

## ENVIRONMENTAL RISK FACTORS

### • PHYSICAL RISK FACTORS

#### Radiation protection

Under **Act 126/2006 Coll. on public health and amendment to other laws**, the Public Health Authority of the Slovak Republic in cooperation with other pertinent resorts have an obligation to carry out monitoring of the radiation situation and secure collection of data in the Slovak territory for the purposes of assessing the impact of radiation on public health.

#### ◆ Air dose equivalent rate

Input of the external photon dose equivalent in air H in 2008 in the early alarm networks of in the whole SR territory reached the average value of 111.2 nSv.h<sup>-1</sup>.

#### ◆ 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 <sup>137</sup>Cs concentration in Slovakia in 2008 reached average value 1.10<sup>-6</sup> Bq.m<sup>-3</sup>.

In 2008, no major air contamination by man-made radionuclides was detected, <sup>137</sup>Cs radionuclide concentration in **radioactive fallout**, originating in the upper atmospheric layers as a result of nuclear weapons tests, was about 1.6 Bq.m<sup>-2</sup> in Slovakia.

#### ◆ Contamination of other environmental compounds

**Average soil** contamination by the <sup>137</sup>Cs radionuclide in 2008 was about 9.3 Bq.kg<sup>-1</sup>. Average activity of the <sup>137</sup>Cs radionuclide **in water** in 2008 was below 0.015 Bq.l<sup>-1</sup>. Average tritium activity **in water** was at the level of 5.1 Bq.l<sup>-1</sup>.

#### ◆ Contamination of foodstuff and agricultural products

Of all man-made radionuclides, in 2008, just like in the previous years, it was possible to detect in food samples only the <sup>137</sup>Cs radionuclide.

#### Nuclear installations in the SR

Under Act 575/2001 Coll. the Nuclear Regulatory Authority of the Slovak Republic carries out state supervision in the area of nuclear energy use and safe handling with burnt nuclear fuel and radioactive waste at physical protection of the nuclear material, and at contingency planning in the

Slovak Republic for cases of radiation threat. The Authority meanwhile controls implementation of responsibilities stemming from international treaties and agreements in the area of peaceful use of nuclear energy. Act 408/2008 Coll. was adopted in 2008, which amends the Atomic Act 541/2004 Coll. due to transposition of the Council Directive 2006/117/Euratom on the supervision and control of shipments of radioactive waste and spent fuel.

#### List of nuclear installation in the SR and their operators

Location	Nuclear installations	Operator
Mochovce	NPP Mochovce, 1. a 2. block NPP Mochovce 3. a 4. block under construction	SE, Inc.
Bohunice	NPP V-2	
Bohunice	NPP Bohunice V-1 NPP Bohunice A-1 Repository of Spent Nuclear Fuel (SNF) Technologies of treatment and processing RAW	JAVYS, Inc.
Mochovce	Final treatment of liquid RAW Republic deposit RAW	

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 installation in the SR

##### *Operated nuclear power plants in the SR*

There is 6 block of nuclear power stations with nuclear reactor VVER-440 nowadays.

#### List of operated nuclear power plants (NPP) in the SR

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

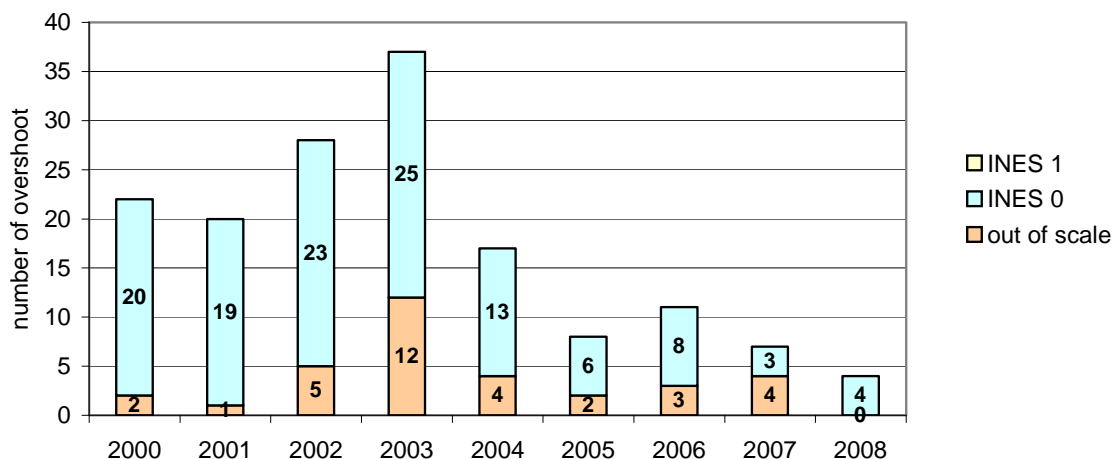
Source: NRA SR

#### NPP V-1 Bohunice

First block of NPP Bohunice V-1 was put out of operation in December 2006, and in February 2008 the block was switched into regime 7, meaning that the fuel from the reactor was transported out to the storage pool. Reactor and the primary circuit is assembled and filled with pure condensate. Second NPP V-1 block in Bohunice was in operation in 2007 according to demands of Slovak energy control centre. In December, the block was shut down as the consequence of the Slovak Government decision.

In 2008 there were no major operating events at the nuclear power plant of V-1 Bohunice, and based on the outcomes of control activities and assessment of safety indicators, NRA SR assessed the operation of both NPP V-1 blocks as safe and reliable in 2008.

**Number of occurrences of block NPP V-1 Bohunice**

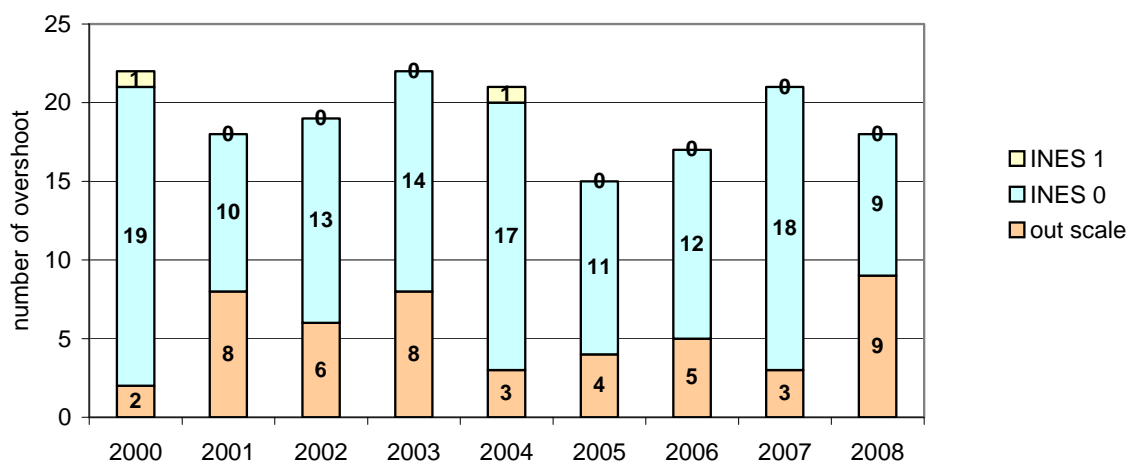


Source: NRA SR

**NPP V-2 Bohunice**

In terms of nuclear safety, the V-2 blocks, meaning blocks 3 and 4 in the NPP Bohunice, which are operated by the SE, Inc. company, represent a newer and substantially improved series of VVER 440 model V-213 blocks, compared to V-1 blocks. NPP is able to handle accidents up to the level of the main circulation pipe rupture, without major impacts on the population and environment. In 2008, both NPP V-2 blocks met the demands of the Slovak energy control centre. In 2008, there were shut-downs within the NPP V-2 zone on fuel exchange blocks as well as overhauls of blocks, during which were implemented investment projects aiming at continual increase of nuclear safety that built on the experience with operation at both national and international levels.

**Number of occurrences of block AE V-2 Bohunice**



Source: NRA SR

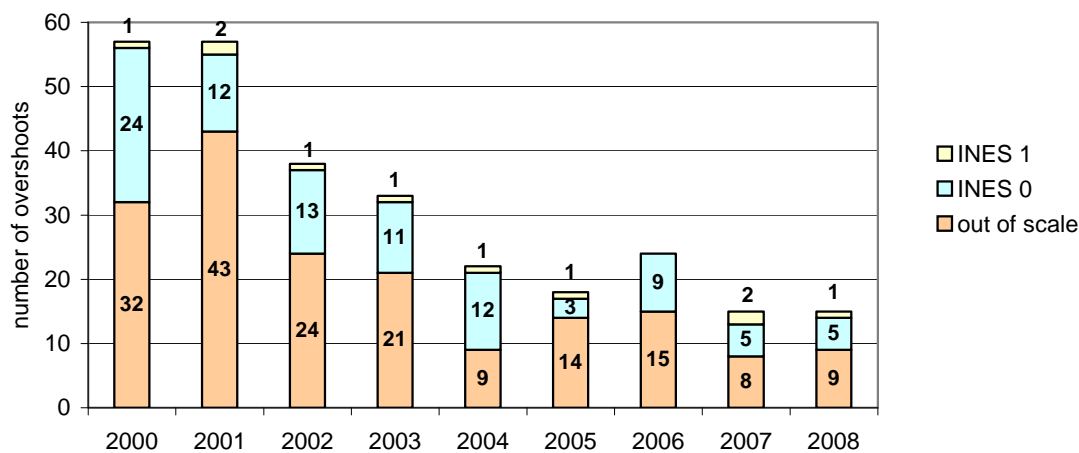
The number and character of events and occurrences in 2008 was within the realm of common technical malfunctions, without a unique safety issue. Events that occurred at NPP Bohunice V-2 did not have a major impact on nuclear safety. There were no cases of automatic shut-downs of AO-1.

NRA SR assessed the operation of both NPP V-2 blocks in 2008 as reliable, with no major failures in the area of nuclear safety. The most important event was a failure of the control of armature at the technical water feed stream to the rinsing system cooler. The operator took a series of corrective measures with the objective to prevent the recurrence of such events

### NPP Mochovce 1, 2

In 2008 in NPP Mochovce 1, 2 planned shutdowns were implemented at the blocks for overhauls and fuel changes. There were two major operation events in NPP Mochovce 1, 2 in 2008. 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.

#### Number of occurrences of block AE Mochovce 1, 2



Source: NRA SR

#### *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 2008, one atomic plant – NPP A-1 in Bohunice was phased out. After the SE Inc. division, the plant became the ownership of JAVYS, Inc. Prepared for shut-down are Block 1 of the NPP Bohunice V-1 that finished its output operation in 2006, and Block 2 of the same power plant that finished its output operation as of December 31, 2008.

### *Operated nuclear installations (NI)*

**Jaslovské Bohunice temporary storage of burnt fuel (MSVP)** 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.

Over the course of 2008, the assessment activity was focused on assessing the condition of operation checks at construction and technological parts and the systems of MSVP and the stored SNF. There was no case of non-compliance with the conditions of nuclear and radiation safety and operation directions; hence, the operation may be assessed as safe and reliable.

**Technology of processing and treatment of radioactive nuclear 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 2008, the discontinual bitumen facility designated for the fixation of ionex and sludge into the bitumen matrix continued to be put into operation. Outcomes of the control activities suggest that the operation of NI Technologies for radioactive waste processing and treatment may be assessed as safe.

**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.

Inspection activities at the National Discharge Site of Radioactive Waste in 2008 focused on the process of receiving the radioactive waste to the repository, and on controlling of the properties of fibre-reinforced concrete containers by the site operator. Based on the outcomes of control activities, operation of the National Discharge site of Radioactive Waste in Mochovce may be assessed as safe, without a negative impact on environment.

**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 2008, NRA SR issued a decision on extending the test operation period of this nuclear facility. Inspection activity at FS KRAO was focused on making sure the test operation complies with the set criteria.

The above mentioned nuclear facilities recorded one operation event outside the INES scale, i.e. with no impact on nuclear safety.

### **Nuclear facilities to be phased out**

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

◆ **Handling with radioactive waste**

In Slovakia, **radioactive waste** (RAW) is defined as unused material that due to its radionuclide content or contamination by radionuclides cannot be introduced into the environment.

**Handling of radioactive waste** constitutes an integrated system that includes the collection, separation, storage, processing, treatment, manipulation, and discharge of radioactive waste.

Objective of the activities that precede the placing of radioactive waste involves the optimization of the loading process and increasing its safety and economic efficiency through creating a packaged form suitable to be stored at the RAW repository. Storage plays an important role between the generation of RAW and the individual steps of the radioactive waste handling system. Final step in the process of RAW handling constitutes its storage, which should be the objective of all activities related to RAW handling, and which represents a permanent placement of the packaged RAW forms in the storage facility. National RAW surface discharge storage site in Mochovce stores the RAW generated in Slovakia. It is assumed that individual NPP blocks will produce over the project operation time.

## • CHEMICAL RISK FACTORS

### Chemical substance

On June 1, 2007, a new EC Regulation 1907/2006 became effective in all EU member states. This legislation addresses registration, evaluation, authorisation, and restriction of chemical substances (REACH) and also establishes the European Chemical Agency. This legislation amends and supplements Directive 1999/45/EC and supersedes Council Regulation (EEC) 793/93 and Commission Regulation (EC) 1488/94, Council Directive 76/769/EEC, and Commission directives 91/155/EEC, 93/67/EEC, 93/105/EC, and 2000/21/EC (hereinafter only „the REACH regulation“).

Changes emanating from the amendments to Directive 67/548/EEC were transformed and subsequently implemented by the Ministry of Economy into the Slovak legal system through novelization of Act 163/2001 Coll. on chemical substances and chemical compounds as amended. (Act 405/2008 Coll.)

The **Rotterdam Convention** on prior informed consent procedure for certain hazardous chemicals and pesticides in international trade is a major international law instrument to improve international regulation of trade with certain hazardous substances and pesticides. This Convention entered in effect for Slovakia on April 26, 2007.

In 2008 works on the preparation of a new directive were carried out, with active participation of the Ministry of Environment together with the Ministry of Economy. In June 2008 the Official EU Journal published a new EP Directive (EC) 689/2008 on export and import of dangerous chemicals.

### SAICM

Ministry of Foreign Affairs of Slovak Republic nominated the Ministry of Environment to be the national contact site for Strategic approach to international chemicals management (SAICM) in Slovakia. In 2008, MoE SR was involved in preparing the strategy and participated in workshops of the SAICM organizations.

### Xenobiotics in the food chain

Volumes of xenobiotic substances in foods are regulated by limits published in the Slovak Food Code and compatible with the EU limits.

Monitoring of the occurrence of xenobiotic substances in the components of environment and the products of agricultural and food production is carried out in two ways – through a random control, and a regular monitoring.

**Testing for xenobiotics** is carried out by testing organisations under the valid legislation, with the goal to prevent the flow of unacceptable foods to the consumer. Results from the tests serve as the basis for adopting immediate decisions.

**Monitoring of xenobiotics** collects information on the status and trends in pollution of individual components of environment, as well as information on health safety of local foods. Results from the monitoring, including the risk assessment, serve as a basis for adoption of preventive measures.

♦ **Monitoring of xenobiotics in the food chain**

Partial monitoring system called: **Xenobiotic in foods and forage** is composed of three subsystems:

- Co-ordinated focus-specific monitoring (CFM) has been used since 1991
- Consumption pool monitoring (CPM) has been used since 1993
- Monitoring of game, wildlife, and fishes (MGF) has been implemented since 1995

Partial monitoring system has been connected to the GEMS/FOOD EURO international monitoring system since 1994.

**Coordinated focus-specific monitoring (CFM)** has the objective to determine actual mutual relationship between the degree of contamination of agricultural land, irrigation water, feeding water, crop and animal production, within the primary agricultural production, and obtain information on the contamination of individual food chain components.

**36 088 samples** were extracted over the entire monitored period (17 years), containing **2 461** limit-exceeding samples, which represents **6.8 %**. Monitoring was carried out for 810 agricultural subjects (in 75 districts), analyzing soil samples from 478 287 ha.

Most limit-exceeding samples were detected **in water** (mainly nitrites and nitrates) and **in forage**. (nitrites) **Since 1991**, soil contamination balance showed significant improvement, with decreased average contents of **mercury** and **arsenic** in 2007. On the contrary, average detection and number of limit-exceeding soil samples for **cadmium** and **lead** increased. In case of water for animal feed, non-compliant values were detected for nitrates as well as nitrites; however, the number of limit-exceeding samples dropped. Irrigation water did not show a single event of limit-exceeding values. For the first time, forage showed limit-exceeding values in 2007. Contents of PCB also show positive balance as there were no limit-exceeding samples detected in 2005 - 2007.

**In 2007**, total number of **1 634 samples** were extracted from 596 hunts and subsequently analysed for content of chemicals, PCB, nitrates, and nitrites. Monitoring was implemented for 47 agricultural subjects in 39 districts, with analysis of the soil samples from 25 781 ha, including the crop produced from this soil.



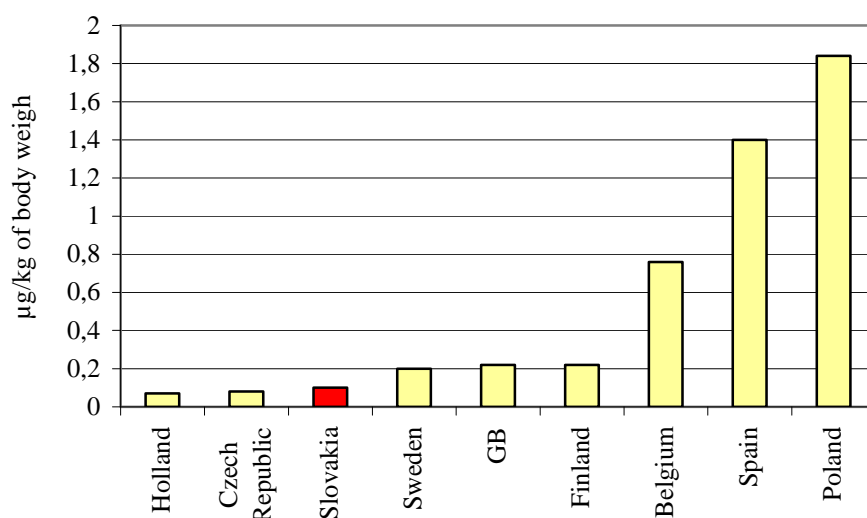
Comparison of contamination of individual commodities suggests that the limit-exceeding samples in 2007 were detected in water for animal feed, contributed to by nitrites and nitrates, while cadmium, lead, and nickel were found in soil.

Objective of the **Consumption pool monitoring (CPM)** is to obtain data on contamination of foods within the consumer network and subsequently assess exposition of the population to the monitored contaminants. Samples are purchased from the commercial network twice a year (May, September) at 10 Slovak sites.

Over the period of **fifteen years, 10 984 samples** were analysed, including **501 samples**, i.e. **4.6 %** that exceeded permitted limit values, especially in nitrates and chemical elements.

Consumption pool in **2007** included 26 basic foods. (by statistical consumption) Samples of drinking water from public sources were not monitored in the given year. **607 samples** were analysed, including **7 samples** (i.e. **1.2 %**) that were unacceptable.

#### Comparison of the weekly absorption of mercury by the human organism between Slovakia and other world countries



Source: FoRI SR

Compared with available international data, the SR may be considered among countries with **lowest values** of weekly intake of arsenic, cadmium, mercury, chrome, nickel, lead, and nitrates by the human organism.

## • WASTE AND WASTE MANAGEMENT

### Initial situation

The year 2008 was the third year of meeting the objectives of the Programme of Waste Management of the Slovak Republic for the years 2006-2010.

### Balance of waste generation

Since 2003, waste generation assessment has been split into 2 tables. The first shows total volumes of generated waste based on notifications from waste generators. More information in terms of strategic territorial development of waste management infrastructure shows the table containing just those waste volumes that are located on the market, i.e. the producers had to submit waste for recovery or disposal to the authorities dealing with waste handling, pursuant to waste law. Waste volumes located on the market represent the initial statistical basis for monitoring the waste management trend.

#### Waste generation (t)

Waste category	Amount (t)
Hazardous waste	602 480
Other waste	12 962 808
Municipal waste*	1 790 691
<b>Total</b>	<b>15 355 979</b>

Source: SEA, SO SR

#### Generation of waste located on the market (t)

Waste category	Amount (t)
Hazardous waste	523 928
Other waste	9 177 459
Municipal waste*	1 790 691
<b>Total</b>	<b>11 492 078</b>

Source: SEA, SO SR

\*MW contains both categories (hazardous and other waste, it is necessary to separate the category of municipal waste considering the unique character of its regime, typical of municipal waste

Compared to 2007, the annual growth of waste put on the market is about 5 %. The decrease existed in hazardous waste generation by 1.5 % compared to the previous year.

In the area of waste generation by economic activities classification SK NACE, manufacturing industry has been the dominating component over the recent years, with 65 % share. Sector of building industry follows with 13 %, agriculture with 8 %, and trade with 5 % share. It is necessary to point out that the total amount of waste produced by particular economic sectors does not include municipal waste.

#### Waste generation by particular economic sectors in year 2008 (t)

SECTION	Total (t)	Hazardous waste (t)	Other waste (t)
<b>A - Agriculture, Forestry, Fishery</b>	788 788	42 249	746 539
<b>B - Mining and quarrying</b>	150 860	569	150 291
<b>C - Manufacturing</b>	4 469 017	327 051	4 141 966

SECTION	Total (t)	Hazardous waste (t)	Other waste (t)
D - Electricity, gas, steam and air conditioning supply	1 150 662	9 871	1 140 791
E - Water supply; sewerage; waste management and remediation activities	794 489	44 795	749 694
F - Construction	1 301 761	5 413	1 296 348
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	486 109	20 123	465 986
H - Transporting and storage	175 233	61 207	114 026
I - Accommodation and food service activities	1 731	112	1 619
J - Information and communication	7 752	362	7 390
K - Financial and insurance activities	380	95	285
L - Real estate activities	7 750	297	7 453
M - Professional, scientific and technical activities	41 101	1 592	39 509
N - Administrative and support service activities	33 170	2 453	30 717
O - Public administration and defence; compulsory social security	33 880	1 480	32 400
P - Education	1 106	165	941
Q - Human health and social work activities	106 176	4 211	101 965
R - Arts, entertainment and recreation	4 389	150	4 239
S – Other services activities	1 377	212	1 165
Unknown	145 656	1 521	144 135
<b>Total</b>	<b>9 701 387</b>	<b>523 928</b>	<b>9 177 459</b>

Source: SEA

## Waste handling

### Handling with waste by means DO, O and Z codes (t)

Disposal code	Activity	Total (t)	Hazardous (t)	Others (t)
DO	Handing over of waste for domestic use	72 222	0	72 222
O	Handing over to another subject for next recovery	218 924	21 399	197 525
Z	Storage of waste	271 051	7 462	263 589
<b>Total</b>		<b>562 197</b>	<b>28 861</b>	<b>533 336</b>

Source: SEA

## Waste recovery

There were 5 157 389 **tons of waste recovered** in the SR in 2008. This represents **53 % of total volume of waste** located on the market (not included MW). R5 activity – Recycling or re-extraction of other inorganic compounds has the greatest share on waste recovery with a 35 % share.

### Waste recovery following codes R1 – R13 in year 2008 (t)

Code	Activity	Total (t)	Hazardous waste (t)	Other waste (t)
R1	Used mainly as fuel or to extract energy through different approach	429 068	12 584	416 484
R2	Solvent reclamation/regeneration	4 020	3 995	25

<b>R3</b>	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)	583 119	29 851	553 268
<b>R4</b>	Recycling or reclamation of metals and metal compounds.	680 866	6 703	674 163
<b>R5</b>	Recycling or reclamation of other inorganic material.	1 789 301	2 533	1 786 768
<b>R6</b>	Regeneration of acids and bases.	392	228	164
<b>R7</b>	Recovery of components used for pollution abatement	376	194	182
<b>R8</b>	Recovery of components from catalysers.	2 399	2 355	44
<b>R9</b>	Oil re-refining or other re-uses of soil.	10 121	10 067	54
<b>R10</b>	Treatment of soil to benefit the agricultural production or to improve environment.	796 051	9 771	786 280
<b>R11</b>	Use of waste obtained from the activities R1 to R10.	34 303	375	33 928
<b>R12</b>	Treatment of waste generated by any of the R1 to R11 activities.	216 842	11 311	205 531
<b>R13</b>	Storing of waste before using any of the R1 to R12 activities (besides temporary storage prior to collection at the place of waste generation).	610 531	20 542	589 989
<b>Total</b>		<b>5 157 389</b>	<b>110 509</b>	<b>5 046 880</b>

Source: SEA

## Waste disposal

Of total volumes of generated waste placed on the market 3 981 801 t, **41 % was disposed** (without MW). Dominance of landfill waste is a historical rule with a 81 % share on total waste disposal, what means the decreasing about 20% compared to previous year (without MW). As of December 31, 2008, there were 143 landfills operated in Slovakia.

### Number of landfills (towards 31.12.2008)

Region	Hazardous waste landfills	Landfills for not hazardous waste	Inert waste landfills	Total
<b>Bratislava</b>	2	10	3	15
<b>Trnava</b>	2	8	1	11
<b>Trenčín</b>	1	16	3	20
<b>Nitra</b>	3	18	2	23
<b>Žilina</b>	0	16	2	18
<b>Banská Bystrica</b>	1	18	2	21
<b>Prešov</b>	1	18	1	20
<b>Košice</b>	3	10	2	15
<b>Total</b>	13	114	16	143

Source: SEA

### Waste disposal following codes D1 – D15 in year 2008 (t)

Code	Activity	Total (t)	Hazardous waste (t)	Other waste (t)
<b>D1</b>	Underground or surface waste disposal. (e.g. landfill)	3 211 530	109 791	3 101 739
<b>D2</b>	Treatment by soil processes (e.g. biodegradation of liquid or sludge waste in soil, etc.)	153 319	117 963	35 356

Code	Activity	Total (t)	Hazardous waste (t)	Other waste (t)
D8	Biological treatment non-specified in this annex that generates compounds and mixtures eliminated by any of the D1 to D12 activities.	38 626	16 716	21 910
D09	Physical-chemical treatment non-specified in this annex that generates compounds and mixtures eliminated by any of the D1 to D12 activities. (e.g. vaporizing, drying, calcinations, etc.)	83 140	52 932	30 208
D10	Incineration on land.	65 878	47 772	18 106
D13	Mixing or blending prior to any of the D1 to D12 activities.	9 138	2	9 136
D14	Placing into other packaging prior to any of the D1 to D12 activities.	81	80	1
D15	Storage before implementing any of the D1 to D14 activities (besides temporary storage prior to collection at the place of waste generation).	420 089	39 302	380 787
<b>Total</b>		<b>3 981 801</b>	<b>384 558</b>	<b>3 597 243</b>

Source: SEA

### Waste from electrical and electronic equipment (WEEE)

There were placed on the market 60 661 of electrical devices in Slovakia in 2008 (11 kg per inhabitant). Amount of collected WEEE was approx. 19 388 thousand tons (3.6 kg per inhabitant).

#### Summary reports by producers of electrical equipment for the year 2008 (kg)

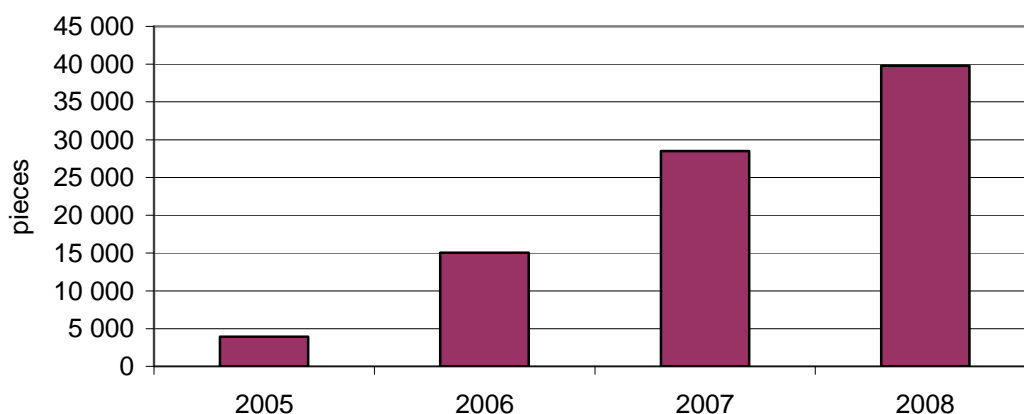
Category under Annex 3 of the waste law	Introduced to market (kg)	Collected (kg)	Processed (kg)	Recovered (kg)	Recycled (kg)
1. Big domestic appliances	32 945 912	12 457 771	12 457 771	10 856 092	10 778 928
2. Small domestic appliances	4 964 096	1 323 392	1 323 392	1 035 681	980 754
3. IT and telecommunication devices	6 533 492	2 531 997	2 531 997	2 253 576	2 189 353
4. Consumer electronic devices	7 278 287	2 265 225	2 265 225	1 945 263	1 908 896
5. Sources of light	3 266 171	179 201	179 201	164 208	158 262
5a. Gas lamps	419 409	132 314	132 314	116 697	116 697
6. Electrical and electronic instruments	4 399 961	179 558	179 558	152 045	150 419
7. Toys, devices designated for sport and recreational use	494 589	7 076	7 076	5 946	5 926
8. Medical devices	93 871	79 535	79 535	68 931	68 876
9. Machines for monitoring and testing	110 350	76 951	76 951	69 804	69 595
10. Vending machines	154 888	154 909	154 909	135 022	134 212
<b>Total</b>	<b>60 661 026</b>	<b>19 387 929</b>	<b>19 387 929</b>	<b>16 803 265</b>	<b>16 561 918</b>

Source: SEA

### Old vehicle

There were 39 769 old vehicles processed in 2008. Compared to 2007 this means increasing about 28 %.

### Processed old vehicle (amount of cars)



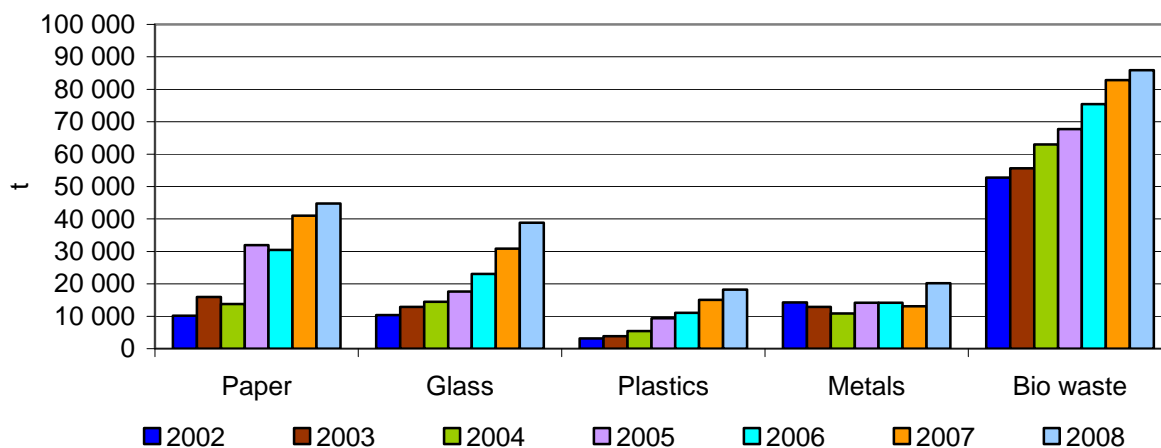
### Municipal waste

According to data from the SO SR, there were **1 790 691 tons of total municipal waste** generated in Slovakia in 2008. This volume represents **331 kg of municipal waste per capita**. Compared to 2007, this is an increase by 22 kg per capita. Long-term waste **disposal on landfills (76 %)** is the **most frequent method** of municipal waste handling, following by incineration with energy recovery (9 %).

In terms of **municipal waste composition**, mixed municipal waste (68.5 %) constitutes the major component of municipal waste together with bulky waste (11 %), small construction waste (5 %). Biologically degradable waste was 5 % and waste paper and cardboard was 3 %.

According to the SO SR, **volume of separated municipal waste per capita is 25 kg**, which means that the level of municipal waste separation decreased by 9 kg compare year 2007. Volume of **recovered municipal waste per capita increased to 58 kg per capita**.

### Separated waste collection (t)



Source: SO SR

### Financial mechanisms of waste management

## ◆ Recycling fund

## Finances paid from Recycle fund (SKK)

Sector	2003	2004	2005	2006	2007	2008
Spent batteries and accumulators	14 665 664	6 123 789	27 762 392	6 548 521	1 521 960	4 527 804
Waste oils	25 978 911	13 513 450	31 838 929	27 122 645	51 419 465	39 142 693
Used pneumatic tires	55 526 823	31 938 861	52 227 842	31 876 532	43 394 128	5 609 428
Multi-layer combined materials	11 200 000	6 011 426	15 788 362	6 104 424	9 436 275	27 270 084
Electric and electronic devices	108 444 952	31 809 571	43 873 057	12 177 730	1 817 482	2 040 451
Plastics	45 331 744	97 465 327	85 257 226	43 462 867	25 886 202	29 895 738
Discharge light sources containing mercury	3 376 397	1 747 720	1 788 973	31 836	0	0
Paper	66 861 855	66 541 864	63 043 210	119 539 255	43 400 107	68 191 721
Glass	6 662 395	26 397 285	36 443 376	41 612 019	20 643 076	22 393 694
Vehicle	20 708 446	73 828 884	50 661 866	135 715 643	167 310 817	408 120 244
Metal packing	0	12 385 467	6 909 123	11 020 641	9 028 531	4 273 598
General sector	16 673 117	69 584 229	34 684 182	1 691 695	4 710 600	6 486 091
General sector - municipalities	5 031 880	27 467 030	33 956 530	17 614 220	63 019 868	112 769 390
<b>Total</b>	<b>380 462 184</b>	<b>464 814 903</b>	<b>484 235 068</b>	<b>454 518 027</b>	<b>441 588 511</b>	<b>730 720 935</b>

Source: RF

## ◆ Environmental Fund

In 2008, the Environmental Fund in the area of waste management, 100 applicants funded, with the amount of 307 mil. SKK.

## Finances invested according to the supported activity in year 2008 (SKK)

Activity	Finance
Separate collection	62 426 000
Waste recovery	94 733 418
Landfill closing and recultivation	150 113 600
<b>Total</b>	<b>307 273 018</b>

Source: EF

## Packaging and waste from packaging

## Amount of packaging materials made, imported, exported and introduced to the market in year 2008 (t)

Material	Production (t)	Import (t)	Export (t)	Market (t)
Gas	47 415	66 188	25 336	75 802
Plastics	43 853	91 690	41 357	80 653
PET	1 104	1 071	1 414	762
Paper and cardboard	62 394	161 004	97 690	117 523
Composite	6 147	13 541	7 502	12 058

<b>Aluminum</b>	476	4 674	813	4 232
<b>Steel</b>	23 084	37 132	35 490	15 688
<b>Wood</b>	96 180	46 623	85 019	18 207
<b>Others</b>	17	361	234	142
<b>Total</b>	<b>280 670</b>	<b>422 284</b>	<b>294 855</b>	<b>325 067</b>

Source: SEA

### Packaging waste handling in year 2008 (t)

Packaging waste Material	Amount (t)	Recycling		Recovery			
		Material recovery (t)	(%)	Energy (t)	Others (t)	Total* (t)	(%)
<b>Glass</b>	75 802	36 109	47.6	-	111	36 220	47.8
<b>Plastics</b>	81 415	35 578	43.7	747	1 328	37 653	46.3
<b>Paper**</b>	129 581	69 422	53.6	310	3 167	72 899	56.3
<b>Aluminum</b>	4 232	1 219	28.8	-	19	1 238	29.3
<b>Steel</b>	15 688	9 890	63.0	-	104	9 994	63.7
<b>Metals</b>	19 920	11 109	55.8	-	123	11 232	56.4
<b>Wood</b>	18 207	2 932	16.1	975	3 004	4 499	24.7
<b>Total</b>	<b>324 925</b>	<b>155 150</b>	<b>47.7</b>	<b>2 032</b>	<b>7 733</b>	<b>162 503</b>	<b>50.0</b>

\* material recovery included

\*\* Tetra-pack included

Source: SEA

### Trans-boundary movement – import, export and transit of waste

Over the period of 1.1.2008 to 31.12.2008, the MoE SR issued **147 decisions on trans-boundary transport of waste.**

### Summary of the number of effective licenses for trans-boundary transport of waste (t)

Issued in year	Import	Export	Transit	Total
2007	76	7	12	95
2007- 2008	92	39	16	147
<b>Total</b>	<b>168</b>	<b>46</b>	<b>28</b>	<b>242</b>

Source: SEA

### Total permitted volumes of waste by individual countries in year 2008 (t)

	Import to SR (t)	Export from SR (t)
<b>Belgium</b>	-	4 800
<b>Belarus</b>	40	-
<b>Czech Republic</b>	487 100	300
<b>Netherlands</b>	370	1
<b>Japan</b>	60	-
<b>Hungary</b>	179 100	150
<b>Germany</b>	149 950	606
<b>Poland</b>	376 084	1 383 895
<b>Austria</b>	191 700	-
<b>Romania</b>	2 400	5 200
<b>Russia</b>	6 000	-
<b>Ukraine</b>	23 120	78 000
<b>Great Britain</b>	500	-
<b>Total</b>	<b>1 416 424</b>	<b>1 472 952</b>

Source: SEA



## • NATURAL AND TECHNOLOGICAL HAZARDS

### Accidental deterioration of water quality

In 2008, the SEI statistics showed reduction in the number of events and recorded 102 emergency deteriorations or threats to water quality (EDW). Of all recorded events, 49 were cases relating to surface water, and 53 were cases of threats or contamination of ground water.

### Special deterioration or quality menace of water of the SR in the years 2000-2008

Year	EDW recorded by SEI	Special deterioration of water					
		Surface			Ground		
		Total number	Watercourses and basins	Water courses	Total number	Pollution	Endangerment
2000	82	55	2	9	27	3	24
2001	71	46	1	4	25	1	24
2002	127	87	1	6	40	5	35
2003	176	134	2	3	42	0	42
2004	137	89	1	10	48	11	37
2005	119	66	2	5	53	2	51
2006	151	94	0	3	57	6	51
2007	157	97	1	4	60	4	56
2008	102	49	0	6	53	4	49

Source: SEI

In 2008 again, in terms of hazardous compounds, deterioration of water quality was caused mainly by crude oil compounds in 65 cases (63.7 %), waste water in 15 cases (14.7 %), and in 6 cases (5.8 %) no contaminant was detected. Livestock excrements in 7 cases (6.8 %), insoluble substances, caustic alkali, pesticides, and other toxic substances have smaller impact on SDW.

### Progress in number of WQEDA according to the sort of WDS in the years 1994 – 2008

Sorts of water deteriorative Substances (WDS)	1994	1996	1999	2001	2002	2003	2004	2005	2006	2007	2008
Oil substances	63	69	54	40	64	59	70	63	69	76	65
Alkalis	3	5	5	2	5	3	1	0	3	4	2
Pesticides	1	1	1	0	1	0	3	0	2	0	0
Excrements of farm animals	9	14	7	4	9	21	15	14	14	12	7
Silage fluids	0	1	2	0	2	1	1	0	0	0	0
Industrial fertilisers	0	0	0	0	0	1	0	0	0	0	0
Other toxic substances	5	1	6	5	3	3	0	4	4	5	2
Insoluble substances	4	4	1	2	6	11	3	4	3	3	2
Waste water	6	6	6	10	17	35	20	10	28	24	15
Other substances	13	9	4	1	3	7	10	8	6	7	3
Water detrimental substances impossible to determine	17	7	12	7	17	35	14	10	22	26	6

Source: SEI

In 2008, there was only one such emergency deterioration of water outside the Slovak territory. Unknown originators (17.6 %) and so-called foreign organisations (7.8 %) represent stable contributors to emergency deterioration of water quality.

Just like in the previous years, in 2008, human factor and poor technical condition of equipment or facilities for hazardous substances were the most frequent causes for SDW. High number of SDW was caused by transport (38) and transfer of hazardous substances (6).

## Fire risk

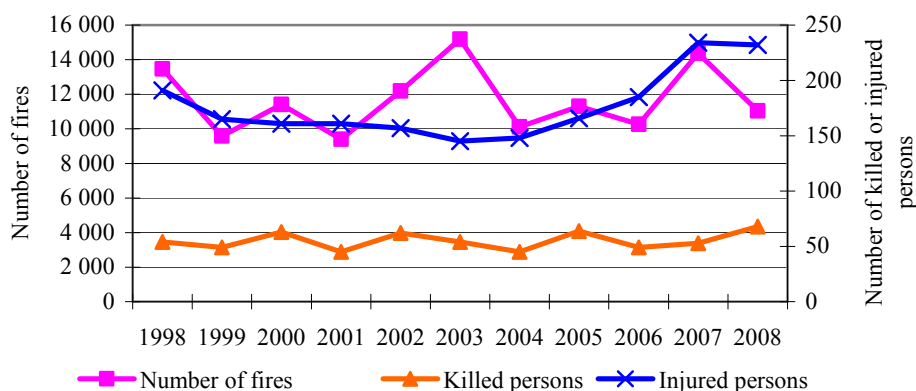
In 2008 were documented in the SR **11 045 fires**, causing 68 casualties and 232 injured. Direct material damage reached 1 310 287.1 thous. SKK (43 493.6 thous. €), while the volume of preserved values was calculated at 5 840 030 thous. SKK (193 853.5 thous. €).

Although the number of fires dropped by 3 321, compared to 2007, material damage as well as the magnitude of preserved values copied the level of 2007.

Compared to previous years, greatest number of fires originated surprisingly in the **household sector** – 1 983, with 42 casualties and 138 injured persons. Direct material damage reached the value of 154,581 mil. SKK (5,131 mil. €). In terms of fire statistics, **agriculture** shows the second greatest number of fires – 1 633, occasioning direct material damage at 81,252 million SKK (2,697 mil. €), with 4 casualties and 5 injured persons. Least number of fires was recorded in the **commercial** sector, with 162 direct material damage totalling 145,446 mil. SKK (4,827 mil. €).

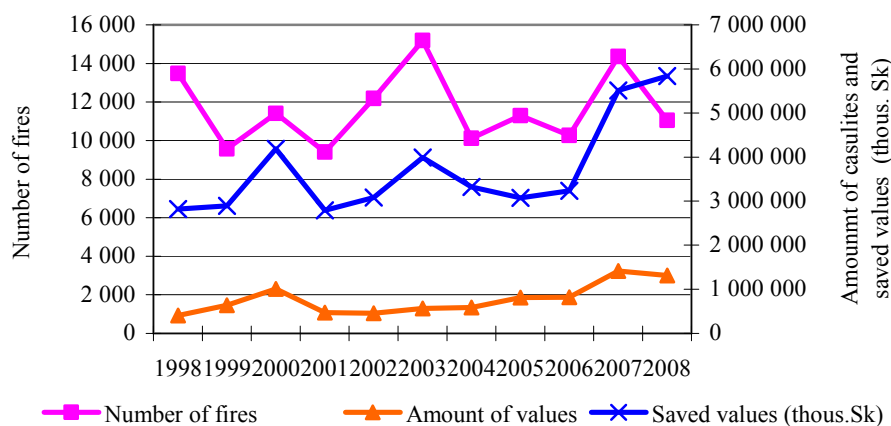
From the perspective of administrative distribution of territory, **most fires** occurred in 2008 in the Košice region (1 768), while **least** fires were recorded in the Trenčín region (989). **Greatest damage** due to the occurrence of fires was recorded in the Žilina region (446 373.0 thous. SKK / 14 816.9 thous. €) and the **least** in the Trenčín region (58 630.9 thous. SKK / 1 946.2 thous. €).

### Relationship between number of fires and number of killed or injured persons in 1998-2008



Source: FPRS MoI SR

### Relationship between number of fires and number of casualties or amount of saved values in 1998-2008



Source: FPRS MoI SR

### Floods

In 2008, there were 188 municipalities affected by floods, where 1 675 houses were flooded (cellars, basements). 10 742 inhabitants felt the aftermath of the floods, including 691 persons who had to be evacuated. Total cost and damages by floods in the SR in 2008 amounted to 1 377.381 mil. SKK (45.720 mil. €), including the rescue costs of 75.764 mil. SKK (2.514 mil. €), and safety works of 108.055 mil. SKK (3.586 mil. €).

Material damage amounted to 1 193.491 mil. SKK (39.616 mil. €), damage to private citizens' property was 57.134 mil. SKK (1.896 mil. €), and damage to municipal property was 270.460 mil. SKK (8.977 mil. €), damage to higher territorial governing units was 271.866 mil. SKK. Flood prevention construction measures at water courses were damaged, resulting in damages at 310.218 mil. SKK (10.296 mil. €).

In January 2008, works begun to be implemented on transposition of the **EP and Council Directive 2007/60/EC on the assessment and management of flood risks** into Act No. 666/2004 Coll. on flood protection.

### Floods aftermath over the period of 2001-2008

	No. of flood stricken residential areas	Flooded territories (ha)	Damages by floods (mil. SKK)	Costs (mil. SKK)		Total costs and damages (mil. SKK/mil. €)
				Rescue activities	Maintenance and safety activities	
2001	379	22 993	1 960.60	57.10	32.10	2 049.80 / 68.04
2002	156	8 678	1 525.70	58.10	50.10	1 639.90* / 54.43
2003	41	744	43.90	5.69	4.20	53.79 / 1.79
2004	333	13 717	1 051.80	37.23	102.93	1 191.96 / 39.57
2005	237	9 237	800.46	67.82	80.64	948.92 / 31.50
2006	512	30 730	2 425.90	180.35	193.4	2 799.64 / 92.93
2007	60	339	109.58	9.14	6.39	125.11 / 4.15
2008	188	3 570	1 193.5	108.00	75.80	1 377.38 / 45.72

\* including also the sum of 6.0 mil. SKK – cost of anti-mosquito chemical spray treatment

Source: MoA SR, MoE SR