THE CZECH PROGRAM FOR RADIOACTIVE WASTE AND SPENT FUEL MANAGEMENT

Lumír Nachmilner
Radioactive Waste Repository Authority
Charvátova 6, CZ - 110 00 Praha 1
Czech Republic

ABSTRACT

The Czech radioactive waste management (RWM) system has been changed significantly after the passing of the Atomic Law in January 1997. Further to total reconstruction of the respective legal structure and newly addressed responsibilities the following are the main novelties: establishment of a national radioactive waste management agency, the Radioactive Waste Repository Authority, and creation of a Nuclear Account, which collects levies paid by waste producers and can be used exclusively to cover the costs of radioactive waste and spent fuel disposal. The paper explains the new RWM structure and describes the links among the involved bodies in the Czech Republic.

INTRODUCTION

Radioactive waste management has a long tradition in the Czech republic. The first repository was commissioned in 1959. Currently there are 3 other in operation designed for institutional and operational reactor radioactive wastes. In 1993 a program on development of the deep geological repository was initiated. These facilities are serving more than 500 institutional producers and one nuclear power plant with four WWER 440 reactors; the other NPP with two WWER 1000 reactors is going to be phased in within two years. Annual waste arisings have not exceeded 600 m^3 of low and intermediate level waste and approx. 35 thm of spent fuel; these values will be nearly doubled after the new nuclear power plant would be commissioned. This production has called for alteration of the radioactive waste management system consistent with the structure usual in developed countries. This step was done when the new Atomic Law got through the Czech Parliament in January 1997.

ATOMIC LAW

The law on peaceful utilization of nuclear
energy and ionizing radiation No. 18/1997 Coll., was approved by the Czech Parliament on January 24, 1997. During the following year this was supported by a set of about 20 regulations elaborating the particular requirements of the Law.

Among others, based on the Law, the Nuclear Account and a new institution were created: its mission is to ensure the safe disposal of all radioactive wastes (RW) arising and appearing in the Czech republic.

The nuclear account, collecting levies paid by waste generators, is a part of the national budget; it can be used exclusively to cover the costs of RW disposal performed by the Radioactive Waste Repository Authority (RAWRA).

RAWRA is a state organization working under the license of the State Office for Nuclear Safety, however, it has also a licensing role as it confirms the calculation of costs of decommissioning a licensee facility, which is a condition for issuing its operational license. On this base, RAWRA sets the annual payment to a reserve fund and audits whether it is made by the licensee at the required level.

The other principal responsibilities can be grouped as follows:

- activities connected with development, construction, operation, closure, and monitoring of RW repositories in the Czech Republic (including conditioning of spent fuel, keeping records of RW's and their generators, administration of payments to the nuclear account, proposing levies, co-ordination of R&D activities, etc.)

- management of RW owned or to be owned by state (lost, found, hidden)

RWM SYSTEM

Both existing and new RWM systems are based on processing RW by their producers or by institutions providing this service on the commercial base. In all cases, generators bear the cost of conditioning of RW. Repositories have been operated by private utilities; by the year 2000 they shall be, according to the atomic law, overtaken into state ownership and entrusted to RAWRA management. Disposal of RW will be financed by RW producers via levies paid to the nuclear account. The newly established organizational links are shown in Figure 1.
With respect to its role in the radioactive waste management RAWRA has overtaken coordination of the development of a deep geological repository since the beginning of 1998.

RWM CONCEPTUAL STRATEGY

One of the highly topical tasks of RAWRA is to develop a proposal of the national radioactive waste management concept. This strategic document shall direct future activities aimed at safe management of radioactive wastes. It will also be subjected to environmental impact assessment which will involve public hearing. The final document shall be confirmed by the Czech Cabinet. The Concept will consider at least the following options:

- *management of low level wastes (LLW) without long lived radionuclides*
the existing technologies and disposal capacities will be confronted with estimated waste arisings and an optimum solution will be recommended

- *management of LLW containing long lived radionuclides*
both temporary and final solutions of making these wastes harmless will be described, taking into account planned construction of a deep repository

- *management of high level waste (HLW)*
HLW management is technically very close to the management of spent fuel; therefore, this problem shall be treated similarly as that of spent fuel (SF)

- *management of spent fuel including*
  - direct disposal
  burial of SF in a deep geological repository is an internationally accepted method; the respective Czech program is described below
  - very long term storage
  this approach can not be considered as the ultimate solution, however, when included in the concept, it allows to postpone the final decision for several decades and in this way to exploit the latest technologies
  - reprocessing and partitioning
  similarly as storage this method must be combined with disposal; the pros and cons will be confronted from safety, technical and economical points of view

- transmutation
transmutation may significantly decrease the content of long lived nuclides and thus make the disposal system simpler and safer; its exploitation must be evaluated in the context including the management of transmutation products (Accelerator Driven Transmutation Technology is the preferred option in the Czech republic)
- disposal in a regional repository
consideration of an international European solution will provide a contrast to any of the internal SF management approaches and this will allow to identify the most optimal extent and direction of the future activities

DEEP REPOSITORY PROGRAM

The program was initiated in 1993, nevertheless, some activities had been performed even earlier (e.g. screening of the Czech territory, generic studies, program proposal). The repository shall accept both spent fuel and radioactive wastes arising from its eventual reprocessing, and medium and high level wastes which are not acceptable for shallow land repositories. The production of spent fuel during NPP's operation is estimated to nearly 3,000 thm (4,300 thm in case of prolongation of their lifetime), the amount of other long lived wastes will probably top 20,000 m^3.

The conceptual phase of the program is to be completed this year. The goal of current activities is to find and confirm a site suitable for the repository construction.

Generic design of geological activities, set in 1995 and updated in 1997, estimates that these phases will require more than 20 years. In that time the final decision on spent fuel management could be done, including timing and required capacities of relevant facilities.

The further steps will include so called non-destructive and destructive geologic investigations (according whether the exploration will or will not reach the planned repository depth), studies of engineered barriers, safety and performance assessments, natural analogue and underground laboratory projects.

CONCLUSIONS

The completed organizational and legislative changes as well as the experience gained in the Czech Republic during 40 years of regular performance of waste conditioning and disposal activities provide a good basis for a safe and internationally acceptable radioactive waste management system.

Figure 1: Basic relations within the Czech radioactive waste management system