

BfS

SAFETY CODES AND GUIDES - TRANSLATIONS

Edition 02/79

Contents

Licences under § 3, para. (1) of the Radiological Protection Ordinance or § 6 of the Atomic Energy Act for the Intermediate Storage of Depleted and/or Natural and Enriched Uranium in the Form of Uranium Hexafluoride (UF₆)

Topic: Licensing Assumptions and Requirements

of 15 February 1979

Genehmigungen gemäß § 3 Abs. 1 StrlSchV oder § 6 AtG für die Zwischenlagerung von abgereichertem bzw. natürlichem und angereichertem Uran in Form von Uranhexafluorid (UF₆)

hier: Genehmigungsvoraussetzungen und Auflagen

vom 15. Februar 1979

**Bundesamt für Strahlenschutz
Salzgitter**

The German original of this translation was published in *Gemeinsames Ministerialblatt 1979*,
p. 91)

In case of discrepancies the German text shall prevail.

Licences under § 3, para. (1) of the Radiological Protection Ordinance or § 6 of the Atomic Energy Act for the Intermediate Storage of Depleted and/or Natural and Enriched Uranium in the Form of Uranium Hexafluoride (UF₆)
Topic: Licensing Assumptions and Requirements
of 15 February 1979

Ref. : Meeting of the Federal States Committee for Nuclear Energy - Radiological Protection - on 24/25 October 1978

- Circular Issued by the Federal Ministry of the Interior on 15 February 1979 - RS II 3 - 517033/3 -

At its meeting on 24/25 October 1978, the Federal States Committee for Nuclear Energy - Radiological Protection - discussed the assumptions and requirements for licenses under § 3 of the Radiological Protection Ordinance or § 6 of the Atomic Energy Act with respect to the intermediate storage of uranium hexafluoride (UF₆). Compiled assumptions and requirements are contained in the Annex and have been agreed upon with the Federal Institute of Physics and Technology. In accordance with the protective goal of the Atomic Energy Act, which also covers all acts requiring a license under the Radiological Protection Ordinance, only the hazards caused by ionizing radiation were dealt with.

The conventional chemical risks involved with the storage of UF₆ exceed by far the simultaneously existing radiological risks, in the event of anticipated incidents such as an aircraft impact on a UF₆ storage facility. In general, chemical plants are not protected against aircraft impact, even if the chemical risks involved are comparatively greater. For this reason the risks resulting from aircraft impact were not taken into consideration in the discussion of the above mentioned licensing assumptions and requirements with respect to the storage of UF₆.

The present licensing assumptions and requirements do not apply to the intermediate storage of UF₆ within the frame of transportation.

In order to harmonize the licensing processes, to ensure a uniform licensing practice and to facilitate government control in the area under review you are requested to use the above mentioned licensing assumptions and requirements as a basis for the issuance of future licenses for the intermediate storage of uranium hexafluoride under § 3, para. (1) of the Radiological Protection Ordinance or § 6 of the Atomic Energy Act. In this context, consideration of the merits of individual cases may lead to deviations or supplements.

To:
The Supreme State Authorities
responsible for Radiological Protection
and the
Federal Institute of Physics and Technology

Licensing Assumptions and Requirements to be underlied the Issuance of a License for the Intermediate Storage of Depleted and/or Natural and Enriched Uranium in the Form of Uranium Hexafluoride (UF₆) under § 3 of the Radiological Protection Ordinance or § 6 of the Atomic Energy Act

Licensing Assumptions

1. Licenses for the intermediate storage of UF₆ may only be granted if provision has been made for a suitable storage building or a suitable open-air storage whose foundations have the required load bearing capacity.
2. Uranium hexafluoride may only be stored in such casks which are suited for transportation outside the store. Depleted uranium in the form of UF₆ shall preferably be stored in Type 48F or 48Y casks which meet the US standards of the "American National Standard Packaging of Uranium Hexafluoride for Transport" (ANSI N 14.1-1971). Other casks may only be licensed if they are accompanied by a special certificate of conformity prepared by the Federal Institute for Materials Testing (BAM). The casks must be provided with a suitable coat of paint which acts both as an anticorrosive and a thermal insulation and will not affect an inspection of the casks.
3. Licenses for the intermediate storage of UF₆ shall be granted preferably for single-layer storage of casks. If double-layer storage is applied for, the applicant shall demonstrate that the recovery of a defective casks will practically not involve any delay as compared with single-layer storage. The lifting equipment specified within the frame of said demonstration shall have been installed at the site.
4. With respect to the intermediate storage of UF₆ with enriched uranium it shall be demonstrated that critical conditions cannot occur.
5. With respect to the intermediate storage of UF₆ at a storage building it shall be examined whether the safety of the storage building personnel will need continuous monitoring equipment for the detection of hydrogen fluoride.
6. With respect to the intermediate storage of UF₆ in an open-air storage more stringent standards shall be applied to the security of the storage than in the case of intermediate storage in a lockable storage building that is secured by alarm devices. Each individual case shall be examined as to the engineered safeguards (e.g. TV-monitoring) that will have to be provided to secure the store adequately.
7. Licenses for the intermediate storage of UF₆ may only be granted for maximum periods of 10 years.

Requirements

1. The UF₆ casks shall be stored on a firm foundation in a lying position on suitable wooden supports or steel supports provided with wooden blocks. The wooden supports may only contact the stiffening hoops of the casks (iron hoops) and shall be designed to enable a visual inspection of the undersides of the casks.
2. The distance between the casks containing depleted uranium shall be at least 30 cm as measured between the iron hoops of two casks. If UF₆ with enriched and depleted uranium is stored simultaneously, the casks containing enriched uranium shall be stored separately from the casks containing depleted uranium.
3. The plan for the arrangement of the casks shall be prepared in agreement with the responsible supervisory authority. Any change of this layout plan

will need the consent of the supervisory authority.

4. To recover a defective UF₆ cask a recovery cask shall be permanently available which will enable the tight enclosure of a defective cask at the site. If there is no decant station inside the store, the recovery cask shall meet the transportation provisions contained in the relevant traffic and transport laws for the transportation of a defective cask outside the store. The decanting of UF₆ from a defective cask into an undamaged cask shall also be possible after enclosure of the defective cask in the recovery cask. Thus, the recovery cask shall be provided with valves and fittings necessary for decanting as well as a device for heating the UF₆.
5. The storage, removal and relocation of UF₆ casks into, from or inside a store may only be effected under the continuous supervision of a radiological protection officer. In this context, the radiological protection officer shall take particular care to ensure that the casks which are handled do not show any defect.
6. The interior of a storage building shall be designated as a restricted access area. Inside the storage building, the UF₆ casks may only be stored in an arrangement that will prevent the creation of a restricted access area outside the storage building. The dose rate on the outer wall of the storage building may not exceed a maximum of 0,3 mrem/h. Accordingly, the restricted access area boundary of an open-air storage shall surround the storage area for the UF₆ casks in such a way that a dose rate of 0,3 mrem/h cannot be exceeded at the boundary.
7. For security purposes, the UF₆ storage shall be fenced in adequately. In this context, care shall be taken to ensure that the radiation exposure at the security fence cannot exceed 150 mrem/year. However, the security fence of a storage building shall be provided at a distance of at least 5 m from the store hall and in case of an open-air storage at least 20 m from the restricted access area boundary.
8. Following the establishment of the storage measurements of the local dose rate shall be carried out in agreement with the responsible supervisory authority, both at the boundary of the restricted access area and at the security fence. The results of these measurements shall indicate in particular that the dose limit of 150 mrem/year cannot be exceeded at the security fence.
9. Apart from the wooden supports for the casks, no combustible materials may be stored in the storage area for the UF₆ casks.
10. Lifting and handling equipment with internal combustion engines may not be refueled inside the storage area. The vehicles shall be parked outside the restricted access area.
11. Prior to the storage of UF₆ casks, the electronic intrusion alarm system provided for the UF₆ storage shall be subjected to an acceptance inspection and an annual in-service inspection by an authorized inspection agency (e.g. TÜV) and shall not reveal any fault during such inspection. The acceptance certificate as well as the certificates covering the annual in-service inspections shall be submitted to the responsible supervisory authority. In addition, the intrusion alarm system shall be subjected to quarterly functional test.
12. At night, the intermediate UF₆ storage shall be illuminated in such a way that all of the UF₆ casks as well as the entire outer fronts of storage building and the security fence can be controlled.
13. For radiological protection monitoring at least the following instruments shall be available:
 - a gamma dose rate meter having at least two adjustable measuring ranges with end-scale deflexion in the orders of magnitude of 1 mR/h and 1 R/h for the measuring of local dose rates of gamma rays with energies above 40 keV;
 - a contamination meter for alpha and beta radiation which is suitable for contamination measurements on wipe samples, clothes and workplaces and which can detect specific activities above 10⁻⁵ µCi/cm².
14. At the operating station of the intermediate UF₆ storage with rest and social rooms the following rooms shall be provided in addition:
 - first-aid room,
 - measuring room for contamination measurements on wipe samples,
 - decontamination room for personnel decontamination with depots for contaminated clothes and radioactive wastes
 - storage room for protective equipment and devices as well as tools and materials for the maintenance of the UF₆ casks and other storage equipment.
15. A quarterly visual inspection shall be carried out to examine the casks for leak tightness and integrity of the protective paint. A contamination measurement (wipe test) shall be carried out if leakage from a cask is suspected.
16. Prior to the intermediate storage of UF₆ casks, operating and radiological protection instructions shall be established which contain the following measures in addition to those specified in § 34 of the Radiological Protection Ordinance:
 - Personnel organization and key plan
 - Storage, removal and relocation of UF₆ casks
 - Inspection rounds of guards
 - Visual inspections of the UF₆ casks
 - Regular tests of the intrusion alarm system
 - Measures in the event of UF₆ casks leakage (protective clothes, respirators, make-shift repairs, application of the recovery cask)
 - Measures in the event of a contamination of personnel and objects
 - Measures in the event of fire
 - Measures in the case of safety-related events
 - Behavior of guards in the case of particular events intrusion alarm and intrusion alarm system failure
 - Accounting
 - Access control.The operating instructions and any subsequent modification or alteration thereof will require the consent of the responsible supervisory authority.
17. The reporting requirements under § 36 of the Radiological Protection Ordinance relate in particular to accidents and incidents involving
 - UF₆ release,
 - acts of sabotage and attempted acts of sabotage,
 - fires inside the storage area of the UF₆ casks involving the risk of a UF₆ release,
 - accidents involving personal injuries including contamination accidents.In addition, the responsible supervisory authority shall be notified of the following incidents:
 - damage to UF₆ casks not involving a UF₆ release,
 - intrusion into the store not affecting its safety as well as any attempted intrusion,
 - minor fires not affecting the casks.
18. Requirements pursuant to § 6 of the Ordinance on Financial Security under the Atomic Energy Act (Nuclear Financial Security Ordinance) of 25 January 1977.

Note:

Prior to the intermediate storage of UF₆ casks, the acceptance and qualification certificates issued by the construction supervising authority shall be submitted to the responsible supervisory authority.