

RADIOACTIVE WASTE MANAGEMENT DISPOSAL OF LOW LEVEL RAW

Mochovce Site

Nuclear Facility

National Radioactive Waste Repository (NRWR)

On the site of the National Radioactive Waste Repository several storage structures have been erected.

The nuclear facility National Radioactive Waste Repository in Mochovce is a repository of surface type designed for final disposal of solid and fixed low level and very low level radioactive waste. The first fibre concrete container with fixed RAW was disposed there in 2000.

Basic Technical Data

Area of NRWR	11.2 ha
Box dimensions	17.4 × 5.4 × 5.5 m
Number of boxes in a row	20
Storage capacity of a box	90 FCC
Actual number of rows	4
Total considered number of double rows	7.5
Actual number of storage boxes	80
Total considered number of boxes	300
Actual storage capacity of NRWR	7,200 FCC
Total considered capacity of NRWR	27,000 FCC
Fibre concrete container (FCC) capacity	3 m³ of RAW
Actual storage volume of the repository	21,600 m ³

Two operational double rows of storage boxes

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Storage Capacity of NRWR

Low level RAW is stored in double rows shielded by a steel hall, which increases safety at the disposal of low level RAW in fibre concrete containers and eliminates adverse effects of atmospheric conditions. The hall also allows opening of several storage boxes simultaneously, thereby facilitating optimization of storage of fibre concrete containers.

In addition to two operated double rows for disposal of low level RAW it is possible to build another five and a half double rows of storage boxes.

Low level RAW protective barriers

Protective barriers preventing leakage of radionuclides into the environment

- 1 fixation matrix (fixation material, by which RAW is fixed in fibre concrete containers)
- 2 fibre concrete container
- **3** filling of free space between walls of storage boxes and fibre concrete containers
- **4** steel-reinforced concrete structure of storage boxes
- 5 gravel draining layer
- **6** clay sealing of a double row of the repository
- 7 geological structures (suitable geological environment)



Storage box with FCCs



Storage boxes of one double row



Storage of fiber concrete container



RAW Control before Disposal

Fibre concrete containers with radioactive waste have to comply with the conditions for disposal in NRWR. Accompanying letters are issued at each handover and takeover of fibre concrete containers with RAW for their disposal. The accompanying letter contains all relevant information on RAW characteristics as well as characteristics of the container as whole, which must be checked and approved still before permitting transport of the container with RAW to the repository.

After transport of the fibre concrete container with RAW to the repository and before its disposal, the visual inspection of surface of the fibre concrete container, surface contamination control and equivalent dose rate measurement is performed. Total activity of reference radionuclides of RAW in the fibre concrete container is checked by gamma scanner.

Monitoring of the Repository

Monitoring system of NRWR provides information important for safety assessment during its operation and after its termination. Modification of drainage system of NRWR allows to directly perform drainage of individual storage boxes, check drainage of water and activity from individual storage boxes as well as functionality of the drainage system for the whole period of institutional inspection. Monitoring steel-reinforced concrete tunnels in clay sealing are installed along each row of storage boxes. The length of each tunnel is 127 m, its width is 1.3 m and its height is 1.9 m.

Monitoring program is related to:

- drainage, underground and surface water,
- soil and atmosphere,
- humidity of clay bath,
- steel-reinforced concrete structures,
- settlement of storage boxes.

Model of NRWR Shielding

After definitive termination of disposing fibre concrete containers with low level RAW and packing ensembles with very low level RAW, final shielding of the storage structures will be performed while its functionality must be maintained at least for the time of institutional inspection. Characteristics of the sealing clay layer and the covering layer of soil protecting the clay layer against weather impacts, are monitored on a model of the final shielding of the storage structures that was built in the site of NRWR since 2005. Also geometric shape of the model, surface erosion and deformation of surface of the covering layer and other parameters are monitored on the model.

Monitoring results will be used for mathematic modelling of potential geotechnical problems of the shielding and elaboration of the project of the definitive shape and structure composition of the final shielding. The period for monitoring of this model has been stated for 15 – 20 years.

Process of FCC gamma scanning



FCC unloading after transport

Monitoring shaft

DISPOSAL OF VERY LOW LEVEL RAW

Repository of Very Low Level RAW

Activity of very low level RAW, e.g. contaminated soils, construction debris, dust generated at decontamination of concrete surfaces, etc. is only slightly above the limit value for clearance of materials into the environment. Therefore, it is more efficient to store this waste separately in storage structures with smaller demands on engineering barriers and packing forms of stored very low level RAW. Improving the storage economy while imposing no impacts on nuclear safety and the environment is also an important aspect.

Very low level waste is stored in a basic structure – a cell or a module in approved type of packaging suitable for manipulation, transportation and storage in several layers one above the other to the height of several meters. The storage module contains several protective layers above and below the waste as well as networks of percolating water and leakage checks.

The repository of very low level RAW has been designed in three modules with maximum capacity of 68,000 m³ in the site of the low level national waste repository.

Very low level RAW protective barriers



Very low level RAW storage facility

Storage of very low level RAW

Very low level RAW storage facility

