

Jadrová vyrad'ovacia spoločnosť, a.s.



***THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT
OF V1 NPP DECOMMISSIONING***

**NON TECHNICAL EXECUTIVE
SUMMARY**

2006

EWN

STM POWER
System Technology Management



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INTRODUCTION

Through the adoption of Resolution No. 801/99 of the Slovak Government of 14th September 1999, as a condition for fulfilling the Accession Agreement of the Slovak Republic to the European Union, *Protocol No.9 on unit 1 and 2 of V1 NPP Jaslovské Bohunice in Slovakia*, the Slovak Republic undertook a commitment to shutdown units 1 and 2 of Jaslovské Bohunice V1 NPP in 2006 and 2008 respectively.

According to the Act of the National Council of the Slovak Republic No.127/1994 Coll. on *Environmental Impact Assessment*, Slovenské elektrárne, a.s. (proponent)¹ submitted the document “*Complex Study of the V1 NPP Decommissioning*” to the Ministry of Environment of the Slovak Republic (MŽP SR) on 26th June 2002. MŽP SR accepted this Complex Study as a Preliminary Environmental Study (Intention), i. e. as the first step of standard environmental impact assessment process of the activity (EIA process), and consequently opened up the process of scoping specified by §12 of Act No. 127/1994 Coll. on the Assessment of Environmental Impacts as amended by Act No. 391/2000 Coll., for the assessment of impacts caused by the proposed activities².

The Scope of Assessment issued by MŽP SR on 8th October 2002 covers the environmental impact assessment of all three alternatives of V1 NPP decommissioning which were considered in the *Complex Study of the V1 NPP Decommissioning* and also the so called Zero alternative (whereby no action will take place).

In July 2004, a Grant Agreement (*GA 005*) for the development of documentation on the decommissioning of Bohunice V1 NPP was established between the European Bank for Reconstruction and Development, - as the administrator of Grant Funds provided by the Bohunice International Decommissioning Support Fund (BIDSF) -, and SE, a.s., as the recipient. The subject of this Grant Agreement comprises the following projects:

- B6.1: “*The V1 NPP Conceptual Decommissioning Plan (CDP)*”;
- B6.2: “*The Environmental Impact Assessment (EIA) Report of V1 NPP Decommissioning*”.

The proponent shall perform an environmental impact assessment in accordance with Act No. 127/1994 Coll. and under the framework of BIDSF, also in accordance with EU EIA Directives, including preparation of the Environmental Impact Assessment Report and public consultation process. “*The V1 NPP Conceptual Decommissioning Plan*” and this present “*V1 NPP Environmental Impact Assessment Report*” (after issuing the final statement of MŽP SR) will be, among other necessary documentation, the main basis for issuing the decision on authorisation for the activity.

¹ At the present time the function of the proponent has been taken over by the GovCo, a.s. (Jadrová vyrad'ovacia spoločnosť, a.s.), Jaslovské Bohunice, which is, besides other, also the V1 NPP operator.

² The new EIA Act No. 24/2006 Coll. came into force on 1st February 2006 and it revokes the previous Act No. 127/1994 Coll. and Act No. 391/2000 Coll. According to §65, item 3 of Act No. 24/2006 Coll., environmental impact assessment commenced before February 1st, 2006 will be completed in accordance with previous regulations.



NON TECHNICAL EXECUTIVE SUMMARY

1 PROJECT

The proposed activity is the V1 nuclear power plant decommissioning.

2 COMPANY

The proponent is GovCo a.s. (Jadrová vyrad'ovacia spoločnosť, a.s. - JAVYS)
919 31 Jaslovské Bohunice

3 OBJECTIVES

The purpose of the proposed activity “*V1 NPP Decommissioning*” is to achieve the status fulfilling the criteria (in accordance with appropriate legal regulations) for site release for unrestricted use. V1 NPP decommissioning will thus be completed by removal of all unnecessary and non-utilisable buildings and equipment and the release of the site for further use.

The goal of the environmental assessment report is to assess and compare the impacts of the proposed V1 NPP decommissioning alternatives on the environment in accordance with Act No. 127/1994 Coll. and to recommend the most suitable alternative.

4 SITE LOCATION

The activities will be carried out on the V1 NPP site (*figure 1*), which is a part of the common site of SE EBO (operator of V2 NPP) and GovCo (JAVYS) in the Bohunice nuclear energy complex.



Figure 1: View of V1 NPP from the southeast.



Possible impacts arising from the proposed activities on the natural and anthropogenic components of the environment and the population will be evaluated in the affected area, which represents the first threatened zone, i.e. circle around the power plant of 5 km radius (*figure 2*). In the case of social and economic impacts, a broader area will be assessed. The affected area comprises 8 villages:

- Jaslovské Bohunice, Malženice and Radošovce belonging to the district of Trnava;
- Žlkovce and Ratkovce belonging to the district of Hlohovec;
- Veľké Kostolany, Nižná and Pečeňady belonging to the district of Piešťany.



Figure 2: Threatened zones around the nuclear installation in Jaslovské Bohunice – 3 zones with 5, 10 and 30 km radius and 16 circle sectors. The affected area represents the first threatened zone.



5 TIMING

In compliance with the proponent's instructions alternative solutions for the decommissioning were addressed in all studies, strategic and planning documents. The initial and final status were in each case the same:

- The V1 NPP decommissioning begins with the issuing of the authorisation for decommissioning after the removal of the fuel from V1 NPP and placement in the Interim Spent Fuel Storage Facility in Jaslovské Bohunice (operator is GovCo (JAVYS)). This means that the period between the Unit 1 final shutdown and the initiation of the decommissioning itself (pursuant to the Government Resolution No. 801/1999, between years 2007 and 2011) does not generally fall within decommissioning activities, rather it is a part of the operation termination and it is a period during which preparatory decommissioning activities take place.
- The V1 NPP decommissioning is completed when all building structures and equipment identified for decommissioning have been removed and the plant site has been released for further use.

The assumed commencement and completion dates for the proposed activity alternatives are given in table 1.

Table 1: Terms of commencement and completion of activities.

<i>Alternative of proposed activity</i>	<i>Commencement</i>	<i>Completion</i>
<i>Zero Alternative</i>	2012	Without time limitation
<i>Alternative 1 (IDO)</i>	2012	2025
<i>Alternative 2 (SES)</i>	2012	2063
<i>Alternative 3 (RSE)</i>	2012	2063

6 ALTERNATIVES

Simultaneously submitted alternatives of the proposed activity are as follows:

- **Alternative 1** - Immediate decommissioning alternative (IDO);
- **Alternative 2** - Deferred decommissioning alternative with safe enclosure under surveillance for 30 years (SES);
- **Alternative 3** - Deferred decommissioning alternative with reactor safe enclosure for 30 years (RSE).

These alternatives have been compared to the **Zero alternative**, which represents the situation and consequences, should the proposed activity - V1 NPP decommissioning -, not take place.



The total costs of the different alternatives are presented in table 2:

Table 2: Total costs for individual V1 NPP decommissioning alternatives (calculated – Project B6.1)

<i>Alternative of the proposed activity</i>	<i>Costs* [SKK mill.]</i>
<i>Zero Alternative</i>	90.00 per year
<i>Alternative 1 (IDO)</i>	17 624.48
<i>Alternative 2 (SES)</i>	15 809.93
<i>Alternative 3 (RSE)</i>	15 435.07

*In the case of Zero alternative the annual costs necessary for operation (energy and media), barrier integrity control, radiation protection, maintenance and work are given.

6.1 ZERO ALTERNATIVE

The Zero alternative is characterised as the situation and consequences which would arise if the proposed activity, i.e. V1 NPP decommissioning did not take place. In the case of V1 NPP decommissioning, the Zero alternative is the status that would arise after the NPP shutdown without commencement of decommissioning activities and its retention with no time limitation. This means that the Zero alternative does not represent further operation of the power plant.

In accordance with the Atomic Act, nuclear power plants must be operated in such way, that their radiation safety would be ensured and continuously monitored after the reactor final shutdown to the extent identified by the Decree of the Nuclear Regulatory Authority of the Slovak Republic No. 50/2006. During the operation termination period, spent fuel will be removed from each unit and operational radioactive waste (waste resulting from operation) will be treated.

In the case of the Zero alternative, namely the following specific systems must be permanently operated:

- heating, ventilation and air-conditioning systems creating suitable hygienic and radiological conditions for personnel during inspections of radioactive rooms and technological equipment and enabling at the same time moderate heating of rooms to minimise corrosion of technological equipment;
- special drainage water system (collection and check for potential leakages) with waste water let down system;
- monitoring of equipment and rooms for radiation using a stationary radiation monitoring system and portable devices;



- automated technological information system – (monitoring system for equipment, monitoring system for building barrier tightness, signalling of leaks in the controlled area, etc.);
- electronic fire protection system;
- electrical distribution systems for lighting of rooms and power supply to operating systems (permanent operation of power supply systems);
- piping distribution systems for media (water for fire-fighting , drinking water for air locks and changing rooms and contamination checkpoints, etc.);
- groundwater monitoring system in the vicinity of individual buildings;
- main changing rooms and showers;
- rooms for operating personnel, from which permanent attendance and monitoring of operating systems will be ensured (in addition to walk-downs).

The maintenance and reconstruction of the aforementioned systems must be concurrently ensured. In addition, building part maintenance with emphasis on the check-ups and maintenance of barriers will be necessary.

The Zero alternative means continuation of the shutdown status of V1 NPP without time limitation whereby operational unusable radioactive material will be remaining. This alternative does not require investments availability for decommissioning however it is not time limited and will put off the horizon of the new site utilization to a very far future. In addition it will extend hazards of possible radioactive substances leakage into the environment. It is not advantageous also with respect to the costs needed for an indefinite time.

It can be seen from the above mentioned facts, that the Zero alternative is unrealistic and unacceptable as a true decommissioning alternative. Hence this alternative for the conceptual V1 NPP decommissioning plan (BIDSF Project B6.1) has not been further evaluated. Therefore no calculation of parameters was made in the frame of the Project B6.1, as shown for the alternatives 1 to 3 in table 3.

6.2 ALTERNATIVE 1:V1 NPP IMMEDIATE DECOMMISSIONING (IDO)

The main feature of this alternative is the immediate and continuous dismantling of the equipment and facilities, demolition of buildings back to the bottom of their foundations and the preparation of the site for further use.

Within the operation termination period the spent fuel is removed from the Units into the Interim Spent Fuel Storage Facility, remaining operational radioactive wastes are processed and the decontamination of the primary circuit as a whole is carried out. Subsequently, the non-radioactive technological systems are dismantled and the non-contaminated buildings which are intended for no other purposes are demolished.



The principle sequence of further decommissioning activities is: system decontamination before continuous dismantling and, if necessary, decontamination after dismantling. The radioactive wastes generated are treated and stored immediately. This is followed by the decontamination of the building surfaces and the demolition of the buildings including the hermetic area. In this alternative the decommissioning is continuous. At the end the site is released for further use.

6.3 *ALTERNATIVE 2: V1 NPP DEFERRED DECOMMISSIONING WITH THE SAFE ENCLOSURE UNDER SURVEILLANCE (SES) FOR THE PERIOD OF 30 YEARS*

A basic feature of this alternative is the safe enclosure of the equipment of the primary circuit. Before the authorisation for the operation is terminated, the spent fuel is removed from each Unit, the operational radioactive wastes are processed and the decontamination of the primary circuit as a whole is carried out.

At the beginning of the decommissioning, no additional internal decontamination is carried out and no contaminated items are dismantled. Corrective building maintenance is performed and the non-contaminated obsolete buildings are dismantled and demolished. The facilities are closed as scheduled. After the facilities are closed, the environmental impact is regularly monitored.

After the expiration of the term of SES, the facilities are dismantled, taking into account the radiation that has decreased because of the natural decay of isotopes. Thus this alternative could be characterised as an interrupted decommissioning process, where the contaminated/activated facilities are safely enclosed and monitored during the determined time and finally they are dismantled up to the point of unrestricted release of the site.

During the safe enclosure under surveillance, equipment and systems which are important to safety are still operated. Maintenance of equipment and systems, electrical equipment, instrumentation and control equipment and radiation monitoring is ensured according to the programme determined in advance. In the course of 30-year period of enclosure under surveillance, it is necessary to consider the reconstruction of different equipment. With regard to the importance of buildings, maintenance (replacement) of building part (roofs, peripheral panels, foundations, structures, etc.) is ensured in regular intervals in accordance with the results of inspections carried out. The appropriately assumed maintenance intervals will be given in operational regulations.

6.4 *ALTERNATIVE 3: V1 NPP DEFERRED DECOMMISSIONING WITH THE REACTOR SAFE ENCLOSURE (RSE) FOR THE PERIOD OF 30 YEARS*

A basic feature of this alternative is the safe enclosure of the reactor in the reactor shaft. Before the authorisation for the operation is terminated, the spent fuel is removed from the Unit, the operational radioactive wastes are processed and decontamination of the primary circuit as a whole is carried out.



Further, the non-contaminated facilities are dismantled and buildings are demolished if they are not intended for any further use. Pre-dismantling decontamination, dismantling of the technological equipment (with the exception of that required for the RSE), decontamination after dismantling and processing of the resulting waste are performed consecutively. These activities are followed by the decontamination of the building surfaces and demolition of the controlled area except the part, required for the RSE. The safe enclosure of the reactor meets all the requirements of environment and radiation protection.

This alternative also includes an interruption of the decommissioning process. During the time of reactor safe enclosure, two independent groups of buildings remain in the site area: the reactor shafts with the reactors and some other buildings necessary for service.

7 IMPACT OF THE ALTERNATIVES

7.1 GENERAL TECHNICAL AND ECONOMIC ASSESSMENT

Alternative 1: V1 NPP immediate decommissioning (IDO)

Technical assessment of the alternative:

This alternative assumes the immediate continuous and adequate distribution of the decommissioning activities. The advantage of this procedure is the possibility of starting with simpler cases of dismantling and decontamination activities whereby the practical experience is gained. This will later be used in the course of dismantling the most complicated parts such as the reactors and the most contaminated equipment. The advantage is the continuity of experience and knowledge of the buildings and equipment, which are most favourably evident in this alternative.

Economic assessment of the alternative:

The costs of this alternative represent 17 624.48 million SKK and they are the highest of all evaluated alternatives.

Alternative 2: V1 NPP deferred decommissioning with safe enclosure under surveillance for the period of 30 years (SES)

Technical assessment of the alternative:

This alternative assumes the postponement of the main decommissioning activities by 30 years. Deferred decommissioning will not affect the technical viability of this alternative. However, deferred decommissioning can cause the unfavourable effect whereby the familiarity and specific knowledge relating to areas and equipment possessed by present V1 NPP workers or their direct



successors is no longer available. Not all details of areas and equipment are recorded in the decommissioning database and this can have unfavourable consequences.

Operation of the safe enclosure under surveillance in the form of the inspection of building barriers and the barriers for technological equipment not in operation is also viable in connection with the operation of the radioactive waste treatment and conditioning facilities.

Economic assessment of the alternative:

The costs of this alternative represent 15 809.93 million SKK and this is the second most expensive of the evaluated alternatives.

Alternative 3: V1 NPP deferred decommissioning with the reactor safe enclosure for the period of 30 years (RSE)

Technical assessment of the alternative:

This alternative assumes the postponement of the decommissioning of the reactor by means of its safe enclosure.

Economic assessment of the alternative:

The costs of this alternative represent 15 435.07 million SKK and they are the lowest of the evaluated alternatives.

7.2 IMPACT ASSESSMENT SUMMARY

A summary of the characteristic parameters for the different decommissioning alternatives is presented in table 3. These parameters were taken over from the results of the CDP (BIDSF Project B6.1) and form the main basis for the impact assessment.

Table 3: Summary of main parameters for alternatives 1, 2 and 3

<i>Parameter</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Total costs [SKK mill.]	17 624.48	15 809.93	15 435.07
Collective effective dose [manSv]	13.8778	8.1734	13.2333
Duration of the decommissioning process under authorisation for decommissioning [year]	14	52	52
Labour hours needed [10³ hours]	15 026.5	13 498.4	12 891.1
Amount of liquid radioactive waste (at 200 g/dm³ salinity) [m³]	1 930	1 774	1 931
Radioactivity of gaseous discharges [Bq]	3.22 10 ⁶	2.04 10 ⁶	3.27 10 ⁶
Radioactivity of liquid discharges [Bq]	7.94 10 ⁷	5.04 10 ⁷	8.08 10 ⁷
Amount of metals released into the environment [t]	55 996	61 004	59 867
Amount of recyclable construction waste [t]	418 125	318 734	318 599



Parameter	Alternative 1	Alternative 2	Alternative 3
Amount of non-utilisable waste [t]	3 331	7 855	7 883
Number of fibre-concrete containers for Near surface repository at Mochovce [pcs]	1 038	886	1 050
Number of fibre-concrete containers for Interim radioactive waste storage facility [pcs]	44	30	30
Duration of the site's radiation load [year]	13.7	51	51

The relatively small difference between the collective effective doses for the alternatives 1 and 3 stems from the fact that the reactors together with their internal parts are in both cases decommissioned remotely (by a manipulator) and thus the resulting radiation load is low.

The average value of the radioactivity of discharges during the power operation of V1 NPP is about 160 MBq for aerosols and about 65 MBq for corrosion and fission products in liquid discharges. These values result from the appropriate values published in the Slovenské elektrárne, a.s. Reports on Environment in 2001 to 2005 obtained from the former SE EBO. These discharges represent about 0.1% and 0.2% of the permitted annual limit values for the radioactivity of gaseous and liquid discharges for the site of the Bohunice nuclear-energy complex.

The environmental impact of decommissioning results mainly from:

- The extent of equipment being operated in the controlled area and its mode of operation,
- The amounts of radioactive materials being dismantled,
- The management methods for radioactive wastes generated during decommissioning.

The principal sources of radioactive discharges are the treatment and conditioning of radioactive wastes, decontamination of radioactive material and dismantling. Gaseous and liquid discharges are generated, depending on the technologies used. However, the chronological distribution of the amounts of discharges generated also depends on the decommissioning alternative selected.

The distribution of radioactive discharges over a period of time is generally similar to the distribution of the radiation load on personnel over a period of time. The highest amounts are produced during the dismantling of contaminated and activated equipment, the decontamination work and the radioactive waste management.

For alternative 1, the estimated average annual radioactivity value of liquid discharges represents about 5.6% and the respective value for gaseous discharges represents 0.1% of the appropriate annual values measured for the V1 NPP power operation. The respective average annual radioactivity values for alternatives 2 and 3 are comparably lower than for alternative 1 due to the safe enclosure period with very low annual radioactivity values of liquid and gaseous discharges.



In general, the radioactivity of discharges from the V1 NPP decommissioning, independently of the chosen alternative, is much lower than during the power operation. The estimated maximum annual value of radioactivity of liquid discharges represents about 13.8% and the respective value of gaseous discharges represents 0.23% of the corresponding annual values measured for the V1 NPP power operation.

In comparison with the V1 NPP power operation, non-radiological impacts (for example ground water consumption, cooling water consumption and emission of water pollutants) are also significantly reduced after the shutdown.

These impacts remain at this low level during the decommissioning practically independently of the selected alternative.

During the performance of the proposed activities, particularly in the cases of dismantling and demolition of building structures, some additional impacts such as noise, dust and emissions from the transport of waste and material can occur. Such impacts are typical for each dismantling and demolition activity. These additional impacts are temporary and restricted to the site of the power plant and its nearest surrounding or the transport routes and therefore do not affect significantly the components of the environment such as flora, fauna, soil or surface and groundwater.

Therefore there are no significant additional non-radiological impacts in relation to the current situation of the environment. The proposed and assessed activities basically remove the consequences of the V1 NPP operation.

Thus the decommissioning activities are positive also in relation to the environment.

8 SELECTED ALTERNATIVE

The result of this assessment of the alternatives of the proposed activity in the *Environmental Impact Assessment Report* is the recommendation that the most suitable alternative is **alternative 1 – V1 NPP immediate decommissioning**. Alternative 2 – V1 NPP deferred decommissioning with the safe enclosure under surveillance for the period of 30 years is the second most suitable followed by alternative 3 – V1 NPP deferred decommissioning with the reactor safe enclosure for the period of 30 years and finally the Zero alternative. The alternative of the V1 NPP immediate decommissioning has more advantages in comparison with the other assessed alternatives:

- It takes into account the anticipated development of the site from the point of view of creating the conditions for decommissioning of the other NPPs at the site and the utilisation of the V1 NPP buildings for these purposes.
- The time schedule for the performance of the decommissioning activities is distributed uniformly with regard to the utilisation of the qualified work force. The complexity of the tasks increases with the passing of time, thus providing the experience for the



decommissioning of the most complicated parts of the NPP (from the point of view of radiation).

- This alternative is the most suitable from the technical point of view, because it is linked to the current status of technical provisions for decommissioning and furthermore the conditions for a fluent transition to the V2 NPP decommissioning are created in the course of the decommissioning according to this alternative.
- An important aspect from the current perspective, based on existing experience of decommissioning, is the preservation of experience and knowledge of current personnel. This can be effectively used for the development of specific working procedures during the partial decommissioning tasks (continuity of knowledge of equipment and areas).

This alternative is the most unfavourable in terms of the costs, because the buildings are decommissioned right back to the foundations.

The recommendation is mainly based on the following reasons and related facts:

- The Zero alternative does not comprise decommissioning and therefore it does not reduce potential leakages of radioactive substances or the risk of accidents associated with the presence of radioactive materials in the facility (at the site) to the full extent. It consists of maintaining the situation after NPP operation termination without any decommissioning activities for an indefinite time period. It does not end up with the landscaping of the site and its release for further use. Due to these reasons, an objective comparison of costs and requirements for maintaining the Zero alternative with other alternatives is not possible. The Zero alternative is in no way equivalent to the others. However, the overall impact of the Zero alternative is positive, if we consider only the immediate environmental impacts of the NPP shutdown. As the Zero alternative does not represent an ultimate solution, the rejection of the other alternatives of the proposed activity would, sooner or later, very probably result in the re-assessment of the decision.
- Alternatives 2 and 3 fulfil the above mentioned parameters, because they end up with the demolition of the non-utilisable buildings and the elimination of all impacts and risks resulting from their presence and they also include site landscaping and the release of the site for further use. However, the time scale is less convenient with the risk of loss of technical information on the equipment and with the loss of continuity of the operation and the resulting social and economic impacts on the population of the affected area.
- In the case of carrying out alternative 2 or 3, the loss of experience during the time period of safe enclosure (30 years) requires expensive education and training of the personnel before the beginning of the decommissioning continuation after the 30 year's interruption.
- Alternative 1 achieves all of the above mentioned positive impacts in the shortest possible time, but on the other hand this leads to the slightly more negative impact resulting from the immediate implementation of the decommissioning (higher costs and higher radiation doses for the personnel).



- The assessment states that alternative 1 is to be preferred in spite of the aforementioned slightly negative impact resulting from immediate decommissioning, because this is well compensated by the positive impacts of removal of the NPP non-utilisable buildings, landscaping of the site and its release for further use. In addition, the anticipated financial savings and lower radiation doses (not very significant and only relevant after 30 years) due to the radioactive decay of radionuclides in some contaminated and activated facilities and buildings of NPP are questionable or at the very least burdened by a high level of uncertainty.
- The recommendation of alternative 1 also adheres to the concept of sustainable development and to the basic principles for the safety of radioactive waste management. When considering all submitted alternatives it represents the most acceptable solution for the population of the affected municipalities and for the affected area from the social, economic and environmental points of view. It is also in accordance with public opinions and recommendations of non-governmental organisations, which have taken part in the assessment process since the stage of scoping.

9 TRANSBOUNDARY IMPACTS

The contribution of V1 NPP decommissioning to environmental impacts is negligible in comparison with usual impacts of V1 NPP units in operation, the Radioactive Wastes Bohunice Treatment and Conditioning Centre or Interim Spent Fuel Storage Facility installed at the nuclear-energy complex of the Bohunice site.

No significant transboundary impacts are expected at any stages of any of the decommissioning alternatives because of the distance of the affected area from state boundaries (*figure 3*). All impacts of radiological character are restricted to the site of the decommissioned power plant, some non-radiological impacts will influence the affected municipalities of the first threatened zone and the socio-economic impacts will affect a broader area (districts of Trnava, Piešťany and Hlohovec).

In view of the proponent this project does not fall under the provisions of the ESPOO Convention.



Figure 3: Distance of GovCo (JAVYS) and SE EBO site from state boundaries

10 MITIGATION OF NEGATIVE IMPACTS

The minimisation of ionising radiation exposure of personnel and population (ALARA principle) – by thorough implementation of efficient programmes and working plans based on the relevant legislation on health protection against ionising radiation and on work in the environment with ionising radiation as well as by using equipment with remote control, manipulators, etc.

Minimisation of contaminant emissions into the atmosphere – by using highly efficient filtration systems to trap emissions and dust, by local suction cleaning of dust, dust fixation (e.g. by sprinkling) and by the thorough planning of activities involving an increased formation of dust.

Minimisation of surface water pollution – by minimising the water consumption, treatment of waste water and by using the waste water in further processes of radioactive waste treatment and conditioning, efficient filtration, etc.

Noise reduction – by using noise barriers and optimising the routing and timing of the transportation.

Minimisation of requirements for land occupation (at the V1 NPP site) needed for buffer collection/storage places for decommissioning waste. Technologies minimising the formation of secondary wastes and preventing the contamination of the surroundings are used.

Utilisation of operating personnel, preferably from the V1 NPP operation and recruitment of the work force preferably from the inhabitants of affected municipalities.



Adequate training and re-training of the personnel at all levels and working places of the organisation.

Site landscaping and further use of the site.

Land scape – if new buildings are required, they are to be built in such a way that the landscape is not affected.

11 MONITORING PROGRAMME

The monitoring programme for the decommissioning activities is the continuation of the present monitoring programme for the nuclear energy complex of the Bohunice site which has been approved by the relevant authorities. It fulfills all applicable legal requirements. The monitoring programme includes the determination of gaseous and liquid discharges of radionuclides and other pollutants into the environment and the monitoring of environmental components (e.g. groundwater, surface water and soil) and a number of agricultural products.

The main point of the monitoring programme is the balance monitoring of the waste gases radioactivity in the ventilation stack of V1 NPP.

Besides these measurements of waste gases, liquid discharges also undergo the balance monitoring on the basis of samples from water reservoirs, where the over-balance service water is accumulated.

Monitoring of gaseous and liquid discharges is supplemented by systematic monitoring of individual environmental components, such as groundwater, surface water and soil and a number of agricultural products based on the monitoring programme of the Bohunice nuclear energy complex surroundings approved by hygienic regulatory authorities.

The collection and evaluation of data from the monitoring of individual point sources of air pollution (ventilation stack) and of liquid discharges and from the monitoring of the surroundings are fully sufficient also for the monitoring of the activity impacts in the course of the V1 NPP decommissioning.

It is suggested to perform the control of keeping the determined conditions of the V1 NPP decommissioning project in the form of submitting the quarter reports *Analysis of discharges of radioactive substances from the site SE EBO and GovCo (JAVYS)* and of radiation situation in their surroundings and the annual summary report *Radiation protection of SE EBO and GovCo (JAVYS) and impact of SE EBO and GovCo (JAVYS) on the surroundings* to the appropriate approving and the affected authorities.