OVERVIEW OF REGULATORY FRAMEWORK ON DRY CASK STORAGE IN JAPAN

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Abstract

On March 2019, the regulatory body of Japan, NRA, issued new regulations on dual purpose cask (DPC) for dry storage of spent fuel on the site, along with the licensing process of design certification on DPC. The requirements ensure consistency with those for the interim storage facility off the site and with transport regulations.

1. BACKGROUND

In Japan there are three types of regulation on dry cask with different purposes; for storage on the site, for transport outside the site and for interim storage at a facility off the site where a power reactor is not co-located. These regulations are well-designed separately to fit with the respective situation and seem to be still working in an effective manner, while it is not necessarily taken into account to keep enough consistency between them. The lack of consistency could result in undue complexity and inconvenience in design and operation, even in case to use the applicable cask on different occasions.

In light of the lessons learned from the Fukushima-Daiichi nuclear accident where the dry cask has suffered no significant damage from the unprecedented external event, operators are urged to explore better ways of enabling longer-term storage more safely than in a conventional manner, especially by means of DPC.

2. NEW REGULATIONS

2.1. Dual purpose cask

Since the current regulation on dry cask for use on the site is focused on that for storage, new rules are put in place that regulate DPC capable of adapting to storage and transport arrangements. This would lead to avoid an unnecessary risk at repacking once the spent fuel has been stored into DPC at the site prior to transport. While it remains a matter of choice for operators to decide whether or not to use DPC for dry storage on the site, the regulatory body encourages operators proactively, but in a non-mandatory manner, to prefer DPC for the prolonged storage on the site with due consideration of the unforeseeable situations.

The regulation on DPC also contains the technical requirements (e.g., confinement, shielding, heat removal and criticality prevention) which are almost the same as those for storage on the site and for interim storage off the site.

2.2. Design-basis hazard of external events

DPC is expected usable for storage at any place and for transport via any transit route. A safety assessment for external hazard, however, should be performed based on site characterization in general. To cope with both, a set of “reference” external hazard is defined as a design-basis requirement for DPC with the aim to exclude site dependencies. The reference hazard is set up for the key hazardous natural events such as earthquake, tsunami and tornado, and has margin of safety enough to encompass all the external natural hazards postulated for the existing sites. The hazard assessments for other external events are no longer required in case that DPC can meet the reference.

2.3. Design-basis hazard of external events

In order to promote DPC, the regulatory regime is amended for DPC to be granted the design certification. Our licensing process of the design certification consists of both a “type certification” and a “type designation” and is applicable for the limited type of target equipment listed in the regulation. The former process is open for whoever is interested, but the latter for domestic and foreign manufacturers, domestic users and importers. The DPC manufacturers can apply for both approval, independent from users.

Since the storage and transport capabilities come together to be confirmed on a single application, applicants for design certification on DPC are not required to submit any other application for approval.

3. THE WAY FORWARD

Although the technical requirements for DPC are stipulated enough to secure consistency with those for interim storage off the site and for transport, separate applications are required to be submitted in accordance with the relating rules. For instance, in case of diverse use of DPC for interim storage off the site, applicant needs to submit its application to the regulatory body for review and approval which addresses the safety characteristics of the facility based on the site conditions even if the design certification of DPC has been already granted. There still remains room for further endeavor, in particular, to streamline our review processes or administrative procedures.