

RADIOACTIVE WASTE MANAGEMENT PROGRAMMES IN OECD/NEA MEMBER COUNTRIES

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NATIONAL NUCLEAR ENERGY CONTEXT

Currently, Austria does not operate any nuclear installations. Only two “nuclear facilities”, nuclear installations in the broader sense, are operated: one research reactor and one central waste processing and interim storage facility. Two other research reactors had been shut down in 1999 and 2004 and were completely decommissioned.

In the 1970s, a nuclear power plant was constructed in Zwentendorf. As a consequence of the negative vote in a referendum it was never finished and Austria has never operated a nuclear power plant. Austria’s policy concerning the use of nuclear energy for peaceful purposes has been significantly influenced by the passing of the law prohibiting the use of nuclear fission for energy purposes in 1978 and by passing the Constitutional Law on a Non-Nuclear Austria in 1999.

All spent fuel from research reactors has been or will be returned to the United States. This means that Austria will not have to deal with the interim storage or the final disposal of relevant amounts of spent fuel.

SOURCES, TYPES AND QUANTITIES OF WASTE

In Austria the radioactive waste classification system is based on the IAEA classification scheme (Safety Series No 111-G-1.1) GSG 1 and has been accepted by the regulatory body:

- Transition radioactive waste: Type of radioactive waste (mainly from medical origin) which will decay within the period of temporary storage and may then be suitable for management outside of the regulatory control system subject to compliance with clearance levels. Waste in the transition phase i.e. short-lived decay waste from medical applications containing I-

125 is left to decay at the producers' sites, i.e., hospitals, or is brought to Seibersdorf for decay storage.

- Low and intermediate level waste (LILW): In LILW, the concentration of radionuclides is such that generation of thermal power during its disposal is neglectable.
 - Short-lived waste (LILW-SL): This category includes radioactive waste with nuclides half-life of Cs-137 and Sr-90 (around 30 years) or less, with a limited alpha long-lived radionuclide concentration (4000 Bq/g in individual waste packages and overall average of 400 Bq/g in the total waste volume).
 - Long-lived waste (LILW-LL): Long-lived radionuclides and alpha emitters whose concentration exceeds the limits for short-lived waste.
- High level waste (HLW): High level waste does not arise in Austria, since there are neither nuclear power plants nor uranium mines nor other nuclear fuel cycle facilities.

The main sources of LILW in Austria are the use of radioactive material in medicine, industry and research as well as the ongoing decommissioning and dismantling activities of nuclear research facilities.

The following activity inventory and waste volume is present at the Nuclear Engineering Seibersdorf GmbH (NES) interim storage facility (end of 2010):

- total activity of short-lived waste (LILW-SL): $\sim 9.92E+15$ Bq, approx. 2170 m³
- total activity of long-lived waste (LILW-LL): $\sim 4.54E+12$ Bq, approx. 60 m³

The major amount of solid waste is material from decommissioning and dismantling activities and combustible waste from the use of radioactive material in medicine. Liquid waste mainly originates from the operation of waste treatment facilities (e.g. NES incinerator's wet scrubber) and radionuclide laboratories on the Seibersdorf site. A small fraction of liquid waste originates from medical facilities and universities.

Sealed sources such as Co-60, Cs-137, Am-241 and others are widely used for industrial purposes. Sources containing Co-60 and Cs-137 are used for medical applications as radiation sources for high dose treatment. Such sources are few in number but their activities dominate the total activity inventory in the NES interim storage.

As of end of year 2010, there have been 10886 mainly 200-litre-drums containing conditioned radioactive waste in the interim storage facility, as well as five Mosaik© containers and five Konrad Type II containers with decommissioning waste from the ASTRA reactor.

Spent nuclear fuel

For reshipment of spent fuel from the remaining TRIGA research reactor in Vienna, Austria has valid contracts in place. This means that Austria will not have to deal with spent fuel management.

RADIOACTIVE WASTE MANAGEMENT POLICIES AND PROGRAMMES

According to the Radiation Protection Act, all license holders have to look for the minimisation of the arising waste. Disused sealed sources should preferably be returned to the manufacturer.

All arising radioactive waste has to be transferred to the Nuclear Engineering Seibersdorf Company, where the waste is treated, conditioned and interim stored. Following the 'polluter pays' principle, the relevant licence holder, the holder of the waste (e.g. arising from recycling of scrap) or the authorities detecting and confiscating radioactive material or receiving orphan sources have to bear the costs for treatment, interim storage and for a future final storage.

Various studies on a national solution for final disposal of radioactive waste have been done in Austria, but no political decision has been made until now in this field. The small quantities of radioactive waste produced in Austria as a country with no nuclear power plant neither economically nor ecologically justify a national final disposal. As a consequence, Austria regards international co-operation for the disposal of radioactive waste as the most reasonable solution. Austria is therefore very interested in common, shared repositories for radioactive waste.

Programmes and projects

Radioactive waste management facility

The only radioactive waste management facility existing in Austria is the Nuclear Engineering Seibersdorf GmbH (NES), 2444 Seibersdorf. This limited liability company with a controlling stake owned by the Austrian Government is located at the site of the Austrian Research Centers Seibersdorf, south from Vienna.

NES is responsible for the treatment, conditioning and interim storage of all radioactive waste generated in Austria. The following treatment, conditioning and waste handling facilities are in operation:

- LILW incinerator (40 kg/h)
- High force compactor (1100 t)
- Waste water treatment facility (precipitation, filtration)
- Sludge dryer
- Cementation equipment
- Drum drying facility
- Waste assay system
- Hot-cell facility
- Buffer storage facilities for raw radioactive waste
- Interim storage facilities for conditioned radioactive waste.

Most conditioned radioactive waste is stored within two dry engineered construction storage facilities (storage facilities no. 12 and 12A). At present the capacity is limited to 15000 200-litre-drums. As of end of 2010, 10886 drums were in interim storage. Since 2010 a new storage facility (no.13) is in operation. The capacity of storage facility no.13 is approx. 2900 200-litre-drums. This storage facility is equipped with a thermal insulation and a heating- and dehumidification-system in order to reduce the risk of corrosion for the steel drums.

RESEARCH AND DEVELOPMENT

Research

At present, there is no substantial research on radioactive waste management in Austria.

Development

Currently, significant investments in new buildings and machinery at NES are made for assuring a waste management at the state of the art and for ensuring an appropriate interim storage of the conditioned waste at NES at least until the year 2030.

DECOMMISSIONING AND DISMANTLING PROJECTS

Radioactive waste management

Currently, decommissioning of a hot cell facility at Nuclear Engineering Seibersdorf is ongoing. In 2006, the decommissioning of two research reactors in Austria was completed according to schedule: the 10 MW ASTRA research reactor at the Austrian Research Centers Seibersdorf and a 10 kW Siemens ARGONAUT reactor at the Graz Reactor Institute. The fuel elements have been shipped back to the United States.

Funding

Two nuclear facilities exist in Austria: a 250 kW TRIGA Mark II research reactor at the Atomic Institute Vienna and the NES waste management facility in Seibersdorf. The financial resources for their decommissioning are guaranteed by the Austrian state. No special decommissioning fund has been established.

TRANSPORT

The import, export and transit of radioactive waste (including spent fuel declared as waste) are subject to an authorization issued under the Ordinance on the Supervision and Control of Shipments of Radioactive Waste and Spent Fuel into, out of or through the Austrian Federal Territory, which implements the Council Directive 2006/117/EURATOM. As a general rule, the import of radioactive waste for final disposal or interim storage is generally prohibited. Any transportation of fissionable material on Austrian territory is prohibited unless under an international agreement. The transport of fissionable material for the purpose of peaceful use is allowed as far as it is not used for the production of nuclear power. The transport of fissionable material arising from the nuclear energy production is also prohibited if the purpose is final disposal.

According to this Ordinance, each crossing of the Austrian border of radioactive waste needs consent or approval by the competent Austrian authority. The Annexes to the Ordinance define, inter alia, the form of the applicable standard documentation and the list of quantities and concentration levels for radioactive waste. The Standard Document according to the Council Directive 2006/117/EURATOM has to be used. In addition, general safety requirements are laid down in the revised Radiation Protection Act (1969) and the General Radiation Protection Ordinance (2006).

COMPETENT AUTHORITIES

The main responsibilities for regulation, licensing and supervision of the radioactive waste management are concentrated in the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

However, also due to the federal structure of Austria, there are additional competencies, that affect this field:

The **Federal Minister of Agriculture, Forestry, Environment and Water Management** is the competent licensing and supervisory authority with respect to radiation protection for the construction and operation of all major nuclear facilities other than for medical use including radioactive waste management facilities.

The **Federal Minister of the Interior** is the competent authority for supervision of nuclear facilities with regard to physical protection and in charge of transport safety measures with regard to the carriage of nuclear materials.

The **Federal Minister of Economy, Family and Youth** is the competent authority for safeguards.

The **Federal Minister of Justice** is responsible for all legal matters relating to the Nuclear Liability Act.

The Heads of Governments of the Federal Provinces issue licenses according to the Environmental Impact Assessment Act.

The locally District Authorities (99 districts in Austria) are the common radiation protection authorities and responsible for other licensing and supervision according to the Radiation Protection Act. They issue i.e. licenses for the handling of radioactive material and can oblige the licensee to deliver their waste to NES. Each licensee is inspected on a regular basis by the competent authority. As a part of this inspection process, the records about the balance of radioactive material and of radioactive waste come under scrutiny.

FINANCING

According to the Joint Agreement between the Republic of Austria (represented by the Federal Ministry of Agriculture, Forestry, Environment and Water Management), the Community of Seibersdorf and NES, the necessary financial resources for the infrastructure and equipment of the Austrian waste management facility are guaranteed by the Austrian State. The ultimate responsibility of the Austrian Federal State for the final disposal of all radioactive waste currently and in future interim stored at NES ensures the availability of sufficient financial resources for the decommissioning of nuclear facilities and the final disposal of radioactive waste.

According to the Radiation Protection Act, the producers of radioactive waste are responsible for its safe management including disposal. They are obliged take care that the radioactive waste is brought into a form suitable for transport, storage and disposal. For this reason, the treatment of radioactive waste is financed according to the polluter-pays-principle by the relevant licence holder, the holder of the waste (especially arising from recycling of scrap), and the authorities detecting and confiscating radioactive material or receiving orphan sources. When the radioactive waste is delivered to NES for treatment and interim storage, a charge (“Vorsorgeentgelt”) taking into account a risk premium (“Risikozuschlag”) has to be paid. This charge comprises the estimated costs for interim storage, pre-disposal treatment and transport to the final repository as well as for disposal and long term management of the final repository. The final disposal fee is calculated using cost estimates based on costs of existing foreign repositories. However, should the collected funds in spite of the state-of-the art estimations at a later period of time prove to be insufficient to pay for the real costs of final disposal, the Austrian Federation covers the difference. The contributions of the producers are handed over to a special separated fund administered by Austrian national authorities, which is exclusively dedicated for financing the later final disposal in an appropriate repository.

PUBLIC INFORMATION

Further information can be obtained under the addresses given below:

Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft
Abteilung V/7 Strahlenschutz; Radetzkystraße 2, 1031 Wien, Österreich
Website: <http://www.strahlenschutz.gv.at>; **E-mail:** strahlenschutz@lebensministerium.at