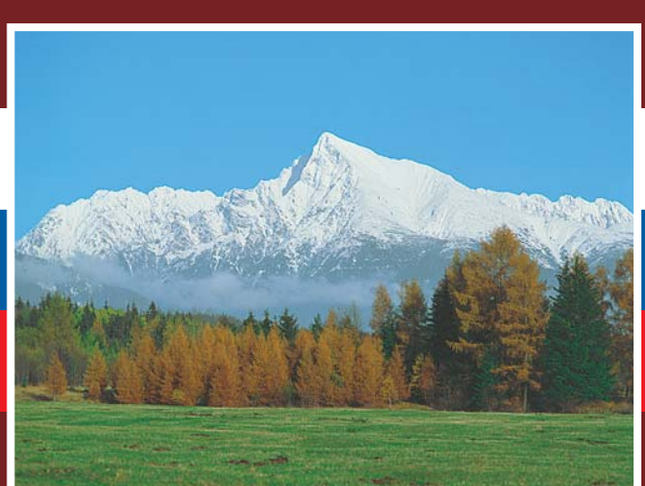
Ministry of the Environment
of the Slovak Republic

STATE OF THE ENVIRONMENT REPORT SLOVAK REPUBLIC 2007



Slovak Environmental Agency

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Exploitation of nuclear energy must be justified by the contribution, which would counterbalance eventual risks originating from such activities, especially in comparison with other ways, which can be used to reach the same goal.

§ 3 par. 3 of the Act No. 541/2004 Coll. on Peaceful Exploitation of Nuclear Energy (Nuclear Act)

ENVIRONMENTAL RISK FACTORS

• PHYSICAL RISK FACTORS

Radiation protection

♦ **Air dose equivalent rate**

Input of the external photon dose equivalent in air H (nSv.h^{-1}) in 2006 in the early alarm networks of in the whole SR territory reached the average value of 107.1 nSv.h^{-1}. Average annual effective dose E (μSv) for the whole SR territory was 937 μSv in 2006.

♦ **Air Contamination**

Air contamination has continually been monitored by measuring the volume activity of individual radio nuclides in **aerosols** extracted in the ground atmospheric level. Their ^{137}Cs concentration in Slovakia in 2006 reached average value 5 μBq.m^{-3}.

In 2006, no major air contamination by man-made radionuclides was detected, ^{137}Cs radionuclide concentration in **radioactive fallout,** originating in the upper atmospheric layers as a result of nuclear weapons tests, was about 3.5 Bq.m^{-2} in Slovakia.

♦ **Contamination of other environmental compounds**

Average soil contamination by the ^{137}Cs radionuclide in 2006 was about 2.8 Bq.kg^{-1}. Average activity of the ^{137}Cs radionuclide **in water** in 2006 was below 0.01 mBq.l^{-1}. Average tritium activity **in water** was at the level of 2.2 Bq.l^{-1}.

♦ **Contamination of foodstuff and agricultural products**

Of all man-made radionuclides, in 2006, just like in the previous years, it was possible to detect in food samples only the ^{137}Cs radionuclide. Its contents in all measured commodities – excluding grasses and fungi – were around the level of units of $Bq.kg^{-1}$, or rather $Bq.l^{-1}$.

♦ **Radon and its radioactive decay products**

The basic public health legislation on protection against the adverse effects of ionizing radiation is Act No. 126/2006 on **public health and amendments to other laws,** which superseded the former Act and Resolution.

Source of radiation	Radiation load	
	Person (mSv)	Population (10^5 manSv)
Natural background together. from that: - cosmic radiation - terestrial gama radiation - radio-nuclides in body - radon and the products of mutation	**2.94** 0.39 0.46 0.29 1.80	**650**
Medical exposure together. from that: - diagnostics - radiotherapy	 0.8 – 1.0 -	
Atmospheric testing of nuclear weapons	-	30
Radio-nuclides outlet	-	2

Source: PHA SR

Nuclear institutions

Nuclear Regulatory Authority (NRA SR) is an independent central state administration authority, headed by the Chief Officer. In 2007, atomic law restatement was discussed in four parliament committees and subsequently approved. Act that amends and supplements the atomic Act No. 541/2004 Coll. as amended, was adopted on 7.2.2007 and published in Collection of Laws of SR on March 7, 2007. NRA SR drafted an amendment to the atomic law as part of its legislative activities in 2007. The amendment is based on transposition of EU Council Directive 2006/117 Euratom on supervision and controls at transboundary transport of radioactive waste and burnt nuclear fuel.

List of operated nuclear power plants in the SR

Nuclear Power Plant (NPP)	Start of operation	Reactor type	Operator
NPP Bohunice V-1	1978, 1980	VVER 440/230	SE
NPP Bohunice V-2	1984, 1985	VVER 440/213	SE
NPP Mochovce 1,2	1998, 1999	VVER 440/213	SE

Source: NRA SR

Slovakia is a signatory to all major international agreements and conventions in the area of peaceful exploitation of nuclear energy.

- **Activity of nuclear institutions in SR**

NPP V-1 Bohunice

First NPP block of Bohunice V-1 was put out of operation in December 2006 and in 2007 was in regime 5, i.e. fuel in the reactor and the primary circuit cooled by natural circulation. Second NPP V-1 block in Bohunice was in operation in 2007 according to demands of Slovak energy control centre.

In 2007, NPP – EBO V-1 detected 7 occurrences, 3 of them within the INES 0 degree, and none in the INES 1 degree.

NPP V-2 Bohunice

Both NPP Bohunice V-2 blocks in 2007 operated with new type of core fuel with the content of second-generation gadolinium that contributes to a more efficient use of fuel and more balanced distribution of output in the reactor's active zone. Implementation of periodic assessment of nuclear safety at NPP V2 in Bohunice after 10 years of operation was major event in 2007. Preliminary results of NRA SR assessment suggest that current condition of nuclear safety of NPP V-2 Bohunice after the completion of MOD V-2 modernization program, implementation of corrective measures and elimination of faults detected by test can be a good starting point for safe operation of NPP V-2 Bohunice until the next periodic nuclear safety assessment.

In 2007, both NPP V-2 blocks detected 21 operation occurrences, 18 of them assessed under the INES 0 degree.

NPP Mochovce 1,2

In 2007 in NPP Mochovce 1,2 planned shutdowns were implemented at the blocks for overhauls and fuel changes. Both shutdowns were implemented as planned.

There were two major operation events in NPP Mochovce 1,2 in 2007. The first event relates to insufficient sealing of primary circuit (PC) return valve, while the second event relates to faults in set paths for measuring sealing characteristics of PC equipment division planes.

In 2007, there were 13 occurrences in NPP Mochovce, 5 of which were classified under the INES 0 degree.

Nuclear power plants under construction

At present, one atomic power plant is under construction in Slovakia - NPP Mochovce 3,4 in the ownership of SE, inc..

NPP Mochovce 3, 4

Conservation and protection works on 3rd and 4th blocks of NPP Mochovce continued also in 2007. NRA SR periodically controls and assesses their condition. Planning works began in 2007 as a result of a decision of the owner of the plant. Their result should involve continuing construction of blocks 3 and 4.

Nuclear power plants to be phased out

In 2007, one atomic plant – NPP A-1 in Bohunice was phased out. After the SE inc. division, the plant became the ownership of JAVYS, inc. Block 1 of the NPP Bohunice V-1 that terminated output operation in 2006 as a result of government decision on early termination of operation of NPP Bohunice V-1 blocks in 2006-2008.

Operated nuclear facilities

Jaslovské Bohunice temporary storage of burnt fuel stores burnt fuel from the NPP V-1, NPP V – 2, and NPP Mochovce 1,2, before its transport to the re-processing plant or before its permanent storage. In 2007, program of gradual translation of burnt nuclear fuel from original T-12 tanks to new KZ – 48 tanks was terminated. This gradually increases storing capacity of storage.

Technology of processing and treatment of radioactive nucklear waste (RAW), Jaslovské Bohunice includes two bitumen lines, cement line, and the Bohunické RAW processing centre. Bitumen lines with the capacity of 120 l/h are designed to process RAW concentrates from the operation of nuclear power plants. RAW is processed into 200 litre barrels placed into fiber-concrete containers before its final storage. In 2007, a decision to launch the operation of discontinual line designated to fix ions and sludge into bituminous matrix was issued.

National discharge site of radioactive waste Mochovce is a multi-barrier discharge site of the surface type, designed for final storage of solid and solidified RAW generated at the operation and phaseout of NPP, at research institutes, in laboratories, and in hospitals in Slovakia. As of the end of 2006, there were more than 1200 pcs of fiber-concrete containers for low to medium-active radioactive waste stored in this facility.

Nuclear facilities under construction

Final processing of liquid radioactive waste (RAW) sludge, Mochovce is in the ownership of JAVYS, inc. and aims at final processing of liquid radioactive waste from the operation of NPP Mochovce into the form appropriate to be stored within radioactive waste deposit. Technology consists of two individual processes involving bituminization and cementation. In 2007, NRA SR assessed documentation that served as a basis for issued permit for test operation of this nuclear facility. The authority was inspected in order to verify its present condition and readiness for test operation. In 2007, this nuclear facility still did not operate in permanent mode.

Nuclear facilities to be phased out

VUJE, inc. owns two experimental nuclear facilities – bituminization line and RAO incinerator, both in the I-st. stage of phase-out.

♦ **Handling with radioactive waste**

Handling of radioactive waste constitutes an integrated system that includes the collection, separation, storage, processing, treatment, manipulation, and discharge of radioactive waste. Current policy of handling radioactive waste in the SR builds on the following steps:

- treatment of RAO into an acceptable form to be contained or stored over longer time periods,
- depositing low and medium radioactive RAO into a surface discharge site and a long-term storage of RAO unacceptable to be deposited at the surface discharge site,
- survey and development of subterranean storage of burnt nuclear fuel and RAO unacceptable to be deposited at the surface storage site.