

Developments in the Regulatory Framework of Interim Storage of Spent Nuclear Fuel (SNF) in Germany – 17374

Christoph Gastl *, Julia Palmes *

* Federal Office for the Safety of Nuclear Waste Management

ABSTRACT

According to article 6 of the German Atomic Energy Act, storage of nuclear fuel requires a license, granted by the competent authority in this field, which has been the Federal Office of Radiation Protection (BfS) until July 2016 and currently is the Federal Office for the Safety of Nuclear Waste Management (BfE). A first license was granted in 1983 for storage of spent nuclear fuel (SNF) and vitrified high level waste (HAW) at the interim storage facility in Gorleben. This license was reviewed in 1995. Dry Interim storage at the NPP sites in its current form started in 2002 in the interim storage facility next to the NPP Lingen. Since that time at each site of an operational NPP storage facilities were licensed and erected. Thus additionally to the three central storage facilities (Ahaus, Gorleben and Rubenow) there are now 12 storage facilities onsite the NPPs. All of these facilities use dry storage in metallic dual purpose casks (DPCs). The actual storage licenses for SNF and the HAW (which is stored in Gorleben and Rubenow) are limited to 40 years after closing the transport and storage cask. The first license to expire will be the storage license for the interim storage facility in Gorleben in the year 2034.

The German "Programme for the safe and responsible management of spent fuel and radioactive waste" expects to take the disposal facility into operation in the year 2050. Thus necessary preparations for interim storage till that time have to be taken on the side of the regulator. In the German Atomic Energy Act precautions have already been taken and a consulting of the German parliament (Bundestag) is mandatory if inevitable events would require an extension of currently licensed interim storage period.

In the year 2016, the regulatory body in Germany was given a new structure. The BfS was formerly competent authority in the field of radiation protection since 1989. It had competences for ionizing and non-ionizing radiation protection (e.g. mobile phone radiation, highvoltage powerlines and the effects of electric fields), licensing storage of spent nuclear fuel and as the operator of facilities for final disposal. Now there is a new structure with two Federal Offices (BfS and BfE) and a federal company for final disposal (BGE). The BfE is responsible for regulation in the field of nuclear disposal since 30.07.2016. So the package design approval for DPCs and the storage licenses for SNF are now granted by this office. The search for a repository site will be coordinated there as well. The site selection, construction and

operation of the repository will be in the responsibility of BGE. The parts of the former BfS dealing with recovery of the waste from Asse (a former salt mine used for disposal research) and the construction of the repository Konrad (for low and medium level radioactive waste) will be transferred into that company. It is planned to incorporate the German company for construction and management of waste disposal facilities (DBE) which is owned by the German utilities as well. The BfS will focus on the scientific foundations and further advancement of radiation protection.

INTRODUCTION

The concept of dry interim storage of irradiated fuel in casks for transport and storage was developed in the late 1970s [2]. The first storage license in Germany according to this concept was granted in 1983 for storage of SNF in the storage facility in Gorleben. It was replaced by a new storage license, which still valid, in 1995.

The currently valid storage licenses for SNF and HAW from reprocessing plants are limited to 40 years. For the storage facilities on the sites of the NPPs, this period starts with the first cask emplacement. In the licensing notices of the central storage facilities Gorleben, Ahaus and Rubenow, an expiry date is indicated. The first storage license to reach the expiry date is the one for the facility in Gorleben in 2034. Additionally, the storagetime of each loaded cask is limited to 40 years on from closure after loading, as for this period safety of enclosure could be proven. The first cask destined for dry interim storage was loaded and closed in June 1992 (containing spent fuel of the Thorium-High-Temperature-Reactor (THTR) for storage in Ahaus).

Interim storage of SNF in storage facilities on the sites of the NPPs started in 2002 in the facility next to the NPP Lingen. Since 2005 delivering SNF for reprocessing is prohibited and a direct disposal is the only allowed way of waste management in Germany. Thus in the following years, in addition to the three existing storage facilities, each NPP site had to erect its own storage facility for storage of the SNF originating from this NPP. The HAW resulting from reprocessing is currently stored in Gorleben and Rubenow. The HAW which is still to be transported to Germany from France and the UK will be stored at NPP sites.

In all of these facilities dry storage in metallic casks inside concrete buildings is used. A remarkable requirement for the storage license is the need for a valid package design approval during the whole storage period. This enables to transport the cask at any time to a nuclear facility away from the storage facility. As the package design approval usually is valid for three years only, it has to be renewed regularly. For casks already in storage, there is the possibility of granting the package design approval for ten years. In combination with a newly introduced

monitoring program even longer periods up to the licensed storage time should be possible.

In the year 2016 the regulatory body in Germany was modified significantly. The BfS was the competent authority in the field of radiation protection since 1989. Before this date, the regulatory work was done at the Physikalisch Technische Bundesanstalt (PTB) in Braunschweig for the Federal Republic of Germany and at the Staatliches Amt für Atomsicherheit (SAAS) in Berlin in the former German Democratic Republic.

This Federal Office had competences for ionizing and non-ionizing radiation protection (e.g. mobile phone radiation, highvoltage powerlines and the effects of electric fields), licensing storage of spent nuclear fuel and as the operator of facilities for final disposal.

To reach a more distinct separation of the regulator and the operator the decision was to found a new Federal Office acting as regulator only and a separate state owned company the BGE.

In the latest revision of the atomic energy act, adopted in December 2016, again a major change was established. The utilities will hand over the SNF and HAW to a state owned operator of the interim storage facilities after packaging in casks.

Description

According to the German Atomic Energy act § 9a cap. 3 the Federal Government is responsible for the availability of a repository. With the latest revisions of the Atomic Energy Act the state will take over responsibility for interim storage, conditioning and disposal as well. For the future the “Programme for the safe and responsible management of spent fuel and radioactive waste” for Germany was published in August 2015. According to this, the repository for high level waste should start operation around 2050. Also a receiving storage is planned once the location for the repository is fixed, which is expected to happen in 2031. The license for storage is granted by the Federal Office, but competent supervisory authority is the government of the Federal State where the storage is located. As the first license for an interim storage facility expires in 2034, preparations have to be started to enable elongation of the time span for interim storage in case of a delay of this timescale.

The BfE is the new Federal Office responsible for regulation in the field of nuclear disposal since 30.07.2016. So the package design approvals for DPCs and the storage licenses for SNF and HAW are granted by this office (starting with the storage license for CASTOR 440/84 mvK at Neckarwestheim 9. August 2016). The BfE takes a central role to ensure the safe management of high level waste

including storage, transport and disposal. Site searching procedures including public consulting and participation have to be developed and implemented. Afterwards, the search for a repository site will be coordinated by this office as well. As needed for the fulfillment of these responsibilities, the Federal Office will conduct its own research projects.

According to the current discussion and a proposal from BfS which was sent to the Federal Ministry for Environment, Natural Conservation, Building and Nuclear Safety (BMUB), there are going to be four main divisions:

- A - Licensing interim storage and transport
- B - Evaluating nuclear Safety and atomic supervision
- C - Site selection and public participation
- D - Research projects, other licensing activities

The realization of site selection, constructing and operating of the repository will be in the responsibility of a new state owned company BGE. Till now the parts of the former BfS dealing with Asse recovery and Konrad construction are part of that company. It is planned to incorporate the DBE which is partially owned by the German utilities as well. Negotiations with the utilities are ongoing.

Main topic for the Federal Office for Radiation Protection will be the scientific foundations and further advancement of radiation protection.

A detailed view in the latest revision of the atomic energy act in December 2016 (which has not become effective yet) shows a major change. The utilities will be furthermore effectively and financially responsible for shutdown and demolition of their NPPs. But they won't be any more responsible for the interim storage of SNF and HAW until operation of a repository. Instead their responsibility for radioactive waste will end after the waste has been packaged. As compensation a fixed sum of up to 23.4 billion euros is transferred to a fond managed by the government to cover the costs for interim storage and disposal. Beyond that the utilities will be financially free of any costs for radioactive waste management and disposal.

CONCLUSION and OUTLOOK

In the year 2016 the structure of the regulatory body in Germany underwent major changes. The BfE took over responsibilities from the BfS and will act as regulatory body in the field of radioactive waste storage and disposal. The BGE will construct and manage the repository for HAW and SNF.

After the decision in December 2016 to take over the waste from the utilities and the interim storage facilities there will be need for another organization to act as operator of the facilities.

REFERENCES

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