

Waste Information Record Keeping System (WIRKS) in Romania

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ABSTRACT

In Romania there is no common national WIRKS used by all waste management organizations. Each waste management organization uses an own WIRKS. The regulatory authority approves the WIRKS of each radioactive waste facility and checks the recordings during the process of authorization.

This paper summarizes the regulatory requirements regarding to WIRKS, the types of the waste generators, facilities and their waste classification of radioactive waste. Also the paper summarizes the WIRKS applied to the most important waste generators.

REGULATORY FRAMEWORK

In Romania the radioactive waste results from different activities such as: production of nuclear energy, use of radioisotopes in medicine, agriculture, industry and from research. Also, the extraction of uranium from uranium ore and the production of nuclear fuel represent main sources of radioactive waste.

According the Law no. 111/1996 on the safe deployment of nuclear activities, with the subsequent completions and modifications, republished in 2004 the National Commission for Nuclear Activity Control (CNCAN) is the competent authority in the nuclear field [1]. Under the Law No. 111/1996, CNCAN is the regulatory and authorization body, having responsibilities in the field of nuclear safety, radiation protection, radioactive waste management, quality assurance, physical protection, emergency preparedness, safeguards, export control, transport, operator certification, nuclear liability, international co-operation with foreign counterparts and international expert organizations, and strict observance and enforcement of Romania's international commitment to the peaceful uses of nuclear energy under bilateral co-operation agreements and contracts, etc. This Law also establishes the competencies, responsibilities and obligations of CNCAN and other organizations and institutions involved in the nuclear area. This law applies to all nuclear activities, including the activities relating to radioactive waste management.

In order to manage the nuclear field in safe manner the CNCAN as regulatory authority is empowered to issue regulations for detailing the safety requirements. In this respect CNCAN issued the set of regulations on the safe management of radioactive waste. The set of regulations does not contain a specific regulation on the WIRKS.

Radiological Safety Fundamental Regulation

This regulation is based on the Council Directive 93/26/EURATOM and on the IAEA Basic Safety Standards no. 115 on International Basic Safety Standards for protection against ionizing radiation and on the safety of radiation sources and contains general radiological safety requirements.

The Fundamental Regulation on Safe Management of Radioactive Waste

The regulation is based on the IAEA SS no. 111-F "The principles of radioactive waste management" and contains the principles of the safe management of radioactive waste as well as the requirements for fulfilling of these principles.

The regulation is applied to all activities involving safe radioactive waste management, from its generation to final disposal. According to this regulation the generator of radioactive waste as well as the operator of the radioactive waste management facility have to implement a waste information record keeping system in order to maintain the relevant information until the radioactive waste is no hazard for public health and environment any more.

According to the law 320/2003 on the management of spent nuclear fuel and radioactive waste, including their final disposal the waste management authority for coordination of activities related to radioactive waste is the National Agency for Radioactive Waste (ANDRAD) which as main duty creates and maintains the national data base regarding the spent fuel and radioactive waste. Until now there is no national database on radioactive waste, each organization maintains its own data base.

MAJOR GENERATORS OF RADIOACTIVE WASTE

The major radioactive waste generators in Romania are the Nuclear Power Plant from Cernavoda (NPP), research reactors, research installations on the Pitesti site and Magurele site, hospitals and industry. There are about 5,000 authorized users of sealed radioactive sources in various fields: industry, agriculture, research, and medicine. Radioactive waste is also generated from uranium mining and milling industry and from nuclear fuel fabrication. There are two radioactive waste treatment plants which collect, perform conditioning and confining of radioactive waste both for long term storage and for disposal, one of them sited in Pitesti site and another in Magurele site. In Romania there is a national repository for radioactive waste sited in Baita Bihor.

WIRKS OF NUCLEAR POWER PLANT FROM CERNAVODA

The Cernavoda NPP has its own classification system of radioactive waste that was established for operational purposes.

During the operation of Cernavoda NPP the following categories of solid wastes are generated:

- a) Spent resins;
- b) Spent filters cartridges;
- c) Low activity solid wastes, Type 1 (contact gamma dose rate < 2 mSv/h);

- d) Medium activity solid wastes, Type 2 (contact gamma dose rate between 2 mSv/h and 125 mSv/h) and Type 3 (contact gamma dose rate higher than 125 mSv/h).

The liquid radioactive wastes generated at NPP Cernavoda are:

- e) Aqueous;
f) Organic.

The radioactive waste is collected separately in drums according to their type.

Radioactive waste record keeping system applied to NPP Cernavoda consists of:

- monthly electronic records as a yearly table containing data about material type (compressible or non-compressible, plastic, textile, oil, scintillation cocktail, solvent and sludge) and package serial number;
- physical record for all sealed drums containing radioactive waste; there are two different record forms:
 - radioactive waste handling recording sheet which contains the following information: sealing date, package serial number, brief material description, volume/weight, gamma dose rate on the surface of unshielded package
 - radioactive waste transport and storage record sheet which contains the following information: package serial number, storage location and gamma dose rate on the surface of unshielded package and tritium in air analyses.

The record sheets for solid radioactive waste do not contain any information on the contaminating radionuclides and their activity.

The collection of liquid radioactive waste is performed according to the type of radioactive waste and to its total activity, as follows:

- radioactive spent oils with tritium content less than $7E4$ Bq/l and more than $E4$ Bq/l; gamma content: detectable or non-detectable; oils are collected in separate drums;;
- radioactive spent solvent with tritium content less than $7E4$ Bq/l and more than $7E4$ Bq/l; gamma content: detectable or non-detectable; solvents are collected in separate drums;
- scintillation cocktail (separately collected depending on source : chemical or dosimetry lab);
- radioactive sludge;
- flammable solids (a liquid-solid mixture of solid radioactive waste and flammable liquids like oil or solvent).

The record sheets for liquid radioactive waste contain the information on the total activity, but there is no reference on the contaminating radionuclides.

The packages with radioactive waste are transferred to the storage facility accompanied by the radioactive waste transport and storage record sheet.

WIRKS APPLIED TO RADIOACTIVE WASTE TREATMENT PLANT (RWTP) SITED IN MAGURELE

The Radioactive Waste Treatment Plant (RWTP) sited in Magurele is authorized by regulatory authority CNCAN for collection, treatment and storage of radioactive waste including spent sealed radioactive sources (SSRS) from all Romanian territory. Also the radioactive waste under the safeguards is collected and stored in the RWTP storage facilities. For this kind of radioactive waste separate records are kept in written form.

The classification of radioactive waste is according to the IAEA classification.

The radioactive waste which meet the waste acceptance criteria for disposal is treated and conditioned and then transferred to the National Repository for Radioactive Waste sited in Baita Bihor. The radioactive waste that does not meet the waste acceptance criteria for disposal is stored in the storage facility of RWTP.

RWTP maintains and develops a record of incoming radioactive waste, separately for SSRS. The record is performed in written form and contains the following data:

- the name and relevant data of end user of SSRS or radioactive waste
- radionuclide, activity and measurement time
- serial number of SSRS
- serial number of container
- location in the storage facility
- serial number of disposal package, as applicable.

RWTP notifies CNCAN for each uncommon case, for example, errors of authorization, absence of source serial number, absence of source, etc.

A database of SSRS is kept by RWTP but it is incomplete, usually the data concerning the activity of sources are missing. Since the last 5-6 years the database contains all information requested. All radioactive waste is collected even if the activity or the radionuclides are unknown. In these cases the radioactive waste is measured and the contents of radioactivity are characterized.

The radioactive waste from past practices in the storing facilities was conditioned in cement. Today the packages are in an advanced degradation state and the radioactive content is unknown. The recording data of these packages are incomplete. Now a program of characterization and reconditioning of these packages has been started.

In the last two years RWTP has developed an electronic radioactive waste database that contains a section for SSRS and a section for radioactive waste other than the SSRS. The database contains the same data as the data in the recording sheets.

After the treatment and conditioning the packages with radioactive waste are transferred to the National Repository for Radioactive Waste that is sited in Baita Bihor County. Each package is accompanied with the two originals of recording sheet. One of them is kept at the Radioactive Waste Treatment Plant and another one is kept to National Repository for Radioactive Waste from Baita Bihor.

The recording sheet contains the following data:

- I. Radiometrical and radiochemical characteristics of the package:
 - a. Dose rate on the any point on the surface (mSv/h)
 - b. Non fixed contamination (Bq/cm²)
 - c. Total weight (kg)
 - d. Total activity of the package:
 - i. Spent sealed radioactive sources: radionuclide, quantity of sources, activity and data of measurements, type of container
 - ii. Other radioactive waste: radionuclide, type of radioactive waste, activity and data of measurement
 - iii. Total activity measured with MADERA devices: radionuclide, estimated activity, signature of the person who performed the measurement

- II. Technical and quality conditions with confirmation by a responsible person

- used materials for the package are according to the technical specification
- waste form is in accordance to the technical specification
- mechanical strength is according to the technical specification
- leaching rate is according to the technical specification
- labeling and marking of the package are according to the technical specification

III. Guarantee

IV. Reception

- a) data of the reception of the package
- b) data of the transport and reception to the National Repository for Radioactive Waste
- c) location of the package in the disposal gallery (this data is written in the moment of reception of packages to NRRW).

CONCLUSION

Though there are no specific regulations on the record keeping system, the regulatory authority maintains the control of records. The record keeping system includes information on radionuclide, activity, physical and chemical form, and identification of the producer, dose rate, contamination of the packages.

REFERENCES

1. Law no. 111/1996 on the safe deployment of nuclear activities, with the subsequent completions and modifications, republished in 2004.
2. Dogaru, Ghe., Matei, G., The inventory of radioactive waste in RWTP, personal communications (2005)
3. Raducea, D., The inventory of radioactive waste in NPP Cernavoda, personal communications (2005)