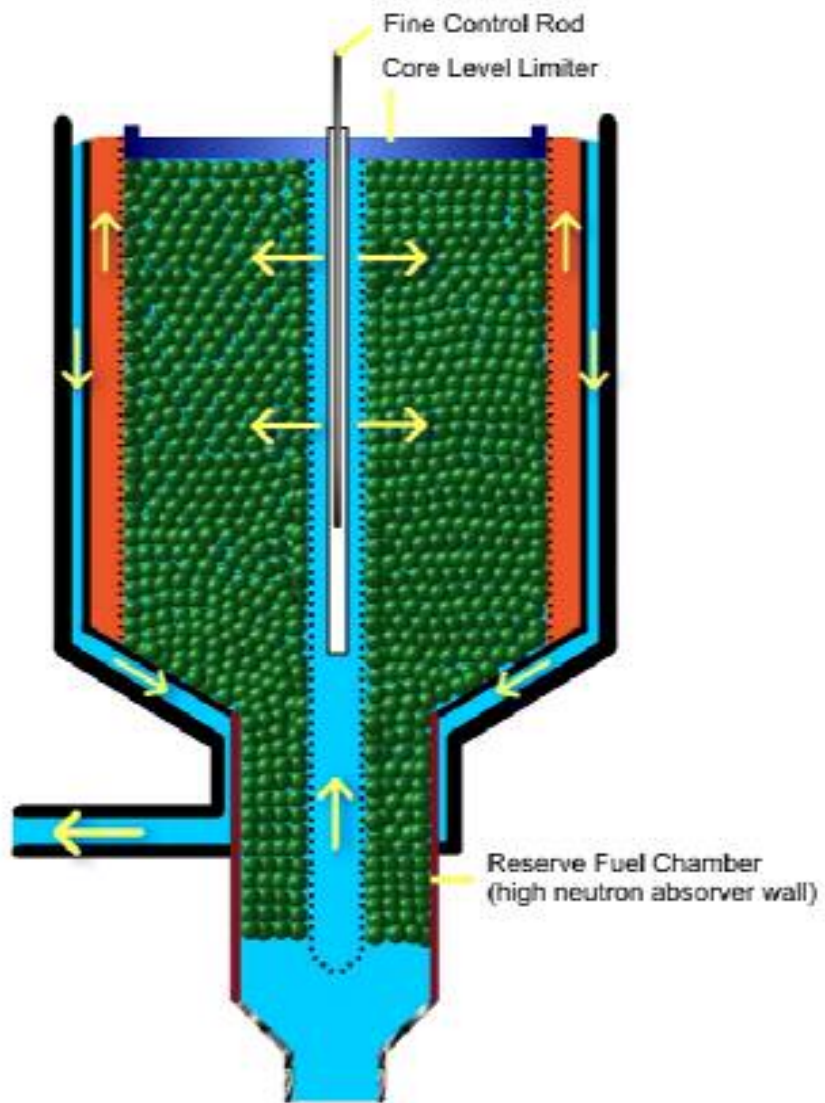
The water heated in the reactor core passes through an integrated steam generator producing steam to drive the turbine.

Any probable accident causes the cutting off of the power to the pump, thus the fuel elements will fall out of the core by the force of gravity and become stored in the passively cooled fuel chamber.

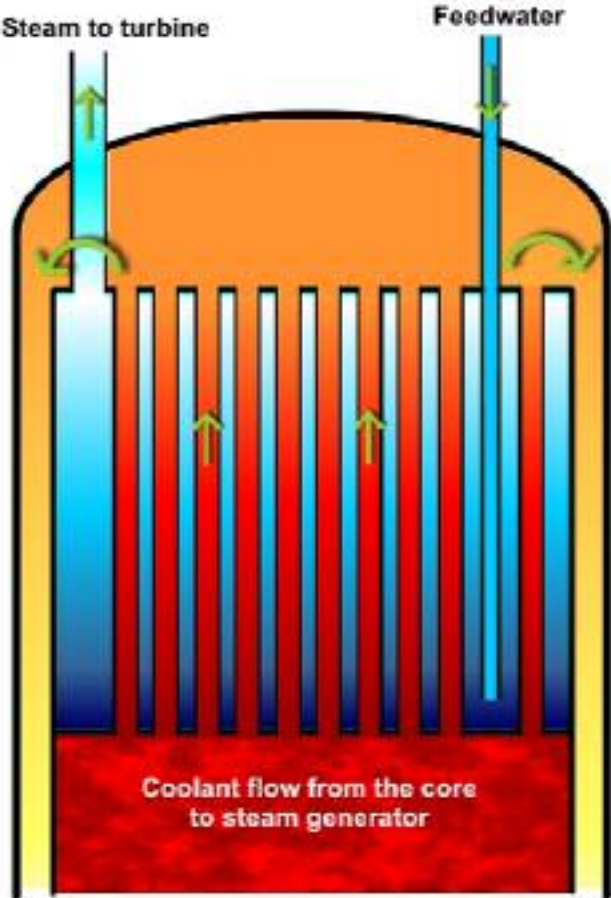
The reactor has non-proliferation characteristics as the fuel elements are confined in the fuel chamber where it can be sealed by IAEA for inspection at the end of fuel life. The reactor vessel is clad by neutron absorbing materials to eliminate the possibility of neutron irradiation to any external fuel. Only the fuel chamber is needed to be transported from factory to the site and return.

For dimensions and material compositions see: <http://www.rcgg.ufrgs.br/FBNRLetterNo.08.pdf>

# Reactor Core



# Integrated Steam Generator



# Fuel Chamber

