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FAST REACTORS : R & D TARGETS AND OUTLOOK FOR THEIR INTRODUCTION.

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This paper contains a brief description of the main reasons of emerging of fast reactors representing separate direction in the nuclear power. The complex story of fast reactors is outlined, including the development of experimental, demonstration and commercial reactors (in some countries).

On the base of the analysis of R & D work results and fast reactor operating experience gained in several countries, conclusion is made on that the technology of these reactors cooled with liquid sodium can be considered as one sufficiently developed from the standpoint of technical approaches and safety assurance.

It is shown that the improvement of parameters, system arrangement and component designs of the sodium cooled fast reactors should be continued in the main following directions:

- Improvement of NPP and fuel cycle economical characteristics. The possibility of considerable increase of economical characteristics of fast reactor NPP is demonstrated using the EFR and the BN-800 reactor designs as examples.

- Increase of fast reactor potential in improving the environmental characteristics of the nuclear fuel cycle.

This aim can be achieved by the development of multi-purpose core designs capable of efficiently burning long lived actinides and fission products, as well as efficiently utilizing both civil and weapons grade plutonium.

The advantages of fast reactors, related to the improvement of the environmental characteristics of the spent nuclear fuel can become apparent when using the optimum structures of nuclear power based on both thermal and fast reactors.

- Further improvement of fast reactor safety systems using passive elements as well as optimization of these systems with the economical factor taken into account.

The examples of up to date fast reactor concepts are: the EFR in Western Europe, the BN-800 reactor in Russia, DFBR in Japan, the PFBR in India, and the LMFR being developed by GE in the USA.

On the basis of analysis of the power development in general and the nuclear power in particular, it is pointed out in this paper that the basic feature of a fast reactor - to efficiently reproduce nuclear fuel - may be needed in the period 2030-2050. Taking into account a successful development of fast reactor technology (Russia, France, Japan) and also some regional peculiarities in power supply or solution of ecological problems, the construction of individual NPPs with fast neutron reactors can be expected in an earlier period (2010-2020).