# DECOMMISSIONING AND CLEARANCE IN AUSTRIA

Experience report of an expert

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**Abstract**

2020 the new Radiation Protection Act was implemented in Austria, replacing the Act from 1969. Among other things, the Radiation Protection Act 2020 regulates clearance and the General Radiation Protection Ordinance 2020 specifies clearance levels. A distinction is made between general clearance and specific clearance. Within this legal framework, a basic principle is to reduce radioactive waste to a minimum, which is controlled by the competent authorities during decommissioning and ensured by good project planning. The paper details the main aspects of decommissioning and clearance in Austria.

## INTRODUCTION

On August 1, 2020, the new Radiation Protection Act (Federal Act on measures to protect against the dangers arising from ionising radiation (Radiation Protection Act 2020 – StrSchG 2020)) came into force in Austria, implementing European Council Directive 2013/59/Euratom laying down basic safety standards for protection against the dangers arising from ionising radiation. The previous Radiation Protection Act dates back to 1969, and due to the specification of the European Union it was deemed appropriate to rewrite the Act. The radiation protection regulations for artificial and natural radiation sources are now largely harmonised. There are five different ordinances in Austria: General Radiation Protection Ordinance 2020 – AllgStrSchV 2020, Radon Protection Ordinance – RnV, Intervention Ordinance 2020 – IntV 2020, Medical Radiation Protection Ordinance – MedStrSchV and Radioactive Waste Shipment Ordinance 2009 – RAbf-VV 2009.

Due to the harmonisation the regulations for practices with naturally occurring radioactive materials (NORM) are now contained in the AllgStrSchV 2020. The former Natural Radiation Sources Ordinance has thus been repealed. On the subject of radon in workplaces, a new Radon Protection Ordinance was issued on 20 November 2020.

## SITUATION IN AUSTRIA

Austria has a research reactor at the TRIGA Center Atominstitut of the Technical University Vienna, but no nuclear power plant (NPP). The TRIGA Mark-II Research Reactor was built from 1959 to 1962 and has been in operation ever since. Contractual Agreements ensure the redemption of spent fuel by the providers, which are not located in Austria. The Zwentendorf Nuclear Power Plant, situated near Vienna, Austria, is the only NPP in the world which has been completely built, but shut down before it became operational. It was stopped by referendum in 1978, in which a narrow majority (50.47%) of the people voted against the commissioning. The non-commissioning in December 1978 led to the Nuclear Blockade Act, according to which no nuclear power plants may be built in Austria in future without a referendum. This law was strengthened in 1999 by the Federal Constitutional Act for a Nonnuclear Austria. The Zwentendorf Nuclear Power Plant is now a museum and used for training purposes (for example by the IAEA).

Since there are no nuclear power plants in Austria, there is neither high-level radioactive waste nor spent fuel elements for disposal. Only low- and intermediate-level radioactive waste is produced in medicine, industry and research. After the treatment of these raw wastes, an average of about 200 200-litre drums of radioactive waste is generated per year [1] and then transferred to the interim storage facility at Seibersdorf. The facility is operated by Nuclear Engineering Seibersdorf GmbH and its total capacity is approximately 18,000 conditioned 200-litre drums [2]. By the end of 2021, the inventory amounted to 12.500 drums of radioactive waste [1].

Most of the raw radioactive wastes arise from decontamination and decommissioning projects of legacy sites. Some sites date back to the beginning of the 20th century, when NORM was improperly disposed of. Most decontamination and decommissioning projects take place at an industrial site in Seibersdorf, where the Austrian interim storage facility is located together with other nuclear facilities. For about 45 years, nuclear research and development work was carried out at this site, and there was also a research reactor that operated from 1960 to 1999 (it was decommissioned from 1999 to 2004). Since 2003, the company Nuclear Engineering Seibersdorf has been legally mandated to collect, treat and store all radioactive waste generated in Austria until it is shipped t to a final disposal site yet to be determined. The competent authorities control such decontamination and decommissioning projects.

### Clearance in Austria

The Radiation Protection Act 2020 regulates, among other things, clearance and the General Radiation Protection Ordinance 2020 specifies clearance levels. A distinction is made between general clearance and specific clearance. In case of general clearance, the materials are released regardless to their destination. In case of specific clearance of solid materials, they must be incinerated in an incineration plant or deposited in landfills, which must meet certain requirements. If clearance levels for a material type or for radionuclides are not defined in the Annex 1 of the General Radiation Protection Ordinance 2020, the competent authority shall define clearance levels on a case-by-case basis to ensure compliance with the dose constraints of an effective dose of ten microsieverts on account of the release for artificial radionuclides or naturally occurring radionuclides used for their radioactive, fissile or fertile properties. For naturally occurring radioactive material from defined types of practices, the dose constraint is an effective dose of 0.3 millisievert. In the case of general clearance and specific clearance, the notifying company checks whether the material meets the clearance criteria and the competent authority may send experts to carry out random checks. Radioactive waste is – after conditioning – deposited in the interim storage at Seibersdorf. There are no special disposal facilities for very low-level radioactive waste or NORM.

The clearance procedure in Austria is summarized in *FIG. 1*.



*FIG. 1. Procedure of clearance in Austria.*

As a legal requirement, the competent authority must receive a Conceptual Site Model (CSM) including a radiological characterization, an operation plan and other relevant information before a decommissioning procedure is initiated. Upon receipt, the competent authority reviews the CSM regarding completeness and forwards them to commissioned experts. The experts check the technical aspects of the CSM and issue the experts’ opinion. The documents are reviewed to determine whether the conditions for the licence, in particular compliance with clearance levels, are met. The experts in Austria are e.g. from the Austrian Agency for Health and Food Safety (AGES). Based on the law and the experts’ opinion the competent authority issues the licence which usually contains the decision, the regulatory conditions and a declaration. The CSM is a living document, constantly kept up to date by the responsible company. In case of any amendments to the CSM (e.g. new materials categories occur), the authority must be informed.

In Austria, every practice involving radioactive materials above exemption levels, including decommissioning processes, is subject to the obligation to obtain a licence. According to the Radiation Protection Act 2020, a decommissioning concept including appropriate financial provisions for decommissioning is required for the granting of a licence. During the decommissioning process, the regulators or commissioned external experts control the progress of the project, carry out inspections and take samples. For example, samples of the clearance material itself are taken, but also environmental samples (e.g. water samples) to control if radionuclides immigrate to the environment due to the decommissioning process. If compliance with the licence is verified, the material can be released. After positive decision measurements, the company can announce the end of the decommissioning project. Subsequently, the measurements for characterisation and the request of clearance are transmitted to the competent authority. Within a certain period, which may vary between two weeks and six months, samples are taken, an experts’ opinion is drawn up and thereafter a licence for disposal is issued by the competent authority. Under consideration of the experts’ opinion, the competent authority evaluates and eventually declares the end of the decommissioning project.

In addition to the procedure described above, framework decisions may be issued for special decommissioning projects (e.g. legacy sites). In this case, the CSM must contain more detailed information regarding the expected materials (e.g. quantity, composition), the planned measuring procedure and the project sequence. The competent authority must be informed regularly about the clearance of the materials, but no individual licences for disposal are required. After orientation measurements by the notifying company, the commissioned experts and the company carry out the sampling for decision measurements simultaneously in order to optimise the process of verifying the measurement results. For example, nuclide vectors can be determined in parallel to avoid waiting times for the licensee. The measurement results are verified afterwards. To allow for a smooth and efficient process of decommissioning, close coordination between the licensee, the competent authority and the experts is essential.

## CONCLUSION

In Austria, every practice involving radioactive materials above exemption levels, including decommissioning processes, requires a licence. The basic principle of minimisation of radioactive waste is ensured by good project planning. It is controlled by the competent authorities during the decommissioning process. In Austria, many discussions have succeeded in optimising the clearance procedure for certain projects. All involved stakeholders actively exchange information and in addition to the announced inspections, where mainly random samples of the materials are taken, unannounced inspections are carried out regularly. The processes can be optimised continuously and the procedure is reviewed regularly.

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