# JAVYS Operation Environmental Impacts Report 2009

Ladies and Gentlemen,

For our company - Jadrová a vyraďovacia spoločnosť, the year 2009 was a year for implementing activities and new opportunities. We appreciate very much the excellent economic results we reached in the time of the world economic crisis; we significantly exceeded the plan for 2009 and also, we recorded growth compared to previous years.

Besides the economic crisis, our company also had to face the gas crisis early in the year. For a needed period of time, we were prepared to re-commission again the 2nd Unit of V1 Nuclear Power Plant, which was shut down at the end of 2008.

Our company was also active in fulfilling new strategic tasks. Together with the Czech Energy Group ČEZ, we successfully completed the process of establishing a new company – Jadrová energetická spoločnosť Slovenska, a.s. (*Nuclear Energetic Company of Slovakia, joint stock company*), which will be in charge of preparing and building new nuclear source in Jaslovské Bohunice. The Government of the Slovak Republic adopted a comprehensive bill concerning handling institutional radioactive waste and captured radioactive materials, where JAVYS plays an important role.

The highest safety standards are applied in the course of operation and decommissioning of nuclear facilities, radioactive waste and spent fuel management.

In operation of all our nuclear facilities, we comply with all environmental limits and operating conditions, in order to minimise environmental impacts of our operations. There, we mainly emphasise environmental protection and the high level of safety culture in our company.

Close cooperation at all levels of specialised units and cooperation with specialists are the key for successful prevention, with the aim to identify any potential risks endangering the quality of environment, and also to propose technical solutions and work procedures that would remove or mitigate risks related to potential environmental dangers.

In our company management, we apply mechanisms through which we monitor and evaluate compliance with legal and other requirements that are obligatory for our company and result from legislative amendments or international requirements.

The great effort we put to environmental protection is also proved by the fact that no limits set in the decisions issued by supervisory and state authorities for our company had been exceeded, so far. We fulfil all requirements stipulated in the issued and valid decisions – in particular the levels of discharged water and gas pollution – are much lower than the limits.

Compliance with environmental protection standards was also confirmed by the European Commission representatives during their verification mission in Jaslovské Bohunice facility, held in the middle of the year 2009. The aim of the mission was to monitor radioactive discharges as well as radioactivity of the environment surrounding Jaslovské Bohunice facility, and also those in JAVYS and Slovak Electricity Utilities facilities. No insufficiencies were identified by the Verification team.

High level of environmental protection applied within JAVYS company had also been translated to the results of re-certification environmental management system audit, where we were awarded the best assessment. I am honoured that our employees are aware of their commitment to protect the environment, and sustain thus the positive environmental picture for JAVYS company.

I believe that the Report on the influence of JAVYS, a.s. operation on the environment will also convince the readers about our responsible approach.

**Ing. Ján Valko**
**Chairman of the Board of Directors and Chief Executive Officer**

## The Mission

The Mission of the joint stock company JAVYS, a.s. is to:

- Safely, reliably and efficiently operate and decommission nuclear facilities,
- Safely, reliably and efficiently dispose of radioactive waste and used nuclear fuel with minimum environmental impacts,
- Actively participate in energy projects in compliance with the Energy Safety Strategy,
- Implement tasks and professional skills in the nuclear energy sector in the Slovak Republic.

## Environmental Policy

Jadrová a vyraďovacia spoločnosť, a.s. is a company dealing with operation of nuclear facilities, decommissioning of nuclear facilities, treatment of radioactive waste and used nuclear fuel guaranteeing the best reliability and maximum safety, with ongoing improvement of environmental behaviour.

To fulfil this task, in its environmental policy the management of the joint stock company Jadrová a vyraďovacia spoločnosť, a.s., is committed to adhere to the below principles:

- To establish, implement, maintain and improve the environmental management system according to the STN EN ISO 14001:2005 standard
- To ensure for ongoing minimisation of environmental impacts of nuclear facilities
- To protect the environment by applying the best management practices in waste generation, air emissions, water discharges and other pollution generated during the process of operation and decommissioning of nuclear facilities, treatment of radioactive waste and used nuclear fuel
- To use the state-of-the-art technologies and equipment with minimum environmental impacts
- To meet the valid environmental regulations and other commitments in the area of environmental protection
- To examine and verify regularly the emergency plans and procedures
- To monitor and evaluate indicators showing the impacts to all parts of the environment and to publish regularly the Environmental Protection Reports
- To support open dialogue with the public, relevant state and municipal environmental authorities
- To enhance continuously environmental awareness of staff, and together with suppliers and contracted partners to participate in systematic management of environmental protection

Employees need to be informed of this Environmental Policy, which is binding for them.

## Introduction

JAVYS, a.s. Environmental Report for the year 2009 offers comprehensive information on waste and water management, environmental protection, prevention of major industrial accidents and environmental protection activities.
Environmental protection in JAVYS, a.s. is focusing on adherence to legal requirements, as well as the conditions and terms stipulated by the respective state and supervisory authorities dealing with individual parts of the environment.
Environmental protection is applied through the environmental management system in all company activities emphasising pollution prevention and the commitment of ongoing enhancement.

## Air Protection

In air protection, JAVYS, a. s. follows the Air Protection Act N°478/2002 Coll., as amended, and all directly and indirectly related laws and regulations.
Operation of air pollution sources, i.e. their operation permits, air emissions monitoring system, limits for air pollution etc., are stipulated in valid decisions issued for JAVYS, a.s. by the respective air protection state and supervisory authorities, the District Environmental Authority in Trnava and Slovak Environmental Inspection in Bratislava.

## Air pollution sources

Jadrová a vyraďovacia spoločnosť, a.s. is operating several air pollution sources belonging to all categories – small, medium and large air pollution sources.

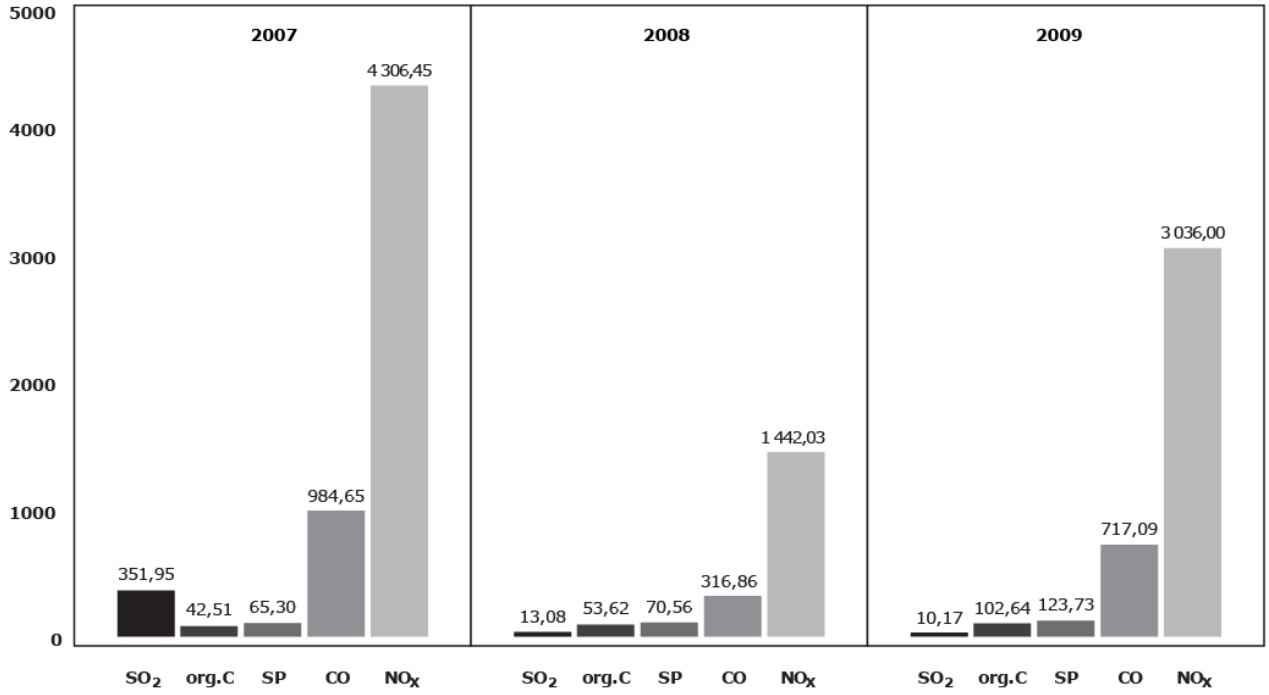
| **Start-up and stand-by boiler room** | **Large size air pollution source** |
|---|---|
| LOOS boiler in the start-up and stand-by boiler room building | Medium size air pollution source |
| Gas boiler room | Medium size air pollution source |
| BRWTC incinerator | Medium size air pollution source |
| Infrared emitters in FCC production in Trnava | Medium size air pollution source |
| V1 NPP diesel-generators | Medium size air pollution source |
| Diesel-generators in FCC production in Trnava | Small size air pollution source |
| Diesel-generators in ISFS | Small size air pollution sourc |

## Air emissions volume from individual sources

**Air pollution sources operation and the volume of air emissions in 2009**

| SOURCE | Fuel | Pollutant (kg) | | | | |
|---|---|---|---|---|---|---|
| | Natural gas ($m^3$) | SP | SO2 | NOx | CO | Corg |
| Start-up and stand-by boiler room | 837 902 | 63,67 | 7,64 | 1 400,97 | 469,64 | 59,70 |
| LOOS boiler | 14 601 | 1,10 | 0,13 | 21,63 | 8,73 | 1,45 |
| Gas infrared emittents | 56 395 | 4,28 | 0,51 | 83,57 | 33,75 | 5,62 |
| Gas boiler room | 148 758 | 11,30 | 001,35 | 220,45 | 89,02 | 14,83 |
| | Diesel (t) | | | | | |
| V1 NPP diesel-generators with 1,680 MW input power | 15,483 | 21,98 | 0,30 | 77,41 | 12,38 | 1,76 |
| V1 NPP diesel-generator with 3,37 MW input power | 11,051 | 15,69 | 0,22 | 55,25 | 8,84 | 0,78 |
| Diesel-generator in ISFS | 1,344 | 1,90 | 0,02 | 6,72 | 1,07 | 0,15 |

**Trends in air pollution emissions 2007 – 2009**




| Pollutant | 2007 (t) | 2008 (t) | 2009 (t) |
|---|---|---|---|
| HCl | 0,00160 | 0,00139 | 0,00220 |
| HF | 0,00238 | 0,00578 | 0,01080 |
| Hg+Tl+Cd | 0,00267 | 0,00097 | 0,00002 |
| As+Ni+Cr+Co | 0,01205 | 0,00440 | 0,00030 |
| Pb+Cu+Mn | 0,00163 | 0,00060 | 0,00008 |
| $SO_2$ | 0,34783 | 0,01065 | 0,00549 |
| $NO_X$ | 3,59323 | 0,98903 | 1,17000 |
| CO | 0,72673 | 0,16806 | 0,09366 |
| SP | 0,03596 | 0,02016 | 0,00381 |
| Corg | 0,04495 | 0,02967 | 0,01835 |
| Number of operating hours | 6 037 | 7 574 | 6 143 |

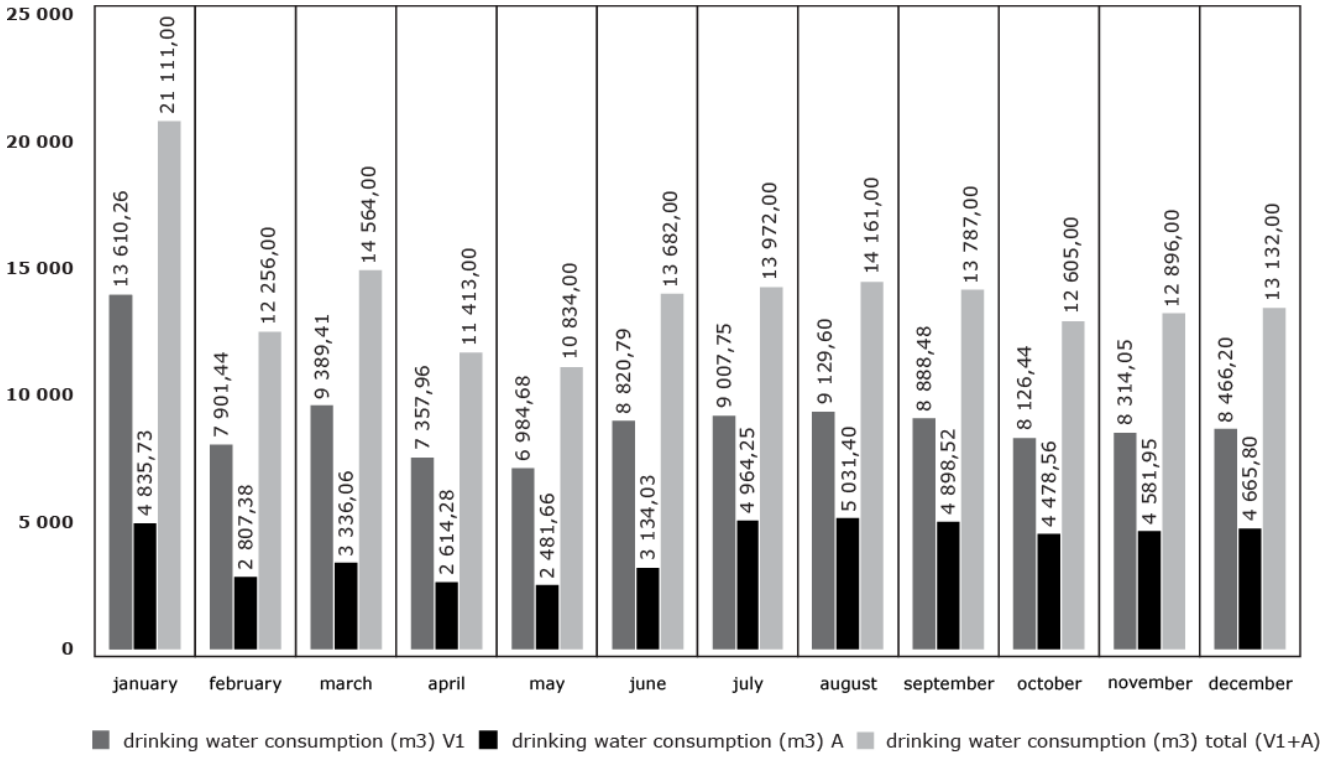
# Water Management

In water protection, JAVYS, a. s. follows the key legislation – the Water Act N°364/2002 as amended, and all relevant laws and regulations in their latest wording. Valid decisions issued by the respective state and supervisory water management authorities for the company JAVYS, a.s. define the discharged wastewater limits, pollutants concentration and balance limits in wastewater, the place and method of wastewater discharge, the volume of used surface water, etc.

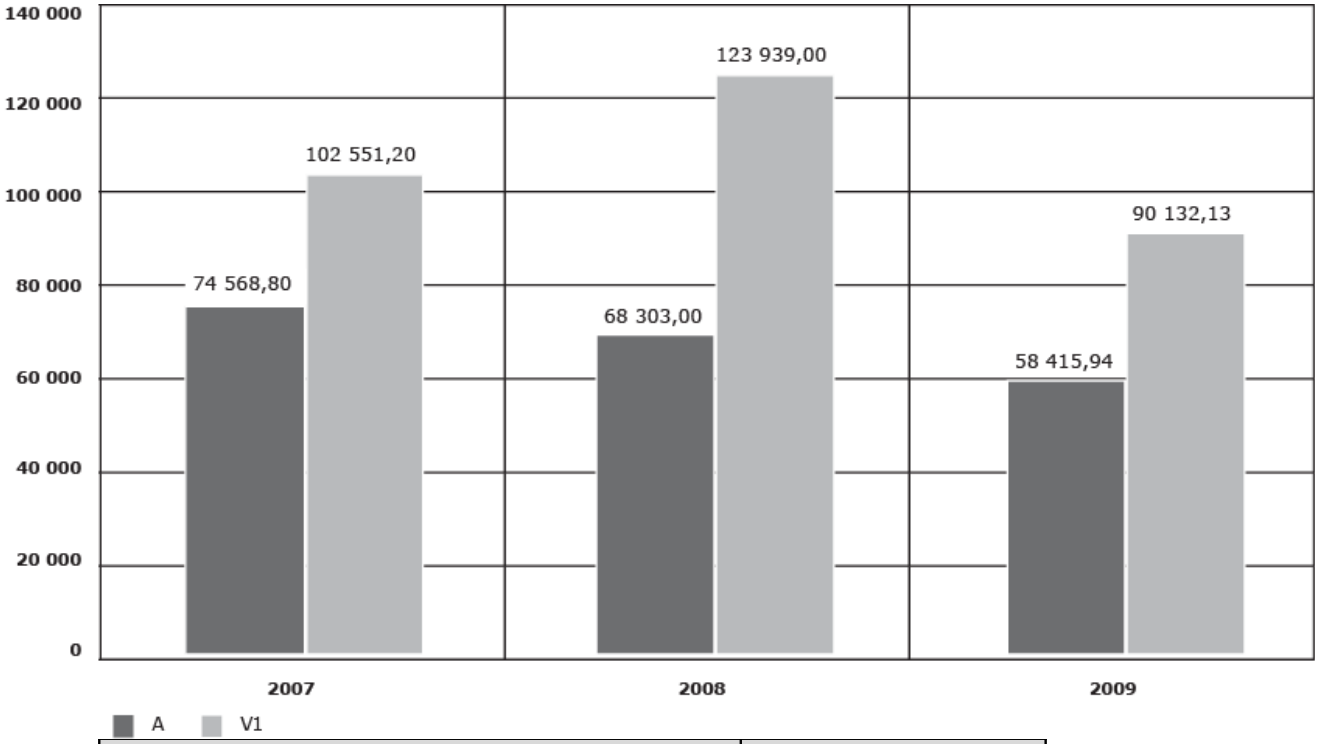
### Drinking water

In Jaslovské Bohunice, JAVYS, a. s. is connected to drinking water distribution pipeline belonging to Trnava Water Utility. Operations in Mochovce location – NRWR and FP LRAW, are connected to drinking water distribution pipeline belonging to Slovak Electricity Utilities, a.s. – EMO.

**Drinking water consumption in Jaslovské Bohunice in 2009**



**Trends in drinking water consumption in Jaslovské Bohunice**



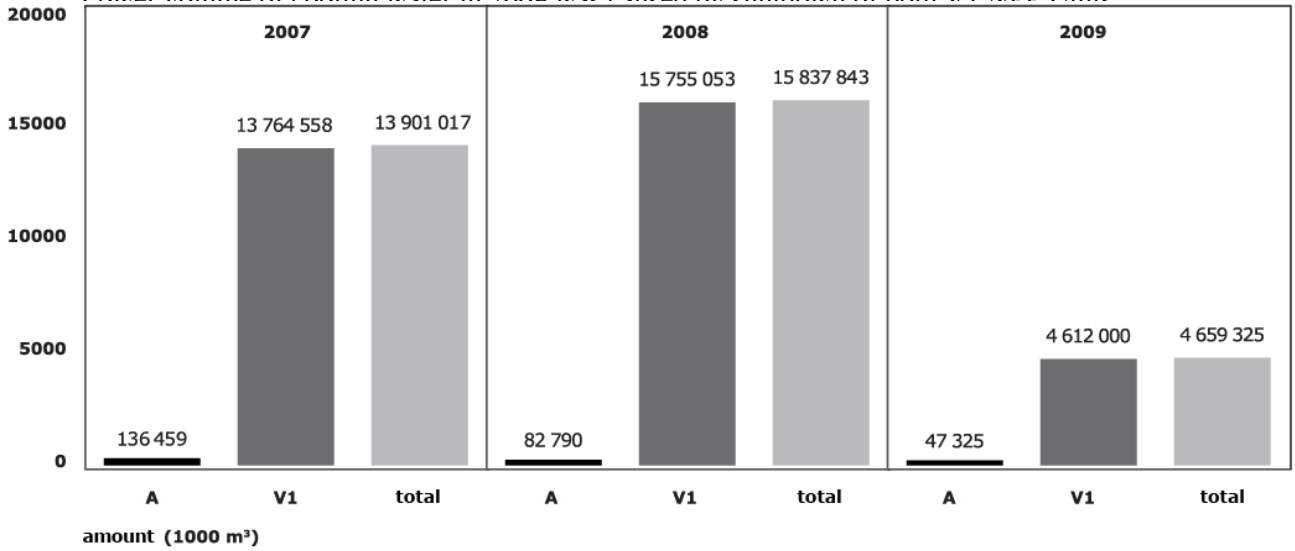

| Facility | Volume ($m^3$) |
|---|---|
| Jaslovské Bohunice | 164 413 |
| Trnava – FCC production plant | 1 134 |
| Bratislava –JAVYS, a.s. Headquarters | 2 218 |
| Mochovce NRWR | 208 |
| Mochovce FP LRAW | 275 |

## Cooling water

Surface water from water reservoir "SÍňava" is used as cooling water. Surface (raw) water from the River Váh is used for cooling of emergency and safety systems in V1 NPP, for cooling radioactive waste processing and storage operations, and to guarantee the required flow for measuring devices.

**Trends in cooling water consumption – from the River Váh 2007 – 2009**

Lower volume of cooling water in 2009 was caused by shutdown of both V1 NPP Units




| Facility | Volume ($m^3$) |
|---|---|
| Cooling (surface) water | |
| Jaslovské Bohunice | 4 612 000 |
| Mochovce FP LRAW | 6103 |

## Wastewater

### Industrial wastewater

Permit N° KÚŽP-1/2006/00273/Fr for wastewater discharge from JAVYS, a.s. facility Jaslovské Bohunice was issued by the Regional Environmental Authority Trnava on July 13th 2006, with validity until December 31st 2008. Following JAVYS, a.s. application, the validity of this permit was prolonged by the decision N° KÚŽP-1/2008/00582/Gl until December 31st 2010, with no changes in the terms.

In wastewater discharged from JAVYS, a.s. facility Jaslovské Bohunice, the volume activity of corrosion and fission products and tritium, as well as chemical pollution are monitored according to the terms defined in the decision issued for JAVYS, a.s. Biological oxygen demand, total phosphorus, chlorides, iron, hydrazine hydrate, chromate chemical oxygen demand, non-polar extractable substances, suspended solids, ammonia nitrogen, nitrates, detergents, acidity, alkalinity, dissolved solids, sulphates are, among others, the monitored wastewater pollutants.

Average concentration of chemical pollutants discharged to the River Váh (the recipient)

| Chemical indicators of pollution | Average concentration of the discharged pollution (for the period 1. – 12. 2009) | Maximum limit (REA decision N°1/2006/00273/Fr) |
|---|---|---|
| **mg/l** | **mg/l** | **mg/l** |
| **Acidity, alkalinity - pH** | 8,2092 | 9,00 |
| **Biochemical Oxygen Demand - $BOD_5$** | 2,1549 | 8,00 |
| **Chemical Oxygen Demand – $COD_{Cr}$** | 8,1528 | 30,00 |
| **Suspended solids - SS** | 14,5833 | 20,00 |
| **Dissolved solids - DS** | 284,9167 | 1 000,00 |
| **Amonnia - N-$NH_4^+$** | 0,3151 | 4,00 |
| **Nitrates - $NO_3^-$** | 9,1801 | 50,00 |
| **Sulphates - $SO_4^{2-}$** | 32,9333 | 350,00 |
| **Chlorides - $Cl^-$** | 21,1082 | 100,00 |
| **Non-polar extractable substances - NES** | 0,0228 | 0,35 |
| **Total phosphate – $P_{total}$** | 0,2240 | 2,00 |
| **Iron - Fe** | 0,2029 | 2,00 |
| **Hydrazine hydrate - $N_2H_4$** | 0,0194 | 2,00 |
| **Detergents - PAL** | 0,0486 | 0,50 |

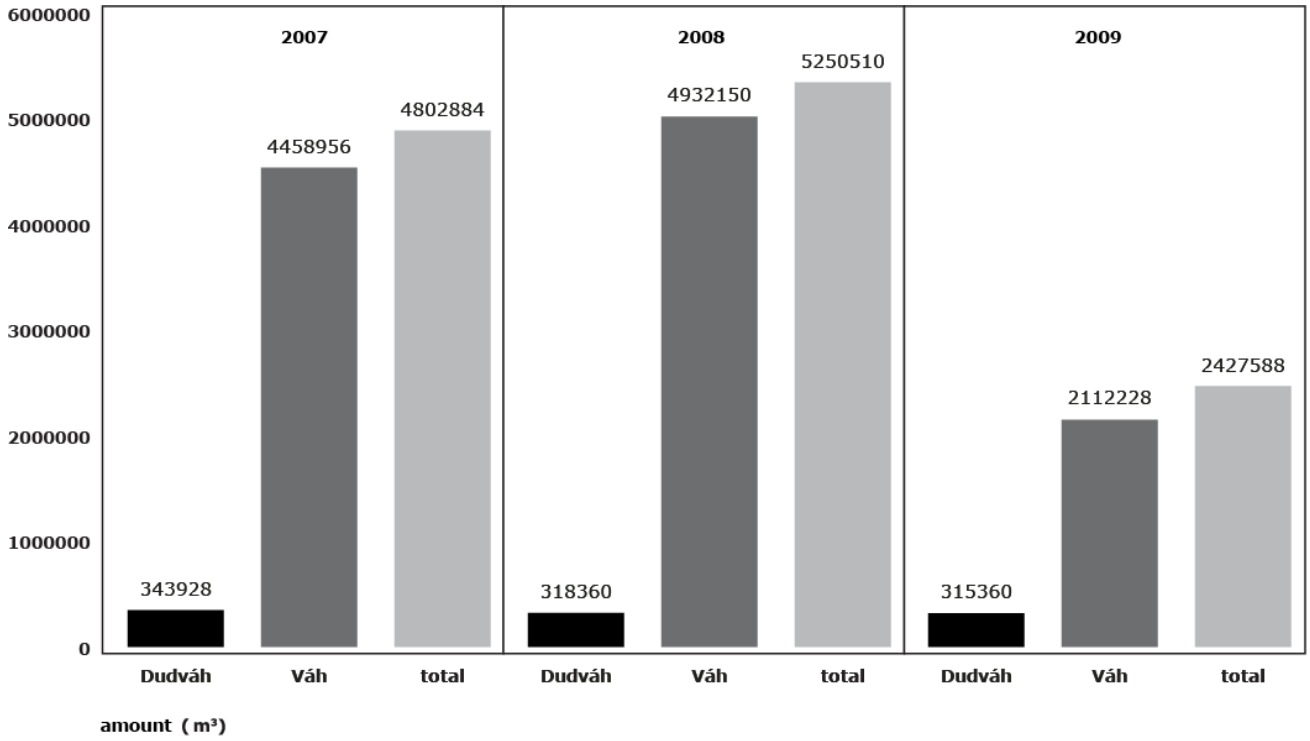
In 2009, none of the defined limits were exceeded in the discharged wastewaters.

Average concentration of chemical pollutants discharged to the River Dudváh (the recipient)

| Chemical indicators of pollution | Average concentration of the discharged pollution (for the period 1. – 12. 2009) | Maximum limit (REA Decision N°1/2006/00273/Fr) |
|---|---|---|
| **(mg/l)** | **mg/l** | **mg/l** |
| **Acidity, alkalinity - pH** | 8,2283 | 9,00 |
| **Chemical Oxygen Demand – $COD_{Cr}$** | 13,0000 | 30,00 |
| **Suspended solids - SS** | 15,9167 | 40,00 |
| **Dissolved solids - DS** | 273,5000 | 1 000,00 |
| **Sulphates - $SO_4^{2-}$** | 47,1583 | 350,00 |
| **Chlorides - $Cl^-$** | 13,3167 | 100,00 |
| **Non-polar extractable substances - NES** | 0,0292 | 0,35 |
| **Phosphates - total – $P_{total}$** | 0,2625 | 2,00 |
| **Iron - Fe** | 0,2353 | 2,00 |
| **Hydrazine hydrate - $N_2H_4$** | 0,0200 | 2,00 |

In 2009, none of the defined limits were exceeded in the discharged wastewaters.

Trends in volumes of discharged wastewater 2007 – 2009




In 2009, standard operation of underground water decontamination pumping from drill N° N-3 (SO 106) was made together with the company EKOSUR, for which a permit was issued by the Regional Authority in Trnava under Section 8 Sub-section 1 b) of the Water Act N°138/1973 Coll.
In 2009, 184 870,717 $m^3$ of underground water was pumped out during this standard operation of underground water decontamination pumping from the drill N° N-3 (SO 106) located in the A1 facility, with the measured total activity of 96,363 GBq tritium and 8,335 MBq of corrosive and fission products.
Wastewater from Jaslovské Bohunice are discharged to the River Váh (the recipient) through the "Socoman" pipeline collector, or to the River Dudváh through the open "Manivier canal".

The River Váh – discharge of „low-activity" water
(incl. those from underground water decontamination pumping in A1 facility)

| Year 2009 | Activity of radionuclides in wastewater discharged to the River Váh | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | V1 facility | | | | A1 facility | | | |
| | CFP (MBq) | Tritium (GBq) | % CFP limit utilisation* | % 3H limit utilisation * | CFP (MBq) | Tritium (GBq) | % CFP limit utilisation ** | % 3H limit utilisation ** |
| Total | 8,589 | 526,494 | 0,066 | 2,632 | 114,845 | 186,637 | 0,96 | 1,87 |

* Corrosion and fission products limit is 13 000 MBq ; tritium limit is 20 000 GBq

** Corrosion and fission products limit is 12 000 MBq ; tritium limit is 10 000 GBq

In 2009, no wastewaters were discharged to the River Dudváh from A1 facility. Condensation water from the start-up and stand-by boiler room is discharged to rainwater sewer pipeline (773 $m^3$ with the summary tritium activity 0,046 GBq, 0,023 % of the approved limit).

Public Health Officer issued approval for liquid discharges from Mochovce National Radioactive Waste Repository, which includes also annual limits for radionuclide concentrations and activity in liquid discharges; and none of the indicators were exceeded during the monitored period.

Total volume of liquid discharges from FP LRAW amounted 47 752,42 $m^3$, in 2009. Industrial wastewater (cooling water, cooled water, bride condensate, active wastewater), once measured on pollution, are directed to the Slovak Electricity Utilities-Mochovce Power Plant (SE-EMO) pipeline and discharged to the environment in compliance with the valid decision.

**Rainwater**

In Jaslovské Bohunice facility, rainwater flows through the rainwater pipeline system to the retention reservoirs, and once measured on pollution, these are discharged to the open Manivier canal.
The decision approving the discharge of water from surface flow was issued by the Regional Authority in Nitra. In 2009, 5 969 $m^3$ of surface water was discharged from NRWR to Telínsky stream.

Rainwater from the facility for FP LRAW flows to rainwater pipeline system belonging to Slovak Electricity Utilities – EMO, where also rainwater from other SE-EMO facilities are directed, and then, these are collected in retention reservoirs and are discharged to the environment after being measured on pollution.

**Municipal wastewater**

Municipal wastewater from JAVYS, a.s. facilities in Jaslovské Bohunice flow to mechanical and biological wastewater treatment plant, Bioclar. $BOD_5$ efficiency ranges between 70-80%. After treatment, municipal wastewater flows to the final wastewater collector – Socoman.

Municipal wastewater from NRWR flow to regularly cleaned septic tank.

Municipal wastewater from the FP LRAW flows through Slovak Electricity Utilities – EMO sewer system to wastewater treatment plant, and after treatment it is discharged to the environment together with its other waters.

## Monitoring and protection of underground water

**Jaslovské Bohunice**

Monitoring and protection of underground and surface water in Jaslovské Bohunice and its surroundings, is a service contracted pursuant to the monitoring programme and the 8-PLN-010 “Emergency plan to prevent pollution of underground and surface water in JAVYS, a.s.“ ; in its part underground waters since 1997, in cooperation with EKOSUR company.

Underground water radiation situation within A1 premises is continuously and regularly monitored and stable at the moment. Since 2000, continuous decontamination pumping system is in operation that is removing contaminated underground waters from the geological environment, and movement of residual contamination outside of the premises is blocked.

**NRWR Mochovce**
There are 52 monitoring drills within the NRWR premises and its surroundings (underground water) from which samples were taken for chemical and radiochemical analysis as planned in the 2009 time schedule.
Also, drainage water is monitored alongside underground water within the NRWR, and the volume of radionuclide activity is below the limit set by the Public Health Officer in the decision N° HH SR SOZPŽ/5179/05.

**The results of chemical and radiochemical analysis of water**

| Measured indicator | Activity (Bq/l) |
|---|---|
| 3 H | < 2,2 |
| total beta activity | < 1 |
| 137 Cs | < 0,026 |
| 60 Co | < 0,025 |
| 90 Sr | < 1 |
| 239 Pu | < 0,03 |

In general, it may be stated that the results of radiochemical measurements reach background levels and no negative environmental impacts were detected during operation within the NRWR premises and its surroundings.

In 2009, no event occurred that would affect the quality of surface or underground waters.

## Waste management (non-radioactive waste)

In waste management (other than radioactive waste), JAVYS, a. s. follows the key legislation, the Waste Act N°223/2001 Coll. as amended, and all directly and indirectly related laws and regulations in their latest wording.

Valid decisions issued by waste management state and supervising authorities for JAVYS, a.s., define the details for disposal – collection of specified types and categories of hazardous waste for a time-limited period, operation and usage of the waste collection centre, and certification of invoicing measuring device.

Waste management comprise its collection, sorting and deposition in premises specified for these purposes – the waste collection centre. Waste that may potentially endanger the environment or need to meet hygiene and/or safety requirements, are temporarily stored in adequate premises under adequate technologies in order to avoid any negative impacts or danger to life and health of people, assets and the environment.

The content of the generated waste results directly and indirectly from activities related to JAVYS, a.s. business activity.

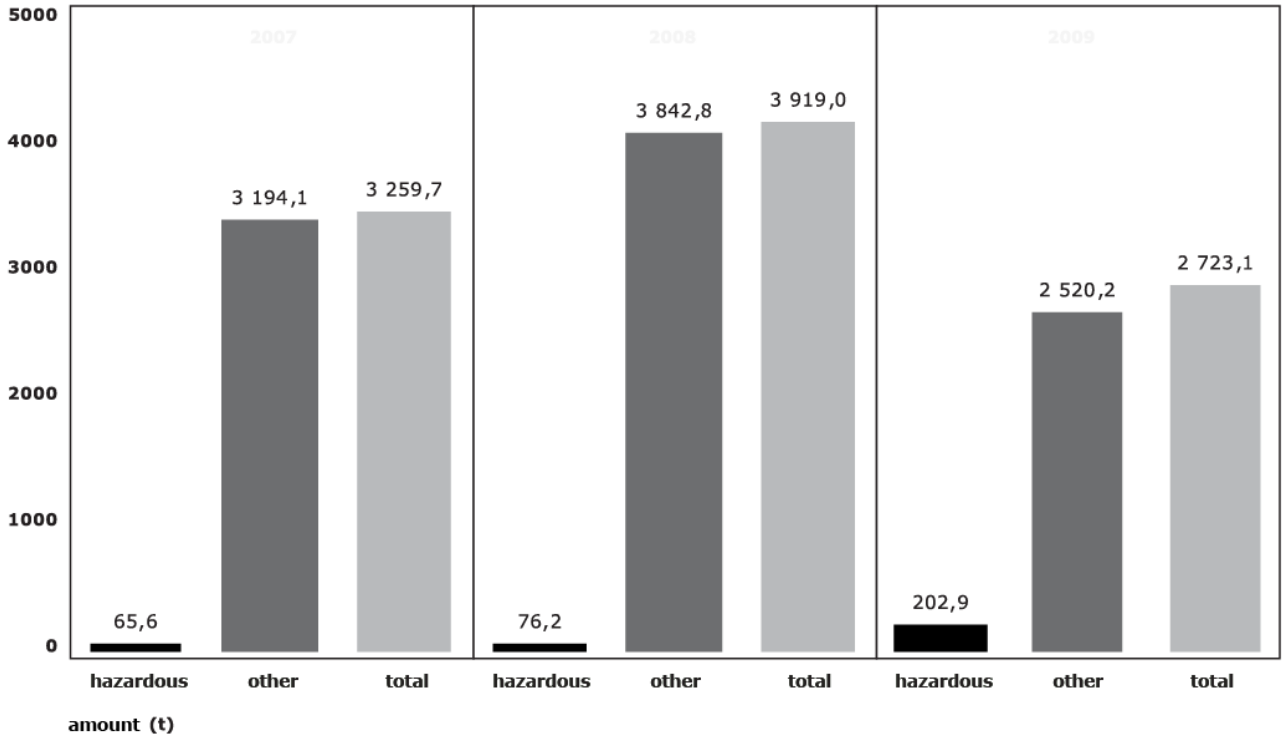
**Waste balance**

In 2009, JAVYS, a.s. generated waste belonging to category other (O) and hazardous (H) waste as defined in the Waste Catalogue – MEn SR Decree N°284/2001Coll., municipal and biodegradable waste.

**Volume and type of waste generated in JAVYS, a.s., in 2009**

| Classification of waste | Name of waste | Volume (t) | Re-used | Disposed |
|---|---|---|---|---|
| other | Mixed municipal waste | 117,7 | | ✓ |
| other | Biodegradable waste | 653 | ✓ | |
| other | Paper, cardboard, PET, glass, aluminium, stainless steel, mixed metals aluminium cables | 328,9 | ✓ | |
| other | Sludge, plastic waste, concrete, wood packages, mixed packages, absorbents, filtr. materials, cloths, used tyres, electronics, concrete, construction debris, wood, solid and stones, insulation materials, mixed waste from constructions and demolition works | 2 191,2 | | ✓ |
| hazardous | Hydraulic oil, non-chlorinated and other mineral engine, transmission and lubricating oils, lead batteries | 141,9 | ✓ | |
| hazardous | Paints, varnishes, organic solvents, cartridges, fixers, water containing oil, packages containing hazardous substances, absorbents, filtration materials, clothes, electronics, chemicals, construction materials containing asbestos | 60,9 | | ✓ |
| | TOTAL | 3 493,6 | 1 123,8 | 2 369,8 |

**Trends in volumes of generated waste 2007 – 2009**



## Major industrial accidents

Regarding the prevention of major industrial accidents, JAVYS, a. s. follows the Act N°261/2002 Coll. concerning the prevention of major industrial accidents as amended, and all directly and indirectly related laws and regulations in their latest wording.

Since January 23rd 2007, Jadrová a vyraďovacia spoločnosť, a.s. belongs to the "A" category pursuant to the Section 5 of the Act N°261/2002 Coll. concerning the prevention of major industrial accidents and on changes and amendments of certain laws. All provisions of the law and its implementing regulations applicable to an establishment of that category were met, in 2009.

**The list of duties defined for an establishment belonging to "A" category**

| CATEGORY A |
|---|
| Verifying the volumes of hazardous materials |
| Preliminary risk assessment |
| Establishing the category |
| Notifying the category to the respective District Authority |
| Risk assessment |
| Prevention programme |
| Assignment of a qualified person |
| Training of staff |
| Emergency plan |
| Public protection plan background documents |
| Emergency service |

The "Management of chemical substances" software was created in the company with regard to the necessity to prevent major industrial accidents, which allows comprehensive monitoring and evaluation of data in handling of the so called "hazardous substances" not only regarding prevention of major industrial accidents but also regarding protection of soil, water, water-related environment, human health and assets. The software also includes the list of approved, limited and forbidden chemical substances.

## Environmental Management System

With regard to the growing interest to maintain and enhance the environmental quality, JAVYS, a.s. increases its efforts in potential negative environmental impacts of its activities, products and services. Environmental policy and the company development objectives are directed towards sustainable improvement in its environmental behaviour.
"Environmental Management System (EMS)" is one of the progressive environmental protection management tool under the ISO 14001:2004 standard of the "Environmental Management System. The requirements and usage instructions".
JAVYS, a.s. was established by merging two facilities – Slovak Electricity Utilities – Bohunice Power Plant (SE-EBO) V1 and Slovak Electricity Utilities - VYZ, which satisfactorily completed their EMS certification in the past. JAVYS, a.s. top management decided to continue in sustaining and enhancing the already established system by successful certification audit in 2006 and then, re-certification audit was performed by DET NORSKE VERITAS (DNV) from December 14$^{th}$ to December 16$^{th}$ 2009. DNV assessed JAVYS, a.s. EMS concordance with the requirements stipulated in individual ISO 14001:2004sections, and within extra services it also verified two other EMS parts, i.e.:

- Optimal external communication in relation to the company commitment to maintain and enhance the environmental management level focusing on the prevention of environmental pollution,
- Qualification of staff performing activities significantly affecting the environment, verification of training needs identification, awareness of staff on environmental policy, system environmental management and important aspects resulting from their activities.

Concordance assessment of with ISO 14001:2004 sections and the extra tasks within the audit resulted in recommendation of the leading auditor to issue another EMS certificate for JAVYS, a.s. valid for 3 years. 8 observations, 17 opportunities for improvement and 5 remarkable efforts were identified during the audit. Zero findings identified in categories – large and small discrepancies, were an important indicator of efficiency improvement in the introduced EMS system in JAVYS, a.s. Successful introduction and ongoing enhancement of EMS in JAVYS, a.s. also ensures for its sustainable economic growth and prosperity, and the change in its behaviour regarding the environmental responsibility. EMS allows JAVYS, a.s. to reach and systematically manage the environmental behaviour level it is setting, i.e. it is a generally applicable principle of the company management that is linking environmental protection approach with the overall company management with the aim to reach environmental and business targets. EMS is a tool that may be used to address environmental issues throughout all production sections, in order to ensure for implementation of measures adopted within the sustainable development strategy.

## Radioactive discharges

From JAVYS nuclear facilities, only fractions of limits approved for gas emissions and liquid discharges go to the environment, after multiple control measures. The objective of limit values for discharges is to guarantee that the summary radioactive substances discharged to the environment from all sources within the facility during normal and specific operating conditions of nuclear power plant will not exceed the annual radiation limit of 0,25 mSv/year per capita caused by radioactive liquid discharges and gas emissions. Limit values of radioactive discharges are defined in the decisions issued by the Slovak Public Health Authority.

## Emissions to atmosphere

**Activity of radionuclides in gas emissions**

| 2009 | V1 NPP | | | RAW PTT | | | ISFS | | |
|---|---|---|---|---|---|---|---|---|---|
| | emissions | limit | Percent of the limit | emissions | limit | Percent of the limit | emissions | limit | Percent of the limit |
| **Rare gases (TBq)** | 3,744 | 2000 | 0,187 % | ** | * | * | ** | * | * |
| **Aerosols (MBq)** | 8,771 | 80000 | 0,011 % | 3,957 | 940 | 0,421 % | 0,528 | 300 | 0,176 % |
| **Iodine (MBq)** | 6,104 | 65000 | 0,009 % | ** | * | * | ** | * | * |

*limit not set
** values not measured

## Discharges to hydrosphere

In 2009, wastewater from JAVYS, a.s. – A1 NPP and RAW PTT were discharged through pipeline collector Socoman and Drahovský canal to the River Váh.
In the discharged wastewater, the volume activity of tritium, corrosion and fission products is measured, as well as the volume of water in collection reservoirs for A1 and V1 NPP.
Wastewater from the premises JAVYS, a.s. – V1 NPP were discharged through the canal Manivier to the River Dudváh in the period February – September 2009 due to a single discharge route of condensate contaminated by tritium from V2 NPP steam from the start-up and stand-by boiler room.

**Activity of radionuclides in wastewater discharged to the recipients – the River Váh and the River Dudváh**

| 2009 | Activity of radionuclides in the wastewater discharged to the River Váh | | | | | |
|---|---|---|---|---|---|---|
| | V1 NPP | | | RAW PTT and ISFS | | |
| | discharge | limit | Percent of the limit | discharge | limit | Percent of the limit |
| **Corrosion and fission products (MBq)** | 16,08 | 13 000 | 0,124% | 118,5 | 12 000 | 0,988% |
| **Tritium - Váh (GBq)** | 1183,5 | 20 000 | 5,918 % | 186,637 | 10 000 | 1,866 % |
| **Tritium – Dudváh (GBq)** | 0,046 | 200 | 0,023 % | - | - | - |

The values measured in 2009 show that gas emissions to air and liquid discharges to rivers reached values deeply below the authorised limits.

## Abbreviations used

| | |
|---|---|
| As | arsenum |
| A1 NPP | A1 Nuclear Power Plant |
| BRWTC | Bohunice Radioactive Waste Treatment Centre |
| Cd | cadmium |
| CFP | Corrosion and fission products |
| CO | Carbon monoxide |
| Co | cobalt |
| Corg. | Organic carbon |
| Cr | chrome |
| Cu | cuprum |
| EMO | Mochovce Power Plant |
| FCC | Fibre concrete container |
| FP LRAW | Final Processing of Liquid Radioactive Waste |
| GBq | Giga bequerel |
| HCl | Hydrogen chloride |
| HF | Hydrogen fluoride |
| Hg | mercury |
| ISFS | Interim Spent Fuel Storage |
| JAVYS, a.s. | Jadrová a vyraďovacia spoločnosť, joint stock company |
| MBq | Mega bequerel |
| MEn SR | Ministry of the Environment of the Slovak Republic |
| Mn | manganese |
| Ni | nickel |
| NOx | Nitrogen oxides |
| NRWR | National Radioactive Waste Repository |
| Pb | lead |
| RAW PTT | Technologies for radioactive waste processing and treatment |
| REA | Regional Environmental Authority |
| SE, a.s. | Slovak Electricity Utilities, joint stock company |
| $SO_2$ | Sulphur dioxide |
| SP | Solid pollutants |
| Tl | tellurium |
| V1 NPP | V1 Nuclear Power Plant |
| V2 NPP | V2 Nuclear Power Plant |