WNA - New Build Licensing Conference
Multinational cooperation in the licensing of nuclear power plants

Session 3: Design development

Entering the new build
along with the potential to market new designs

How complete a design should be when going into licensing ?

How to manage changes ?

As an introduction
Some elements in the regulations

IAEA Safety Fundamentals (IAEA SF-1):

"**The fundamental safety objective** is to protect people and the environment from harmful effects of ionizing radiation.

This fundamental safety objective of protecting people and the environment **... has to be achieved without unduly limiting the operation of facilities... "**

Safety has to be assessed for all facilities and activities, **consistent with a graded approach.**

A facility may only be constructed and commissioned ... **once it has been demonstrated to the satisfaction of the regulatory body that the proposed safety measures are adequate**.

=> Necessity to fully demonstrate nuclear safety and to anticipate in the licensing process

IAEA SSR-2/1 - Safety Design of NPPs

Safety assessment (Req.10)
Safety assessments shall be carried out throughout the design process for a NPP **to ensure that all safety requirements on the design are met** ... and to confirm that the design, as delivered, **meets requirements for manufacture and for construction**....

The safety assessments **shall be commenced at an early point in the design process**, with iterations between design activities and confirmatory analytical activities, and **shall increase in scope and level of detail as the design programme progresses.**

=> Flexibility is needed ....

Provision for construction (Req.11)
Items important to safety for a NPP shall be designed so that they **can be manufactured**, constructed, assembled and installed in accordance with established **processes that ensure the achievement of the design specifications and the required level of safety**.

=> Design in time to enable predictability and manufacturing ...

Refer to presentation yesterday by Dr Kefah Naom

How prelicensing processes are helping deliver New Nuclear Build

"**Pre-licensing** is generally seen by the nuclear industry as an effective means of enhancing predictability" (WNA)

Examples in US, UK, Canada, France, Czech Republic...

In France:
Examination of the safety options by the Safety Authority, before submitting the Preliminary Safety Analysis Report, which must demonstrate most of the safety analysis, by the operator (licensee).

=> Examination of design options to anticipate at an early stage of the process

US Regulation - Issuance of construction permits (10 CFR 50.35).

When an applicant has not supplied initially all of the technical information required ... the Commission **may issue a construction permit if the Commission finds that** :

.....

There is reasonable assurance that

(i) such safety **questions will be satisfactorily resolved** at the latest date stated in the application for completion of construction...,

(ii) ... **the proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public.**

=> Flexibility to accompany the progress in the design

=> **Major points :**

- Importance to anticipate the progress in design for a smooth and predictable licensing process

- To demonstrate to the Regulator that the proposed safety measures are adequate (licensing process);

- To be able to take investment decision for construction in a predictable way

- To launch the construction process with the suppliers in compliance with the required level of safety

=> **Questions:**

- Which iterative process and with which level of detail ?

- What are the best ways to lend stability and industrial consistency to the nuclear operational and planning processes ?

EDF experience

Licensing process

- anticipate in submitting the safety options to the ASN and having its early feedback ;
- importance of the Preliminary Safety Analysis Report, as a commitment by the operator to comply with the associated requirements, in order to give predictability to the project;
- necessity to reach a great confidence level in the design options when submitting the PSAR in order to minimize further modifications,
- it implies to have detailed accident analysis studies and PSAs at this preliminary stage, with validated methodologies;

Decision process

- beyond that, necessity to have sufficiently detailed studies at an early stage of the project to enable to take the Final Investment Decision or to validate the offer;

Manufacturing oversight

- necessity to anticipate the detailed studies for the procurement and quality control of big forgings, civil works and buildings for the first concrete, I&C... and even more if the planning is relatively short, while enabling the feedback of the manufacturers;

Progress in design

- the instruction can lead to some design modifications (additional requirements, adaptation, treatment of non-conformities...) which must be fully integrated in the process.