

# Management of Radioactive Waste in Poland 2016.

Lukasz BAK

Radioactive Waste Management Plant, Otwock-Swierk, Poland

[bak@zuop.pl](mailto:bak@zuop.pl)

**Abstract.** Virtually every activity related to the production or use of radioactive isotopes is accompanied by the formation of radioactive waste. The only institution in Poland authorized by law for the disposal and storage of radioactive waste is a state-owned public enterprise Radioactive Waste Management Plant (ZUOP), which is responsible for the proper management of radioactive waste from the moment of their acquisition from the manufacturer. The presentation describes management of radioactive waste generated within Polish territory. Will provide overview of all methods used for waste treatment and plant capacity.

Key Words: Rad-Waste Management, National Rad- Waste Repository

Atomic Law, ACT OF PARLIAMENT of 29 November 2000:

„Chapter 14

*State-owned public utility “Radioactive Waste Management Plant” Article 114. 1*

*State-owned public utility named “Radioactive Waste Management Plant” located in Otwock-Świerk, hereinafter referred to as “the Plant”, shall be established for conducting the activities involving radioactive waste management and spent nuclear fuel management, and - above all – with the aim to ensure permanent feasibility of the radioactive waste disposal and spent nuclear fuel disposal. 1a. The Plant shall also conduct activities consisting in the collection, transport, storage and disposal of nuclear materials, radioactive sources and other radioactive substances.”*

In Poland radioactive waste comes from:

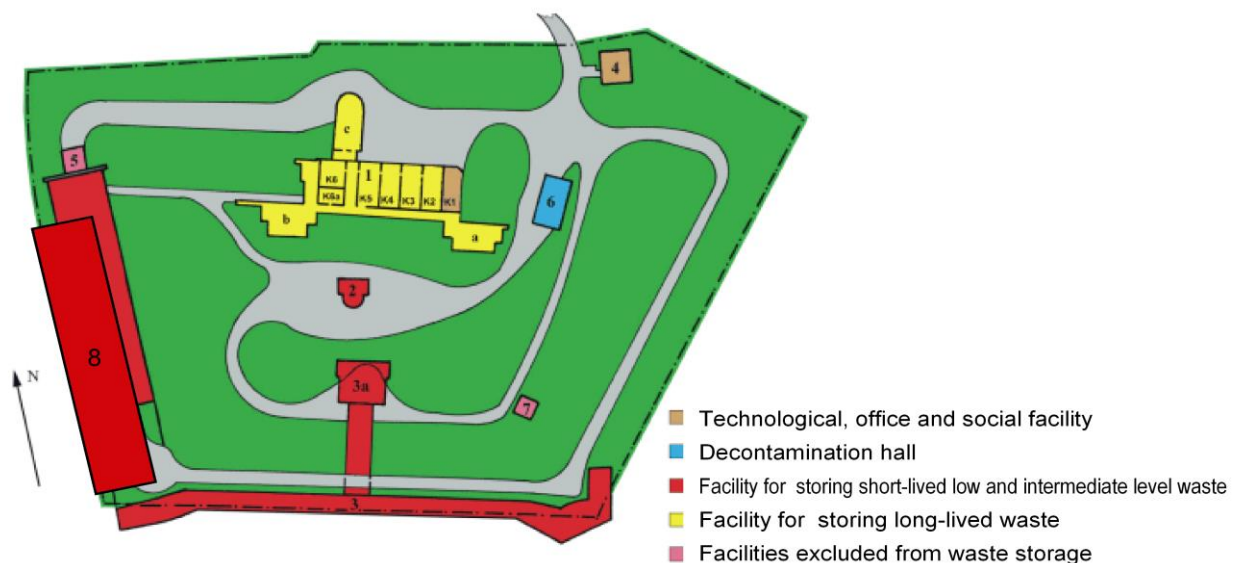
- research reactors - at present, there is one 30 MWt reactor operating in Świerk Centre – MARIA RR (NCBJ). Except Maria, the first Polish research reactor – EWA was decommissioned to the 2-nd stage according to the IAEA classification, from which process were also some waste arisings contributing to the inventory.
- scientific and educational institutions, industrial organizations and hospitals. More than two thousands radioactive source users are scattered over the country. Only low- and intermediate level waste is produced. Most of spent high activity gamma sources are in KSOP. It serves for the disposal of low- and medium level waste containing short-lived beta and gamma isotopes, as well as a temporary storage for long-lived waste. Most of spent high activity gamma sources are transported back to the supplier abroad, but number of them, mainly of Soviet origin, still remain at the user’s premises, or is stored at RWMP storage facilities in Świerk Centre.

The low-level liquid waste is treated with use of mixed synthetic inorganic sorbent composed of barium carbonate and copper ferrocyanide. Decontamination factor achieved was 30. Precipitate obtained was further subjected to the cementation. Intermediate level waste, as

well as waste arising from decontamination are evaporated and evaporator bottom is solidified with cement. The solid waste was sorted. About 60% of total volume of the waste was subjected to the bailing technique with use of hydraulic press. Volume reduction factors obtained were ranging from 3 to 5, depending on waste type. Ion-exchange resins were conditioned by dewatering and mixing with polyester resin. The solid and conditioned waste was packed into the standard metal drums, zinc - plated or varnished on both sides. Radium sources are immobilized with glass and placed into brass containers. Subsequently, the brass containers are located in the storage containers and transported to the repository.

The National Radioactive Waste Repository is located in the village of Rozan near to Narew river at a distance of about 90 km from Warsaw and is located within an old fort. Area of about 3.045 ha. On the north side of the fort, in the distance of about 400 m, there are municipal buildings, and from the north – east side the Narew river is about 800 m away.

When the repository in Rozan was opened in 1961, a big cleaning operation started in Poland. Unfortunately, this action did not include the processing or suitable packaging of waste. The documentation provided for disposal of radioactive waste was usually incomplete. It should be emphasized, however, that the situation in Rozan is still an exception in the world, since the waste collection records, although incomplete, have survived. We know what isotopes the waste contained, and we have the information on the packaging. We can estimate the volume and weight of the waste. We know in general the kind of waste (sources, reagents, contaminated laboratory equipment, devices).



**Figure 1 Plan of National Rad-Waste Repository**

In accordance with the Atomic Law Act, nuclear facilities in Poland, apart from MARIA and EWA research reactors, include also spent nuclear fuel storages.

Wet spent nuclear fuel storages (facilities No 19 and 19A) since January 2002 have been operated by the Radioactive Waste Management Plant. Basic element of storage facility is concrete body in which four cylindrical chambers are inserted in the square net. The chambers

are fitted with acid-resistant steel lining and inside there are storage facilities with separators for suitable placement of spent nuclear fuel elements.

In accordance with the Global Threat Reduction Initiative, the preparation for repatriation of HEU-type spent nuclear fuel to the Russian Federation started in 2007 with financial and logistic support of US Government. The shipment program was prepared by Interministerial Team for Coordinating Tasks Connected with the Performance by the Republic of Poland of „International Research Reactor Fuel Return Program supplied by Russia” established by virtue of the Ordinance No 132 of the Prime Minister as of 14 November 2007. The team was led by the President of National Atomic Energy Agency. The implementation of the program started in 2009 and by the end of 2015 there had been 7 shipments of highly enriched (i.e. exceeding 20% U-235) spent nuclear fuel from Polish research reactors EWA and MARIA to the Russian Federation. All the shipments were performed on schedule and with no issues.