

## “Radiological Protection in EPR Design”

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The EDF takes radiological protection into consideration from the design stage in EPR. The EDF imposed on this new-type reactor the continuation of the improvement and the optimization of radiation protection through benchmarking with the best practice of France and Germany and with nuclear reactors of the best performance in France as its objectives.


The control of the amount of radioactivity which is significant for radiological protection involves all the stakeholders—designers, license holders and plant construction companies—and it is carried out in a series of stages, starting from investigation by workers and designers, to the review of proposals and finally to decision-making entrusted to the ALARA committee.

The reference collective dose was 0.44 man-Sv/year and per plant in the latest N4 plant series, which was optimized and improved by 21%. The target collective dose at present is set to be 0.35 man-Sv/year and per plant after taking the average of 10 years on the assumption of two refueling shutdowns, three routine shutdowns and one 10-year refueling shutdown in an 18-month cycle.

In order to reduce internal exposure risk, the inside of building will be divided into two categories, i.e., red areas (entrance and exit not allowed) and green areas (entrance and exit allowed). As for external exposure, as a result of studies on radiological protection, shielding will be installed at the piping outlet of the primary system and also the bunker and pump of steam generator will be reinforced. With these measures, an entrance and exit allowed area can be turned into a green area (dose rate < 25  $\mu$ Sv/h, neutron dose rate < 2.5  $\mu$ Sv/h).

Since a special zoning is made in order to take out nonradioactive wastes from a radiation controlled area, and contamination control is performed at the exit of each contaminated area (contamination barrier) not only during operations but also after reactor decommissioning, the risk of the expansion of contamination will be reduced.

### 3. Two Rooms concept for internal exposure



- Optimisation of neutron and gamma dose rates in accessible area
- To take into account : the temperature, the noise, the hygrometry

**Objective of radiological conditions**

**Effective dose rate < 25  $\mu$ Sv/h**  
**And**  
**Neutron dose rate < 2,5  $\mu$ Sv/h**

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