

The First Interim Storage Program & Safety Review — Points and Evaluations of Safety Review in Japan —

Shuhei KOJIMA
Director, Nuclear Fuel Transport and Storage Regulation Division
Nuclear and Industrial Safety Agency (NISA)

Recyclable-Fuel Storage Center built by Recyclable-Fuel Storage Company (RFS) in Mutsu city, Aomori prefecture, is the first spent fuel storage facility (interim storage facility ¹) in Japan and scheduled to be operated in July, 2012. The business license of the spent fuel storage facility was applied by RFS in March, 2007 and issued in May 2010. The license for the design and the method of construction was applied by RFS in July, 2010 and issued in August, 2010. The facility is designed to store 288 metal casks (about 3,000tU) for 50 years and uses dual-purpose dry metal casks as way of storage.

Accident prevention at spent fuel storage facilities is the important point of the safety at facilities, leading to no radiation impact on residents near facilities at unexpected accidents. The government makes a safety review to confirm if the safety is secured. For the review on a business license (basic designs or basic design policies), Japan adopts a double-check system to evaluate the safety. NISA makes an initial review, and the Atomic Energy Commission and the Nuclear Safety Commission make a second review.

For the review on a license of the design and the method of construction (the detailed design), NISA makes a review if it conforms to the technical criteria.

1. Review on Business License (the Basic Design or the Basic Design Policy)

The review on the basic design or the basic design policy is made for a business license and it is confirmed that there is no interference with peaceful uses, planned operations, technical capabilities, accounting foundations and accident preventions on this business. In the safety review, the validity of site conditions, safety designs of spent fuel storage facility, dose evaluation under normal conditions and safety evaluation are reviewed to confirm no interference with accident preventions.

1.1 Siting Conditions

It is confirmed if it considers active faults, volcanoes, events with weather; hydrologic; earthquakes, and social environment around the concerned facility.

1.2 The Safety Design of Spent Fuel Storage Facilities

The validity of designs to maintain fundamental safety functions during designed storage period (50 years), such as confinement functions, shielding functions, criticality prevention functions and heat removal functions, is confirmed. The validity of radiation control, environment safety and seismic designs are also confirmed.

1.3 Dose Evaluation under Normal Conditions

At this facility, metal casks have confinement and shielding functions and the

¹ Japan aims to establish the nuclear fuel cycle to reprocess spent fuel and efficiently utilize recovered plutonium as a basic policy. Interim storage facilities are the means to adjust the time until the start of reprocessing of spent fuel, which lends flexibility to nuclear cycle.

spent fuel is stored without repackaging in other containers. Therefore direct radiation and skyshine radiation are evaluated.

1.4 Safety Evaluation

Events which have possibilities of an effect on fundamental design functions of metal casks and a risk of radiation exposure on general public are selected and evaluated.

As a result of the reviews on business license, NISA determined that the concerned business of spent fuel storage meets the requirements for the license that there is no interference with prevention of accidents by nuclear fuel materials, and licensed the business.

2. Review on the Design and the Method of Constructions (the Detailed Design)

The review is made on the viability of the basic design or the basic design policy on the business license and the validity of the detailed design and the method of construction according to technical criteria.

The technical criteria for the design and the method of construction have 15 items, including 4 major items (Criticality Prevention of Spent Fuel, Heat Removal, Confinement, Shielding) as follows:

2.1 Criticality Prevention of Spent Fuel

It is confirmed that geometrical shape and size for nuclear safety and other appropriate measures are taken to prevent the criticality of spent fuel.

2.2 Heat Removal

It is confirmed that the facility is designed to safely remove the decay heat of spent fuel.

2.3 Confinement

It is confirmed that the facility is designed to retain the function confining spent fuel and contaminated materials by the fuel in restricted areas.

2.4 Shielding

It is confirmed that the facility has the required shielding capability to prevent radiation hazard.

As a result of the review on the design and the method of construction, NISA determined that the design and the method of construction for the facility conform to the technical criteria, and licensed them.

In addition to the above-mentioned safety review on the storage, NISA just introduced a new way of regulation so-called "Holistic approach", which will be used for the dual-purpose cask in the interim storage facility. This approach harmonizes the regulatory requirements for both storage and transportation. Under this approach, the integrity of casks and spent fuels can be confirmed without opening their lids during very long period between pre-storage loading of spent fuels, storage, and post-storage transportation. To this end, the operators are required to monitor and keep records on visual inspections of spent fuel, pressure between two lids of casks, etc. throughout the storage period.