

SAFETY REVIEW OF THE HIGH FLUX REACTOR

(J. Couturier, H. Abouyeyia, J.F. Barbier and J. Ducau)

In France, nuclear reactors which have been operating for more than 10 years undergo a systematic safety review at the request of the safety authority (DGSNR). For such a review, the applicant has to provide up-to-date safety documents for the installation (safety report, general operating rules, on-site emergency response plan) which take into account the modifications to the site conditions due to human activities or improvements in knowledge, regarding earthquakes for instance. A new chapter must be added to the safety report presenting operational experience feedback and lessons learned from incidents which have occurred in the reactor. At the request of the DGSNR, these documents are then assessed by the IRSN which reports before a standing advisory group of experts (Groupe permanent pour les réacteurs nucléaires). Following this review, the group sends its advice and recommendations to the DGSNR.

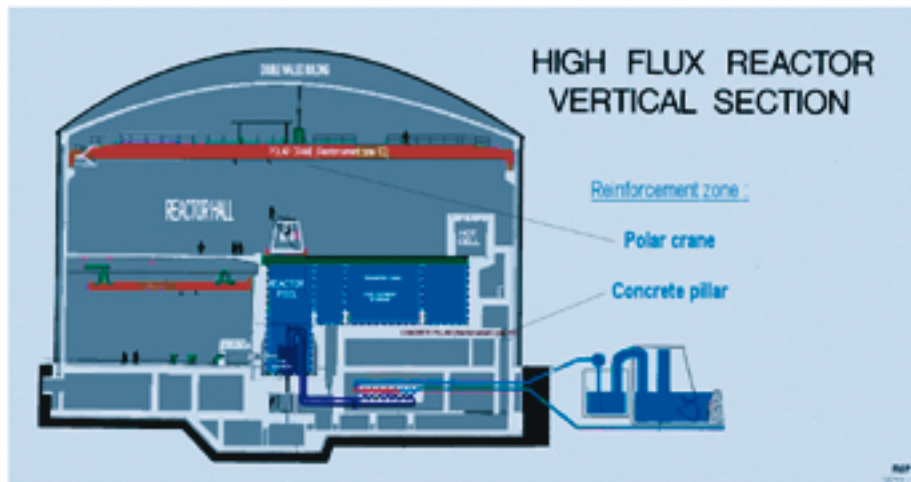
A safety review was carried out in may 2002 for the High Flux Reactor, a 58.3 MW pool-type reactor located in Grenoble nuclear site (ILL - Institut Laue Langevin), used for experiments.



> Scope of the safety review

The safety review covered mainly the following points :

- updated safety documents of the facility ;
- behaviour of the installation in case of an earthquake (SSE: VIII - IX MSK) ; the operating organization had to check the seismic behaviour of the installation, taking into account the seismic spectra of the site which were up-dated in 1996 ;
- thermal-hydraulic studies related to the reactor core ;
- operational experience feedback and lessons learned from incidents ;
- consistency of the reactor design provisions with the current safety criteria, regarding in particular the reactor protection system ;
- fire protection and reactor containment.



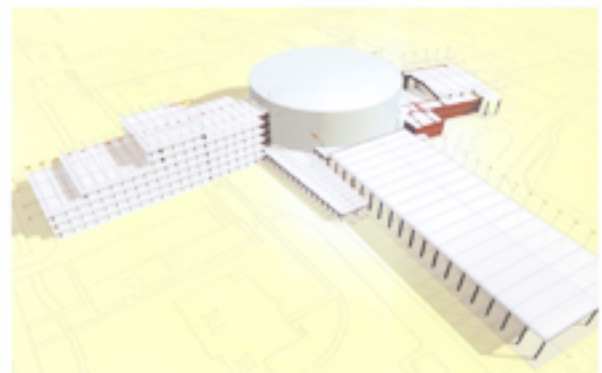
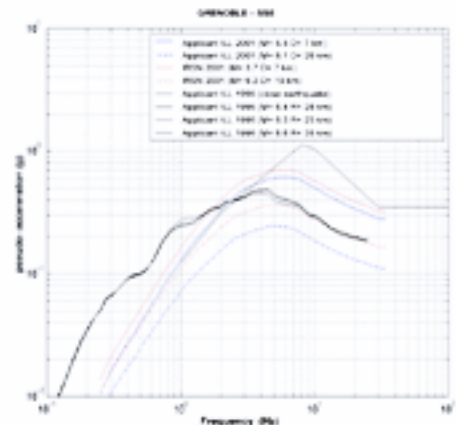
> Main conclusions

The assessment of IRSN lead to the conclusion that complementary safety requirements concerning seismic risk are needed and that it was necessary for the applicant :

- to take provisions in order to maintain, in case of an earthquake, a containment by the concrete and metallic shells of the reactor ; so, the applicant has to define solutions in order to manage the risk of interaction between the reactor building and the neighbouring buildings ;
- to carry out new seismic studies by using linear methods for the calculations ; the detailed analysis of weak points identified by these studies could be performed with realistic calculation methods (non linear methods) ;
- to reinforce the concrete pillar supporting the transfer canal and to reduce the number of spent fuel elements stored in this canal in order to reduce the potentiel source terme, in case of an earthquake leading to their uncovering.

These conclusions were endorsed by the safety authority.

Following IRSN assessment, the applicant make also commitments to the safety authority concerning the realization of improvements of the fire protection system and the redundancy of the reactor protection system.



IRSN - J. Couturier
BP 17, 92262 Fontenay-aux-Roses Cedex, France
Tel: + 33 1 58 35 72 21 / E-mail: jean.couturier@irsn.fr