

Decommissioning in the Czech Republic September 2006

CURRENT STATUS

Two nuclear power plants are in operation in the territory of the Czech Republic:

- NPP Dukovany - installed four Russian designed WWER 440/213 pressurised water reactors. The total installed capacity of four units is 1,760 MWe. The individual units started its operation in 1985-1987.
- NPP Temelín - installed two units with WWER 1000/320 pressurised water reactors. The total installed capacity of two units is 1,960 MWe. The Temelín NPP was commissioned in 2002-2003.
- In 2005, these plants produced 30% of electricity generated in the Czech Republic.

At present, there is no decommissioning project for the nuclear installation in progress or foreseen in the near future.

POLICY OBJECTIVES OF D&D

Legal framework

Legal framework for decommissioning is stipulated in the Atomic Act [1] and related regulation on decommissioning [2].

Atomic Act specifies technical and financial requirements for decommissioning which can be summarised briefly as follows:

- The preparation for decommissioning is included in each stage of the service life of a nuclear power plant and it is part of the licensing documentation.
- An applicant for the issue of a licence for NPP siting, construction, or for individual stages of NPP commissioning and NPP operation should submit relevant documentation to SÚJB which deals with decommissioning. In relation to the nuclear power plant lifecycle, we distinguish 1) a concept of safe operation termination, 2) a concept of safe operation and decommissioning and 3) a proposal for the decommissioning procedure. The proposal for the decommissioning procedure is subject to the approval by SÚJB and should include the relevant costs estimate verified by RAWRA. The documentation submitted for the permit of the individual stages of the NPP decommissioning process presents the top level of the documentation processed and is listed in the Appendix (item G) to the Atomic Act.
- The nuclear power plant operator must create a reserve to cover the costs related to nuclear power plant decommissioning. This reserve must be created in compliance with the proposed procedure of NPP decommissioning as approved by SÚJB.

Decree No. 185/2002 Coll., regulates the method and scope of decommissioning and specifies a content of the documentation on the decommissioning procedure to be approved by SÚJB. Furthermore, the decree sets down the definitions of decommissioning activities and requires the regular updating of the proposed decommissioning procedure and related decommissioning costs.

[1] Act No. 18/1997 Coll., on Peaceful Utilisation of Nuclear Energy and Ionizing Radiation (the Atomic Act) and on Amendments and Additions to Related Acts, in the wording of the Act No. 13/2002 Coll.

[2] Decree No. 185/2003 Coll., on the Decommissioning of Nuclear Installation or Category III or IV Workplace.

Decommissioning of the NPP Dukovany and the NPP Temelín

The adopted concept of the decommissioning of both nuclear power plants operated by ČEZ a. s. is outlined in the option of a gradual decommissioning procedure with disassembling of the nuclear facility and implementation of safe enclosure.

The main decommissioning activities such as decontamination, disassembling, demolition of the buildings accommodating the technology working with contaminated media and radioactive waste processing, will follow after safe enclosure.

A schedule of NPP Dukovany decommissioning is given for informative purpose. The schedule is given for 30-year-long operation of the nuclear power plant. If the service life is extended by 10 years or more, the schedule will be adjusted and the safe enclosure period will be shortened (see Tab. 1).

The decommissioning schedule of the NPP Temelín is given in similar structure (see Tab. 2).

Table 1

Time schedule of decommissioning process in NPP Dukovany

Shut-down of units	2015 – 2018
Spent fuel removal (from the spent fuel storage pond)	2022 – 2025
Preparation of safe enclosure (including demolition of the 1st operational building)	2015 – 2025
Operation of safe enclosure	2026 – 2075
Dismantling and demolition of the active buildings	2076 – 2085
Releasing of the locality	2086

Table 2

Time schedule of decommissioning process in NPP Temelín

Shut-down of units	2042 – 2043
Spent fuel removal (from the spent fuel storage pond)	2047 – 2048
Preparation of safe enclosure	2047 – 2049
Operation of safe enclosure	2047 – 2082
Dismantling and demolition of the active buildings	2082 – 2091
Releasing of the locality	2091

COMPETENT BODIES AND ROLES

- State Office for Nuclear Safety – SÚJB

The State Office for Nuclear Safety is a governmental body as stipulated by Act No. 2/1969 (full wording Act No. 122/1997 - §2). The SÚJB is headed by SÚJB Chairman who is appointed by the Government of the Czech Republic.

The SÚJB is a regulatory body responsible for governmental administration and supervision in the field of nuclear energy, ionizing radiation and radiation protection. The authority and responsibilities of the SÚJB are given by the Atomic Act.

- Radioactive Waste Repository Authority – RAWRA

The Radioactive Waste Repository Authority (RAWRA) was established in 1997 under the Resolution of the Minister of Industry and Trade No. 107/1997 issued in pursuance of Article 26 of Act No. 18/1997 Coll., as a state organisation responsible for the management of activities related to the disposal of radioactive waste. The main responsibilities of RAWRA are also given by the Atomic Act.

FUNDING

In accordance with the Atomic Act ČEZ a. s. creates statutory reserve for the decommissioning of nuclear installations. As required by the Atomic Act, the reserve is based on estimated costs of decommissioning using a procedure approved by SÚJB and RAWRA. RAWRA provides the monitoring of the financial reserve for decommissioning and approves any withdrawal of financial means from the reserve (blocked account). Financial means may be used only for the preparation and implementation of decommissioning.

DECOMMISSIONING TECHNIQUES AND INSPECTION

The techniques for decommissioning are aimed at minimizing radiation doses to workers and to the public and at minimizing the amount of radioactive waste. Decontamination techniques will be used in order to clear material arising from the dismantling process and render it as inactive.

Decontamination

Decontamination techniques include chemical or electrochemical techniques, thermal techniques, mechanical cleaning and washing, or other techniques to achieve the stated objective.

Decontamination methods include: 1) the use of remote techniques that reduce the risk of worker exposure, 2) in situ decontamination methods that reduce the generation of secondary wastes and reduce the requirement for waste handling, 3) methods for decontaminating inaccessible areas.

Dismantling

Decommissioning of nuclear facilities involves various dismantling techniques, e.g. cutting, sawing and mechanical demolition. Such techniques are available in the non-nuclear area and have been adapted for the decommissioning of nuclear facilities. The protection of persons from the inhalation / ingestion of radionuclides and from direct radiation is essential during decommissioning process. Thus remote techniques, working under water, shielding and installation of new ventilation systems will be applied during dismantling and demolition.

Inspection

The organisation of the inspections is the same as during operation but the focus of the inspection will change more towards radiation protection and conventional safety aspects.

RADIOACTIVE WASTE MANAGEMENT

When considering radioactive waste management, the following principles were adopted:

- Waste resulting from the decommissioning process will be processed by the standard technologies which are currently available and used in NPP Dukovany and NPP Temelín (bitumenization, low-pressure compaction).
- Waste volumes will be estimated based on their acceptability to radioactive waste repository Dukovany, i.e. presently the only available repository for waste produced by power reactors.

The quantity of radioactive waste fulfilling the criteria of acceptability for repository Dukovany as specified for the NPP Dukovany decommissioning process is 2,573 m³; for NPP Temelín this quantity is estimated at 3,709 m³.

Waste such as internal parts of reactors which exceeds the limits of ⁶³Ni and ⁵⁹Ni is classified as non-acceptable for repository and amounts to 405 m³ for NPP Dukovany and to 724 m³ for NPP Temelín. This waste will be disposed of in a deep geological repository which is planned as part of the studies on decommissioning concept.

PUBLIC INFORMATION

Informing the general public about decommissioning of nuclear installations and radioactive waste management is one of SÚJB's and RAWRA's responsibilities.

State Office for Nuclear Safety - SÚJB
Senovazne square 9, 110 00 Prague 1, Czech Republic
tel.: +420 221 624 111, fax: +420 221 624 396
Internet: <http://www.sujb.cz>

Radioactive Waste Repository Authority - RAWRA
Dlazdena 6, 110 00 Prague 1, Czech Republic
tel.: +420 221 421 511, fax: +420 221 421 535
Internet: <http://www.surao.cz>