Slovenian Report on Nuclear Safety

Slovenian 3rd National Report as
Referred in Article 5 of the Convention on Nuclear Safety

July 2004
Executive Summary

In the period 2001-2003 the safety of the only Slovenian nuclear power plant Krško was assessed by the SNSA as satisfactory in relation to the requirements, which was pointed out in the annual Reports on Nuclear and Radiation Safety prepared by the SNSA.

Besides the continuous regulatory safety assessment, since 2001 the Krško NPP has experienced a number of reviews and assessments of its safety. The important activities in the area of safety reviews and assessments were the following: two international missions (IAEA Review of Accident Management Program and IAEA Operational Safety Review Team); Probabilistic Safety Analysis (PSA) of preventive online maintenance, outage activities and biennial reassessment of plant status; Regulatory Conformance Program Compliance Review of the United States Nuclear Regulatory Commission regulatory requirements issued from 1972 to 2002 and the first periodic safety review of the plant, which is in progress (the reviews and analyses were finished by the end of 2003).

In July 2002 the Parliament of the Republic of Slovenia adopted a new Act on Ionising Radiation Protection and Nuclear Safety, which entered into force on October 1, 2002. The 2002 Act separated the responsibilities for radiation protection between two authorities. The responsibility for supervision of nuclear safety in nuclear facilities and radiation practices outside medicine and veterinary activities lies with the Slovenian Nuclear Safety Administration, while the responsibility for supervision of radiation practices in medicine and veterinary activities lies with the newly established Slovenian Radiation Protection Authority.

Permanent safety improvements are made by a number of modifications. All changes are evaluated for licensing applicability in accordance with the criteria defined in the United States 10 CFR 50.59.

In the case of a nuclear accident financial resources to compensate the claim are provided through the Slovenian third party liability legislation and through Nuclear Insurance and Reinsurance Pool, taking into account that in 2001 Slovenia became a party to the Paris Convention on Third Party Liability in the Field of Nuclear Energy, and in 2003 also a Party to the Brussels Supplementary Convention.

The Krško NPP continuously updates the full-scope simulator configuration commensurate to plant changes (model improvements), and maintain and develop training programs in compliance with international practice, regulation and trends, as well as plant specific needs and situations. In parallel, also the level of knowledge and skills of the simulator instructors is constantly being maintained and improved.

The Krško NPP as the license holder is responsible for the overall quality of the design, construction, operation, maintenance and modification of the NPP.

The Slovenian Nuclear Safety Administration carries out its surveillance responsibilities with a combination of inspections, scrutiny of documents, approval of modifications to the license, approval of
modifications to the plant, and regular monitoring and evaluation of the station’s performance. In 2001 the Krško NPP upgraded and declared functional its Emergency Off-site Facility, which takes over the liaison with off-site authorities, public information and a part of engineering support from the Technical Support Centre during the Site and General Emergency. The Krško NPP prepared an information brochure for the people living within the area of planned urgent protective actions. The brochure was distributed to all households in the municipalities around the Krško NPP in 2002.

The Design Modification Control Program, established in the Krško NPP, provides an overview of the roles, responsibilities and requirements of the plant divisions involved in the design modification process. The program specifically defines the activities performed by each group. The purpose of the program is to provide high quality, timely and cost effective modification solutions to plant problems and at the same time to reduce the cost and time of modification completion.

At the Krško NPP the in-house capabilities have been developed to perform engineering and technical support. Other engineering and technical support is assured through outsourcing at Slovenian research and engineering organisations or from abroad. In the Krško NPP the Root Cause Analysis of significant events is performed and the lessons learned are followed up and training is given where appropriate. An Operating Experience Feedback Program is in place, which includes the consideration of internal as well as external operating events.

It can be concluded that the Slovenian regulations and practices are in compliance with the obligations of the Convention on Nuclear Safety.
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**Introduction**

On 20 September 1994, Slovenia signed the Convention on Nuclear Safety (in the following text - Convention) and ratified it in the Parliament in October 1996. The Convention entered into force for Slovenia in February 1997. The fulfilment of the obligations in the period from 2001 to 2004 is evaluated in this third report. The report presents the achievements and contributions to the safety of the only nuclear power plant in Slovenia in the recent years, focusing on major projects, programs and modifications, and explaining the impact of the new nuclear and radiation safety act, which was adopted in 2002. The report addresses the areas which were identified during previous evaluation and during the Second Review Meeting. Also presented are the results of the international missions which were undertaken in the given period.

Slovenia has one operating nuclear power plant, one research reactor, one central radioactive waste storage for low and intermediate level solid radioactive waste from non-power users of nuclear energy, and one uranium mine and mill in a decommissioning stage.

The Krško Nuclear Power Plant, situated in the south-eastern part of Slovenia, is the only nuclear installation according to this Convention. It is a Westinghouse two-loop pressurised water reactor with originally installed capacity of 632 MWe. After steam generator replacement the power was uprated to 676 MWe. The basic safety features of the plant are typical for a two-loop Westinghouse plant. The construction started in 1974; on the basis of a special permit, the first fuel loading was accomplished in May 1981 and the plant was synchronised to the grid in October of the same year. After an authorised trial operation, full power was reached in August 1982, and the first full year of commercial operation was 1983.

As stated in the previous two Slovenian Reports, the Krško NPP was constructed as a joint project of the electric utilities of Slovenia and those of the neighbouring Croatia on an equal, 50:50 basis.

To avoid legal uncertainty and to adjust the legal status of joint investments of both Slovenia and Croatia to the new reality (market economy, two sovereign and independent states) the Government of Slovenia and the Government of Croatia signed in December 2001 the Agreement on Settlement of Statutory and Other Legal Relations Regarding the Investments into NPP Krško, its Exploitation and Decommissioning. The Agreement, which was first ratified by the Croatian Parliament, entered into force on March 11, 2003, after being ratified also by Slovenian Parliament (February 25, 2003) and after the notification of the completion of Slovenian internal legal requirements for its entry into force was sent to the Croatian side.

The Agreement actually reaffirms the basic philosophy and provisions set out in the agreements and arrangements stipulated and adopted in early 70’s and 80’s between the two Yugoslav federal entities and their electric utilities; on the other hand it also stipulates new provisions which were not dealt with before, as for example decommissioning, for which two separate funds are to be established and maintained both in Slovenia and Croatia.

Based on the Agreement, the Krško NPP is registered as a company for production of electrical energy, engineering design, technical expertise, testing, analyses, and research with experimental development...
in the area of nuclear technology. Since the Krško NPP is located in Slovenia it is subject of Slovenian law and Slovenian nuclear safety regulations.

The NPP Krško operates as a non-profit organisation, but the potential company’s profit could be put in the reserve assets.

The safety features of the Krško NPP design are based on the requirements of the US Atomic Energy Commission of 1973. Westinghouse as the main contractor was responsible for the implementation of these requirements during the design, construction and testing phases. The Krško NPP has been the subject of IAEA scrutiny since the very beginning of the project. The commitment of the plant and of the regulatory body, the Slovenian Nuclear Safety Administration (SNSA), has been to follow international experience in the field of nuclear safety and to fulfil western safety standards. Several software and hardware modifications and improvements of the plant have been implemented. These were based on the experience from the Three Mile Island accident, recommendations of different international missions, United States Nuclear Regulatory Commission requirements, experience of the nuclear industry Institute of Nuclear Power Operations (INPO), World Association of Nuclear Operators (WANO), the Westinghouse Owners Group, experience gained from the Phare - Regulatory Assistance Management Group program of the EC and from bilateral co-operation of the regulators.

Solid radioactive waste and spent nuclear fuel are stored within the plant area. The major project in 2003 was expanding the capacity of the spent fuel pit, which has now enough capacity to store spent fuel until year 2023, with the possibility for further expansion of the capacity. Solid radioactive waste is treated and then packed into steel drums, which are then stored in the Solid Waste Storage.

The Research Reactor TRIGA Mark II of the Jožef Stefan Institute is situated in the vicinity of Ljubljana and has a 250 kWth General Atomic pool reactor. TRIGA was initially licensed in 1966 as an IAEA project and was re-licensed for steady state and pulse operation after refurbishment and reconstruction in 1992.

The Žirovski Vrh Uranium Mine and Mill was in operation in the period from 1985 to 1990. Its lifetime production was 607,700 tons of ore corresponding to 452.5 tons (U3O8 equivalent) of yellow cake. Both the mine and the mill are undergoing decommissioning and re-mediation of surface disposal of 1,548,000 tons of mine waste and red mud, and 593,000 tons of mill tailings respectively.

The Central Radioactive Waste Storage at the Jožef Stefan Institute in Brinje is used for storage of Low and Intermediate Level solid radioactive waste from the reactor centre and other small waste producers such as medical, research, and industrial applications of ionising radiation.

The governmental energy policy is outlined in the National Energy Program, which also addresses nuclear power. The main principles of this Program are sustainability, ecological acceptability and reliability of supply.

In September 1996 the Government adopted “A Strategy for Long-Term Spent Fuel Management”, which is still valid but the Agency for Radwaste is intensively working on a new one, which will be finalised in 2004. Also the activities related to the search for the location and preparing the conceptual design of the low and intermediate level waste have been given high priority.
In the following section, the fulfilment of each of the articles 4 - 19 of the Convention is evaluated separately. The specific issues which require more detail, together with a comprehensive list of legal documents, are given in the Appendices. The topics which were extensively covered in the Second Report are only mentioned and reference is given to the previous Review Meeting.

It can be concluded that the Slovenian regulations and practices are in compliance with the obligations of the Convention.
Article 4 Implementing Measures

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures, and other steps necessary for implementing under this Convention.

The legislative, regulatory and administrative measures, and other steps necessary for implementing Slovenian obligations under the Convention on Nuclear Safety are discussed in this report. It was concluded that the approach taken in Slovenia provides for continuous fulfilment of the requirements presented in the articles of the Convention.
Article 6
Existing Nuclear Installations

Each Contracting Party shall take the appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force for that Contracting Party is reviewed as soon as possible. When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonable practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible. The timing of the shut-down may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.

In the period 2001-2003 the safety of the only Slovenian nuclear power plant Krško was assessed by the SNSA as satisfactory in relation to the requirements, which was pointed out in the annual Reports on Nuclear and Radiation Safety prepared by the SNSA.

Besides the continuous regulatory safety assessment, since 2001 the Krško NPP has experienced a number of reviews and assessments of its safety. The important activities in the area of safety reviews and assessments were the following:
2. Probabilistic Safety Analysis (PSA) of preventive online maintenance, outage activities and biennial reassessment of plant status, taking into account all modifications performed in this period (PSA model is continuously upgraded).
4. First periodic safety review of the plant is under way, with all of the reviews and analyses already finished by the end of 2003.

The Government of Slovenia invited the IAEA Operational Safety Review Team (OSART) to review the performance of the Krško NPP for the third time. Previous missions of this kind took place in 1984 and 1993. For the first time safety culture was evaluated as a separate factor. The OSART mission report presents assessments of these activity areas and includes 11 recommendations and 8 suggestions for further enhancement of operational safety. In this report, the OSART mission also presented 10 examples of good experience in terms of good performance and good practice.

The Krško NPP maintains a Probabilistic Safety Analysis (PSA) assessment program by continuously updating the PSA model with inclusion of all modifications performed at the plant. At the end of a two-year period, reassessment of the model is performed and a new, updated version of the model is issued. This new version reflects the knowledge of plant design/configuration status as of the end of the last outage and of plant history up to the end of the previous year. The issues have various backgrounds and can generally be divided into three broad categories: (a) modifications in plant design...
or procedures, (b) methodological issues and (c) data update on the basis of plant-specific experience and state of knowledge. The model is also quantified at Level 1 and Level 2, and the obtained results are described and discussed in the report. A comparison is provided with the results for the previous version of the model. Both the model and corresponding report are also delivered to the SNSA; the last version delivered was for the model of fuel cycle 18 (2001).

The Krško NPP issued a new revision of an internal Regulatory Conformance Program, which demonstrates continuous compliance with the United States Nuclear Regulatory Commission (US NRC) requirements. Non compliant issues from this program have been included in the Periodic Safety Review action plan, according to risk evaluation. At present, the Krško NPP has been in compliance with more than 99% of the US NRC requirements.

A major achievement of the Krško NPP in the area of modernisation was to enable spent fuel storage until 2023, i.e. until the designed lifetime of the plant. The spent fuel storage reached its full capacity in 2003 and had to be extended. With SNSA approval in the years 2002-2003 the project of reracking of the spent fuel storage was performed to increase its capacity. The capacity was extended to 1750 spent fuel assembly storage locations.

In 2003 the fuel cycle was extended to 15 months and in 2004 it will be further extended to 18 months. No additional safety analyses were needed since fuel cycle extension was already evaluated and approved by the SNSA during the plant modernisation and uprate in 2000.

For the implementation of the Periodic Safety Review recommendations an action plan will be made and approved by SNSA. The action plan will include issues from review findings, Westinghouse Owners Group recommendations, issues from the Regulatory Conformance Program (Compliance with NRC requirements), as well as some specific SNSA requirements. The issues were evaluated and ranked according to risk associated with them.

The Krško NPP operates with the operating license issued in 1984 and new revisions of Technical Specifications and updates of the Final Safety Analysis Report approved by the SNSA. The lifetime of the plant, as provided by the design, is forty years, i.e. until 2023. The designed lifetime was also repeated in the Agreement between Slovenia and Croatia on Krško NPP adopted in 2003, where there is also a provision considering lifetime extension, if this is needed.

Article 111 of the Act on Ionising Radiation Protection and Nuclear Safety (2002 Act) stipulates that the operating licence of a nuclear installation can be extended for a 10-year period when the facility fulfils the prescribed conditions. Article 82 defines that an approved report of the Periodic Safety Review is the condition for an extension of the operating licence.

The IAEA Review of Accident Management Program mission found that the Accident Management Program for the Krško NPP had been successfully developed and implemented to a major extent and that it is in accordance with the IAEA guidance documents as well as with international experience and practice.

The mission indicated areas where improvements can contribute to further effective implementation of the accident management program. These improvements include:
considering the possible adverse effects of reactor cavity flooding,
assessing the hydrogen issues inside the containment,
potential failure of systems during scenarios dominating core damage frequency,
reviewing vendor products for adequate incorporation of plant details,
considering simultaneously performing several Severe Accident Management Guidelines,
making effective use of knowledge and co-ordination between the Main Control Room and the Technical Support Centre,
specifying training needs for the Severe Accident Management Guidelines part of the various posts in the Technical Support Centre,
developing Severe Accident Management Guideline also for shutdown operational states,
including the new revision of the Westinghouse Owners Group Severe Accident Management Guidelines.

The mission identified a number of positive features, which are worth mentioning for consideration by other accident management procedure developers. These positive features include:

- extensive involvement of the plant staff in the development and implementation of the accident management procedures,
- independent review by Westinghouse of the work performed by the staff,
- organisation and equipment of the Technical Support Centre,
- availability of all documents related to accident management through the plant computer network,
- participation of plant staff in international workshops in the field.

A special example is the use of a full-scope simulator in the severe accident management area in addition to the usual training tools. The plant walkdown also showed that the buildings were well maintained and that tagging was very clear, which is viewed as positive in connection with local actions in case of accident situations. Last but not least, the readiness to be exposed to the review by a group of international experts is also considered a positive fact.

Since this was a pilot IAEA Review of Accident Management Program mission, its results are considered useful not only for the Krško NPP and the Slovenian nuclear safety authorities but also for the IAEA in that they provide an impulse for further improvement of the methodology for this type of IAEA service.

The IAEA Operational Safety Review Team (OSART) found that the senior management of the Krško NPP is committed to improving the operational safety and reliability of their plant with a long-term perspective. The team found that the Krško NPP has many areas of good performance which are above the industry standards, including the following:

- priority is given to safety at all levels with a focus on safety culture,
- the management of the plant has in-depth technical knowledge and strong background in nuclear plant operation,
- the plant has made effective use of computer technology to plan work, track activities and communicate within the plant,
- the safety culture is strong, driven from the top by efforts to encourage safety-oriented thinking in employers and contractors and by fostering an open relationship with the local community.
The OSART mission suggested some improvements. The most significant of these were:

- the industrial safety policy, practice and management involvement should be improved,
- the plant should further address the volume and storage of low level radioactive waste,
- the plant should enhance the use and adherence to procedures in the field.

Complete mission reports for RAMP in 2001 and OSART in 2003 are available on the SNSA web page:
- RAMP report (http://www.gov.si/ursjv/en/por_pris/ramp_ang.php);

**In conclusion, it should be pointed out that Slovenian regulations and practices are in compliance with the obligations of Article 6.**

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**Figure 6.1: The Krško NPP**
**Article 7**

**Legislative and Regulatory Framework**

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations.

2. The legislative and regulatory framework shall provide for:
   (I) the establishment of applicable national safety requirements and regulations;
   (II) a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a license;
   (III) a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licenses;
   (IV) the enforcement of applicable regulations and of the terms of licenses, including suspension, modification or revocation.

**7.1 Description of the Legislative and Regulatory Framework**

In July 2002 the Parliament of the Republic of Slovenia adopted a new Act on Ionising Radiation Protection and Nuclear Safety (Off. Gaz. RS, 67/2002 - hereinafter referred to as “2002 Act”). As defined in the first Article of this act, its main purpose is “to regulate ionising radiation protection, with the aim of reducing the detrimental effects on health and reducing to the lowest possible level radioactive contamination of the environment due to ionising radiation resulting from the use of radiation sources, while at the same time enabling the development, production and use of radiation sources and performing radiation practices”.

The 2002 Act entered into force on October 1, 2002. From that day two previous Acts ceased to apply, namely:
- Act on Radiation Protection and the Safe Use of Nuclear Energy (1984 Act), and

An Act amending the 2002 Act was adopted on 25 February 2003. It provides that the Slovenian Government shall prepare an amended National Program for the Protection of the Environment as regards radioactive waste and spent fuel management by the end of 2004 and submit it to the Parliament for adoption. The site for a low- and intermediate-level waste repository must be approved by 2008 and licensed for operation by 2013.

New amendments of the 2002 Act were adopted on 29 April 2004. The amendments were introduced to reflect the fact that from 1 May 2004 Slovenia is a Member State of the European Union. The aim of this last revision was mainly to harmonise the provisions of the act with the European Union’s legal requirements, especially in the area of shipment of radioactive waste and sources.

The 2002 Act also provides that the regulations which have been issued on the basis of the 1984 and 1980 Acts shall apply until new regulations, which are to be adopted pursuant to provisions of the
2002 Act, are issued. Based on the 1984 Act, eight regulations for carrying into effect radiation protection and four regulations for carrying into effect nuclear safety provisions are still in force.

With regard to other domestic acts and regulations which govern the nuclear, radiation, transport and radioactive waste management safety, as well as to those international instruments to which Slovenia is a party, there have been no important changes since the Second Review Meeting.

The comprehensive legislative and regulatory framework which governs the areas related to nuclear and radiation safety is attached to this report (Appendix II). It consists of the national legal frame and of those international instruments (multilateral and bilateral treaties, conventions, agreements/arrangements) to which Slovenia is a party.

Based on the 2002 Act, twelve decrees and regulations have been issued (Appendix II). All other decrees and regulations are expected to be adopted and issued in 2004 and early 2005.

The 2002 Act is adjusted to the demands of the European Union Acquis Communautaire in the field of radiation and nuclear safety. Complete transposition of the European Union directives into Slovenian legislation was achieved by the adoption of the Government Decree on Dose Limits, Radioactive Contamination and Intervention Levels and the Government Decree on Radiation Practices in April 2004.

### 7.2 Summary of Legislation

With regard to nuclear safety, the 2002 Act is the most important document, providing requirements for protection from the effects of ionising radiation and nuclear safety measures.

The definition of “nuclear safety” is given in paragraph 20 of Article 3: *Nuclear safety* shall mean technical and organisational measures which result in the safe operation of a nuclear facility, prevention of emergencies or mitigation of the consequences of emergencies, and which protect exposed workers, the population and the environment against ionising radiation.

Besides the main principles (among others also “primary responsibility for safety”, “the causer-pays principle”, “justification”, “optimisation”, “ALARA” and “the preparedness principle”) the 2002 Act includes, with respect to nuclear and radiation safety area, also provisions on:

- reporting an intention to carry out radiation practices or to use radiation source,
- licensing of the radiation practice or use of radiation source,
- classification of facilities (nuclear, radiation and less important radiation facilities),
- licensing procedures with respect to siting, construction, trial operation, operation and decommissioning of nuclear, radiation and less important radiation facilities,
- radioactive contamination and intervention measures,
- radioactive waste and spent fuel management,
- import, export and transit of nuclear and radioactive materials and radioactive waste and spent fuel,
- physical protection of nuclear materials and facilities,
- non-proliferation and safeguards,
- administrative tasks and inspection,
- penal provisions.
With regard to the prescribed measures on radiation protection or nuclear safety, facilities are to be classified into nuclear facilities, radiation facilities and less important radiation facilities; this is to be done based on the governmental decree which shall determine the criteria for the classification (Article 55). A basic selection of facilities classified as nuclear facilities has already been done by the Act itself, where in paragraph 22 of Article 3 a nuclear facility is defined as “a facility for the processing or enrichment of nuclear materials or the production of nuclear fuels; a nuclear reactor in critical or sub-critical assembly; a research reactor; a nuclear power plant and heating plant; a facility for storing, processing and depositing nuclear fuel or high radioactive waste; a facility for storing, processing or depositing low and medium radioactive waste. A nuclear facility shall also mean several of nuclear facilities when they are functionally linked in the same geographically confined territory and are managed by the same person.”

The 2002 Act separated the responsibilities for radiation protection between two authorities. The responsibility for supervision of nuclear safety in nuclear facilities and radiation practices outside medicine and veterinary activities lies with the Slovenian Nuclear Safety Administration, while the responsibility for supervision of radiation practices in medicine and veterinary activities lies with the newly established Slovenian Radiation Protection Authority (more in the next paragraph).

The licensing system can be divided into four steps after the preliminary condition (the planning of the location of nuclear facilities in the national site development plan) is fulfilled:

- application for the license for the use of land - the competent body is the Ministry of the Environment, Spatial Planning and Energy, with preliminary approval of radiation and nuclear safety - the competent body is the SNSA,
- application for the license to construct a facility - the competent body is the Ministry of Environment, Physical Planning and Energy, with an approval from the SNSA,
- application for the license for trial operation - the competent body is the SNSA,
- application for the operation and the decommissioning - the competent body is the SNSA.

More comprehensive licensing requirements are given in Appendix I.

### 7.3 Inspection and Enforcement

In accordance with Article 138 of the 2002 Act, inspection and enforcement of nuclear and radiation safety rests with the Slovenian Nuclear Safety Administration (SNSA). On the other hand, the Slovenian Radiation Safety Administration is in charge of inspection and enforcement of radiation practices and use of radiation sources in health and veterinary care. Inspection includes control over the implementation of the provisions of the 2002 Act, the ordered measures and the regulations and decrees issued in accordance with the 2002 Act.

Within the scope of inspection an inspector may:

- issue licenses and orders within the framework of administrative proceedings,
- order measures for radiation protection and measures for radiation and nuclear safety,
- order cessation of a radiation practice or use of a radiation source when it is established that an applicable license has not been issued or if the prescribed methods of handling a radiation source or radioactive waste have not been followed. Appeal against such a decision of an inspector does not prevent its execution.
An inspector may, prior to submitting a proposal for an institution of proceedings on a violation, seize the objects containing radioactive substances if he or she assesses that the handling thereof may cause health detriment to people or harm to the environment.

The 2002 Act has indeed only one article on inspection since there is a general Act on Inspection (Official Gazette of the RS, 56/02) which stipulates the general principles of inspection: its organisation, status, rights and duties of inspectors, inspection measures and other issues in relation with inspection, and which is to be followed also by nuclear and radiation safety inspectors.

The enforcement of applicable regulations and of the terms of the licenses is ensured by the application of penal provisions, inspection and provisions related to suspending of the operation of a nuclear facility, as provided for in Articles 115 and 116 of the 2002 Act. The SNSA may order the suspension of the operation of a nuclear facility on the initiative of a competent inspector or ex officio.

The SNSA orders the suspension of the operation of a nuclear facility on the initiative of a competent inspector when it can be concluded that the prescribed conditions for radiation or nuclear safety are not fulfilled and the licensee has not ensured their fulfilment within a reasonable period of time in spite of the request from the inspector to remedy the deficiencies.

The SNSA orders the suspension of the operation of a nuclear facility ex officio if the licensee did not submit for approval the changes and amendments of the evaluation of the protection of exposed workers against radiation within the prescribed period of time, or if the licensee has started maintenance work, testing or introducing modifications, which are significant for the radiation or nuclear safety of a facility, without the SNSA having given prior approval for this.

There is no right of appeal against the decision on suspension of the operation of a nuclear facility.

The elements of risk informed inspection are already partially incorporated into the current annual inspection program, like inspection assessment of the activities and events in the light of Probabilistic Safety Assessment (PSA) analysis, review and follow-up of shutdown safety regarding PSA of safety equipment operability with respect to the on-going activities status.
Article 8
Regulatory Body

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.

2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organisation concerned with the promotion or utilisation of nuclear energy.

The 2002 Act divided the competencies in nuclear and radiation safety among two regulatory bodies, namely the Nuclear Safety Administration (SNSA) and in March 2003 the newly established Radiation Protection Administration (SRPA). The SNSA is accountable for nuclear safety and safety of industrial radiation sources, while the SRPA is accountable for radiation protection of patients, medical surveillance of exposed workers, surveillance of workplaces, dosimetry and dose registers and education in the area of radiation protection. Besides this general division there are some parts of the legislative and regulatory framework referred to under Article 7 of this Report, which are entrusted to other institutions, i.e. the Administration for Civil Protection and Disaster Relief of the Ministry of Defence is accountable for emergency preparedness and planning, while the Ministry of Interior has the responsibility for physical protection.

8.1 Slovenian Nuclear Safety Administration (SNSA)

The SNSA, as a regulatory body in the area of nuclear and radiation safety, is a functionally autonomous institution within the Ministry of the Environment, Spatial Planning and Energy (hereinafter Ministry). The SNSA’s responsibilities and competencies are defined in the Governmental Decree on Organisations under the Responsibility of the Ministries:

The SNSA performs specialised technical and developmental administrative tasks and tasks of inspection in the area of radiation and nuclear safety, radiation practices and use of radiation sources (except in health and veterinary care), protection of the environment against the ionising radiation, physical protection of nuclear materials and nuclear facilities, non-proliferation of nuclear weapons and safeguards of nuclear goods; the SNSA furthermore monitors the radioactivity in the environment and third party liability.

The precise competencies of the SNSA and other relevant administrations, which are entrusted with the implementation of the legislative framework, are prescribed in particular in the 2002 Act and the documents listed in Appendix II.

The SNSA is organised into six divisions. These are (the number in brackets denotes the number of staff in the respective division):
- Division of Analysis and Consulting (5),
- Division of General Affairs (5),
- Division of Nuclear Safety (12),
- Division of Radiation Safety and Materials (14),
- Division of International Co-operation (5),
- Inspection (6).

According to the current organisational chart approved by the Government in 2003, depicted in Fig. 8.1, 48 permanent staff positions and two interns are foreseen for the SNSA for the years 2004 and 2005.
The budget of the SNSA is determined on the basis of the realisation of the previous year, taking into account new needs which have to be well justified. The budget is the only source for financing the SNSA’s basic activities. There are very limited extra budgetary sources, i.e. within the licensing process for some direct costs.

Although the SNSA is within the Ministry, it still has its own share in the Ministry’s budget and is independent in allocating the programs, projects and other expenses from the budget. The composition of the SNSA’s budget for 2004 is shown in Table 8.1.

### Table 8.1: SNSA’s budget for 2004

<table>
<thead>
<tr>
<th>Structure</th>
<th>in million SIT</th>
<th>in million USD*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>317,960</td>
<td>1,693</td>
</tr>
<tr>
<td>Material expenses</td>
<td>73,570</td>
<td>0,392</td>
</tr>
<tr>
<td>Investments</td>
<td>19,272</td>
<td>0,103</td>
</tr>
<tr>
<td>Membership fees (IAEA, OECD/NEA membership, USNRC programs)</td>
<td>62,000</td>
<td>0,330</td>
</tr>
<tr>
<td>Outsourcing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear safety</td>
<td>63,569</td>
<td>0,338</td>
</tr>
<tr>
<td>Radiation safety</td>
<td>37,537</td>
<td>0,200</td>
</tr>
<tr>
<td>PHARE Assistance</td>
<td>302,088</td>
<td>1,609</td>
</tr>
<tr>
<td>Total</td>
<td>875,996</td>
<td>4,665</td>
</tr>
</tbody>
</table>

* exchange rate as of January 2004

### 8.2 Other Regulatory Bodies

The 2002 Act gives the competence in the area of radiation practices and use of radioactive sources in heath and veterinary care to the Slovenian Radiation Protection Administration (SRPA), which was established in March 2003 within the Ministry of Health. The SRPA responsibilities and competencies are also generally defined in the above mentioned Governmental Decree on Organisations under the Responsibility of the Ministries.

The SRPA performs technical, administrative, inspection and development tasks in the area of radiation practices and use of radiation sources in health and veterinary care; health protection of people against detrimental effect of ionising radiation; systematic inspection of working and living premises due to exposure of people to the natural radiation sources; implementation of monitoring of radioactive contamination of foodstuffs and drinking water; reduction, restriction and prevention of health detrimental effects of non-ionising radiation and assessment of compliance and authorisation of radiation protection experts.

Besides SNSA and SRPA, also some other administrations, ministries and other organisations are entrusted with the implementation of the 2002 Act, in particular:

- The Civil Protection and Disaster Relief Administration (within the Ministry of Defence) for the off-site emergency planning is, as the operator of the National Notification Centre responsible for notification procedures in the event of radiological emergency,
- Ministry of Interior, inter-alia, has competencies in the area of physical protection of nuclear materials and nuclear facilities in general (while the SNSA only approves the safety analysis
report - to which the plan of physical protection is attached as a separate and restricted document),
- Agency for Radwaste Management,
- The Fund for Decommissioning of the Krško NPP,
- the Nuclear Insurance and Reinsurance Pool,
- Technical Support Organisations.

The position of the SNSA and the SRPA, as well as Civil Protection and Disaster Relief Administration and Ministry of Interior, in the governmental structure is in Fig. 8.3.

Based on the 2002 Act, the Expert Council for Radiation and Nuclear Safety was appointed in mid 2003 as an advisory body to the Ministry of Environment and the SNSA, and the Expert Council for the Protection of the People against the Ionising Radiation, for radiological procedures and use of radiological sources in health and veterinary care, as an advisory body to the Ministry of Health and SRPA.

Figure 8.3: The SNSA and SRPA within the governmental structure

8.3 Independence of the SNSA and the SRPA

The Slovenian Nuclear Safety Administration (SNSA) is an administrative body in the structure of the Ministry of the Environment, Spatial Planning and Energy, which was established to perform administrative, inspection and other control tasks. The SNSA is independent in its professional decisions. Licensees may appeal to the Ministry of Environment, but the 2002 Act prevents appeals to the Ministry for some decisions. The SNSA may draft regulations which could be adopted and passed either by the Minister or the Government. The Director of the SNSA may issue legal acts, i.e. decisions to the licensees. The Inspection for Nuclear Safety is independent and is not part of the Inspectorate for the Environment, Spatial Planning and Energy, which comprises all other inspections within the Ministry of the Environment, Spatial Planning and Energy. The SNSA has its own budget, which is part
of the budget of the Ministry of the Environment, Spatial Planning and Energy. The SNSA is a direct
user of the state budget, which means that its budget is public. Independent technical expertise in
the relevant areas is available in the SNSA. The 2002 Act also enables independent financing of tech-
nical support organisations. The SNSA has the authority to communicate independently its regulato-
ry requirements, decisions and opinions to the public; it may independently liaise with regulatory
bodies of other countries and with international organisations to promote co-operation and
exchange of regulatory information.

A similar arrangement applies to the Slovenian Radiation Safety Administration (SRPA), except that
it is a part of the Ministry of Health.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of
Article 8.
Article 9
Responsibility of the Licence Holder

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.

Slovenia fulfils its commitment given in the second national report to incorporate explicit provision on prime responsibility of the licence holder into the 2002 Act.

Article 4 (the principles of the Act) of the 2002 Act provides, in paragraph 6:
“The user of a radiation source shall be responsible for radiation protection and the facility operator shall be responsible for the nuclear safety of a nuclear facility (the principle of prime responsibility).”

Throughout the 2002 Act there are several provisions designed for the execution of the above stated principle:

- Article 57 (prohibition and ensuring safety of a facility) provides that a nuclear facility, a radiation facility or a less important radiation facility may not be constructed, tested, operated or used in any other way, or permanently cease to be used without a prior approval or licence pursuant to the 2002 Act. Furthermore it provides that the safety of a concerned facility, including the safety of radioactive substances, radioactive waste or spent fuel management, which are found or produced in a facility, must be ensured by the operator.
- An operator of a radiation or nuclear facility must also ensure that programs of recording and analysing operational experience at nuclear facilities are implemented (Article 60). In the assessment, examination and improvement of radiation and nuclear safety the operator must take into account the conclusions of such programs.
- The execution of the prime responsibility of the licence holder for the safety is provided also through the division of costs for the protection against ionising radiation and nuclear safety between the licence holder and the state (Article 132, 133). As a main rule the Act provides that the person carrying out radiation practices and the operator or user of a radioactive source shall cover the costs of their own measures relating to radiation and nuclear safety in accordance with the 2002 Act.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 9.
Article 10
Priority to Safety

Each Contracting Party shall take the appropriate steps to ensure that all organisations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

10.1 General Approach to Safety

The priority to nuclear safety is given in the general principles of the 2002 Act, which regulates the protection against ionising radiation in order to reduce the detrimental effects on health and reducing to the lowest possible level radioactive contamination of the environment, the implementation of nuclear safety measures and also, in the case of use of nuclear materials, special protection measures. The Act defines nuclear safety as “technical and organisational measures which result in safe operation of a nuclear facility, prevention of emergency events or alleviation of the consequences of emergency events, and which protect exposed workers, the population and the environment against ionising radiation”. The principles and priorities of nuclear safety remained the same since the Second Review Meeting.

Safety culture at the Krško NPP was extensively described during the Second Review Meeting. The plant policy on safety culture is defined in documents such as: Quality Assurance Plan, Plant Management Manual, Krško NPP Policies and Goals, Company General Employee Training Handbook, Operating Experience Assessment Program, Codex on Safety and Business Ethics etc. In 2003 there were two major reviews of safety culture at the Krško NPP, the Periodic Safety Review and the IAEA Operational Safety Review Team mission.

The Government invited the IAEA Operational Safety Review Team (OSART) to enhance safe operation of the Krško NPP in 2003. For the first time safety culture was evaluated as a separate area. The overall impression by the team was that the plant has a strong safety culture, driven from the top down with conscious efforts to inculcate the safety thinking in employees from the very start, by sharing of vision and standards in long-term partnership with subcontractors and by fostering an open and good relationship with the local community. A stable workforce with long experience in the plant has facilitated these developments.

The Agreement between Slovenia and Croatia on the Krško NPP in 2003 has defined that operation of the Krško NPP is directed by a management team consisting of two members, where the president is a Slovenian and the other member is a Croatian. In case of a disagreement between the two members, the president holds a decisive vote to implement his decision if such disagreement could jeopardise the safety of operation of the plant.

Monitoring of the routine plant operation is achieved by the line management through daily meetings.
A nuclear safety overview is achieved through the function of different committees and departments, such as the Krško Operating Committee, the Krško Safety Committee and the Independent Safety Engineering Group (ISEG). The ISEG performs an extensive indicator program which is based on the World Association of Nuclear Operators (WANO) performance indicators and IAEA INSAG Safety Culture Indicators.

Independent reviews of outage activities and surveillance tests are performed by the Technical Support Organisations (TSO). The TSOs are engaged for the inspection, witnessing and safety evaluation of refuelling, surveillance and modifications activities. The safety analysis and the safety assessment of plant changes which impact Technical Specifications are also reviewed by the TSOs.

The plant operation is carefully controlled by trained personnel who operate it in accordance with approved procedures. A maintenance, test or modification requirement is processed through a detailed planning and scheduling system. Throughout this process all nuclear safety activities receive careful consideration based on Standard Technical Specification parameters, supported by the Probabilistic Safety Analysis. During the outage, the Outage Risk Assessment Management (ORAM) computer code is used.

In the area of Severe Accident, important steps are taken with respect to mitigation of severe accidents. Plant-specific Severe Accident Management Guidelines (SAMGs) are being prepared, based on the Westinghouse Owners Group’s SAMG and a plant-specific Probabilistic Safety Analysis Level 2 study.

Permanent safety improvements are made by a number of modifications. All changes are evaluated for licensing applicability in accordance with the criteria defined in the United States 10 CFR 50.59. For that purpose an administrative procedure, the Authorisation of Changes, Tests and Experiments, was developed.

The role of training has been fully recognised by the Krško NPP management and is reflected by the number of training programs. The Systematic Approach to Training is accepted as the best currently available method. From similar power plants in the United States the Job and Task Analysis is being used as a basis to determine many of the training requirements for the personnel at the Krško NPP.

10.2 Safety Culture Assessment at the Krško NPP

The Krško NPP policy is that all the plant staff shall constantly be alert to opportunities to reduce the risks to the lowest practicable level and to achieve excellence in plant safety. The Periodic Safety Review (PSR) also evaluated the plant risk profile through the Human Reliability Analysis. Safety Culture was incorporated into the periodic review as a separate factor, covering the following topics: Organisation, Administration and Management aspects; Attitude of personnel; Quality assurance; Configuration management; Human resources and staffing and other human performance aspects. After the implementation of corrective actions the permanent risk reduction measures shall improve the current safety level.

The conclusion of the Periodic safety review was that the nature and extent of the programs and
organisational/management arrangements that contribute to safety culture at Krško NPP are satisfactory and reflect good practice. Only a small number of issues of low safety significance have been identified that can be resolved by changes in the existing procedures or development of new procedures, changes in management and administrative practices, etc.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 10.
**Article 11**

**Financial and Human Resources**

1. Each Contracting Party shall take the appropriate steps to ensure that adequate financial resources are available to support the safety of each nuclear installation throughout its life.

2. Each Contracting Party shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training and retraining are available for all safety-related activities in or for each nuclear installation, throughout its life.

The licensee has the prime responsibility for the safety of the nuclear power plant. This responsibility includes providing both adequate financial and human resources to support the safety of the power plant throughout its life.

**11.1 Financial Resources**

The 2002 Act introduced as one of the main principles the “causer pays” principle (paragraph 7 of article 4):

“the user of a radiation source shall cover all costs related to the radiation protection measures in accordance with this Act, the preparedness for emergencies and intervention measures, as well as the costs of mitigation of the consequences of an emergency”.

Based on this principle the 2002 Act introduced a provision (article 61) which relates strictly to the obligation of the operator of a radiation or nuclear facility to ensure sufficient financial resources guaranteed throughout the operating lifetime of a facility for implementing the prescribed measures of radiation and/or nuclear safety.

Such financial resources must be guaranteed to the operator by the current owner of the facility, to the level of all operational costs as well as costs of maintenance investments, including investments in technological renewals relating to the measures of radiation or nuclear safety.

For the time being the Krško NPP operator is allotted enough financial resources by their owners for maintaining the appropriate level of nuclear safety, the Slovenian state owned electrical utility and the Croatian state owned electrical utility.

The suitability of ensuring financial resources, the amount thereof and the forms of warranties, as well as the method to be used for the enforcement of warranties are assessed by the SNSA during the procedure for issuing the operation license for a radiation or nuclear facility.

Financing of measures for the protection against ionising radiation and nuclear safety is prescribed in Chapter 12 of the 2002 Act, where division between the regular (and extra) costs of the user of a radiation source (Article 132) and the public expenses (Article 133,134) is defined.
Besides other explicitly itemised tasks and measures, the operator of a radiation source must cover also the costs of ensuring the sufficient number of qualified workers involved in the operation of a radiation or nuclear facility.

Adequate financial resources for the decommissioning of Krško NPP and for the construction of a repository are ensured by the provisions of the Act on the Fund for Financing Decommission of the Krško NPP and Disposal of Radioactive Waste from the Krško NPP (adopted in 1994). The levy for every kWh of Slovenian share of electric energy produced by Krško NPP is regularly contributed to the Slovenian fund for decommissioning.

In the case of a nuclear accident financial resources to compensate the claim are provided through the Slovenian third party liability legislation and through Nuclear Insurance and Reinsurance Pool, taking into account that in 2001 Slovenia became a party to the Paris Convention on Third Party Liability in the Field of Nuclear Energy, and in 2003 also a Party to the Brussels Supplementary Convention.

In conclusion, the Slovenian regulations and practices are in compliance with Article 11, paragraph 1.

11.2. Human Resources, Training and Qualification

11.2.1 Krško NPP

The total number of the Krško NPP staff at the end of year 2003 was 627, adequately covering all necessary functions for the technical operation, including QA, training and engineering. There are 6 operations shifts with a minimum shift composition of 5 licensed operators per shift, including an on-duty shift engineer.

Training and qualification activities at the Krško NPP are governed by:
- the new 2002 Act,
- the plant Updated Safety Analysis Report, applicable plant procedures,
- the annual training program, approved by the SNSA.

The education and training requirements are outlined in the Updated Safety Analysis Report, Chapter 13.2 “Training”. The process is further detailed in the administrative procedure Training and Qualification of the Krško NPP Personnel. Further training procedures cover specific areas, such as the Licensed Operator Training Program, the Non-licensed Operator Training Program, the Health Physics Training Program, etc.

In addition to this, the Krško NPP personnel are trained and examined using other relevant standard industry guides in areas like welding, specific equipment and machinery operation, and safety at work.

In general, training programs are divided into initial and continuous training. In addition to the training of the Krško NPP personnel, specific training courses are conducted for subcontractors,
specifically in the area of General Employee and Radiation Protection training, and specific Work practices.

Since the commissioning of the full scope replica simulator in the Krško NPP training centre the licensed operator training program is completely implemented in-house. The continuing training for licensed personnel consists of multiple weekly training segments (typically 4 per year) which comprise a two-year cycle of requalification training. Each day of training consists of classroom lecture topics and practical simulator exercises.

Initial licences and their renewals are obtained based on examinations conducted by the SNSA’s Board of Experts for Operators Exams.

In 2002 the first group of operations personnel successfully finished their entire training program for reactor operator on the Krško NPP full scope simulator.

In addition to training the full scope simulator is used also for other purposes. The Severe Accident Management Guidelines were validated on the Krško full scope simulator in 2001. Some unusual events were analysed and corrective actions were proposed with emphasis on human performance. Identification of procedures shortcomings and their improvement is a continuous process. Validation of the new Fire response procedures for the case of main control room evacuation caused by fire was performed on the simulator in 2003.

The Krško NPP will continuously update the full-scope simulator configuration commensurate to plant changes (model improvements), and maintain and develop training programs in compliance with international practice, regulation and trends, as well as plant specific needs and situations. In parallel, also the level of knowledge and skills of the simulator instructors is constantly being maintained and improved.

There are other types of training courses that are conducted for specific areas like Refuelling Operations training, Maintenance training, Engineering training, Radiation Protection training, Chemistry training, Security training, Emergency Preparedness training etc.

Maintenance personnel training is conducted in a dedicated maintenance training centre by using the Krško NPP own resources (instructors and subject matter experts), or by contracting such services from certified institutions or equipment vendors. Supervisory and technician level personnel are also specialised at various equipment vendor training facilities.

11.2.2 Slovenian Nuclear Safety Administration and Technical Support Organisations

The Slovenian Nuclear Safety Administration (SNSA) recruits mainly experienced staff, with several years of adequate experience in other institutions. In addition, the SNSA is making sure that every employee goes through at least two months of initial training relating to nuclear technology in the Nuclear Training Centre in Ljubljana or in Chatanooga, USA, and that several times per year they take part in international workshops on topics related to their areas of work. In the year 2003, special training was also conducted for the SNSA personnel involved with the Krško NPP - classroom training.
and simulator training with emphasis on plant design transients and accidents. One of the young SNSA employees is also going through the complete initial operator training at the Krško NPP.

The training of personnel of the Technical Support Organisations is organised according to the type of each institution. They also have access to international workshops, to training courses at the Nuclear Training Centre in Ljubljana and similar events. Furthermore, the 2002 Act stipulates that the training of the TSOs shall be funded from the national budget.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 11.
Article 12
Human Factors

Each Contracting Party shall take the appropriate steps to ensure that the capabilities and limitations of human performance are taken into account throughout the life of a nuclear installation.

12.1 Legal Requirements

Slovenian legislation covers the human factor issue in Article 62 of the 2002 Act, which defines workers’ qualifications and physical as well as psychological requirements. Workers’ conditions must be regularly checked. The employer must also ensure regular updating of the workers’ professional knowledge. Regulation E-3 further elaborates some of these requirements. For the work in a radiation or nuclear facility a permit is issued to the workers for a maximum of 5 years. Health surveillance of exposed workers is dealt with in Article 39 and review of the assessment of fitness to work in Article 42 of the 2002 Act.

12.2 Licensee Methods and Programs at the Krško NPP

The methods of dealing with human factor issues at the Krško NPP were extensively described at the Second Review Meeting. The methods which are used to prevent, detect and correct human errors are covered by the Operating experience assessment program, which is supported by procedures such as the Deviation Report, the Root Cause Analysis etc. Analysis of human errors is performed by the Independent Safety Evaluation Group. Man-machine interface issues are covered by the Human factors engineering design guidelines, based on ANSI/HFS 100-1988, NUREG-0700, and other documents.

In 2003 there was a detailed review of human factor issues in the scope of the Periodic Safety Review (PSR). PSR established that in the area of human factor the Krško NPP practice is generally consistent with the basic requirements provided in the IAEA guidelines and the current good practice.

The current status of man machine interface features is compliant with the current industry practice of the United States Nuclear Regulatory Commission and the American Nuclear Society, through the plant procedures (e.g. Human Factor Engineering Guidelines, Process Control and Process Information Systems Man Machine Interface). The Main Control Room, the Remote Shutdown Panel, and other important locations are designed according to human factor engineering principles. The man machine interface related upgrading programmes conducted recently were comprehensive. Regular inspections and periodic reviews of these features are conducted and deviation reports are issued in case where human error may be a contributing factor. Operator’s performance trends are evaluated and monitored. The human error trending analysis is performed by the Independent Safety Evaluation Group; so far no concerns relating to this have been indicated.
There is a systematic, well defined, and properly documented approach to job and task analysis that covers all safety related tasks performed at the plant. The process focuses on the establishing/enhancement of training requirements relating to the task; the use of insights in other areas such as physical, psychological and cognitive demands, potential consequences of failure to perform and other is limited. The Periodic Safety Review of the human factor concluded that this limitation may have influence on the potential use of the task analysis results.

Human performance aspects are taken into consideration in setting up the organisation and management of the plant. There are arrangements such as: Quality Assurance Plan, Plant Management Manual, Krško NPP Policies and Goals, Company General Employee Training Handbook, Operating Experience Assessment Program, and others, which focus on developing, communicating, understanding, and monitoring of the strategy to improve safety. These arrangements also cover reporting and analysis of human induced incidents at the NEK and feedback on the lessons learnt regarding plant operation procedures and training programmes.

Staff workload is strictly regulated for the control room personnel. Workload for the other staff members is regulated by the Slovenian legislation, and overtime is limited to 8 h/week, 20 h/month, and 180 h/year. Two plant procedures deal with working time and salaries. Responsibilities for controlling the workload of the personnel according to the procedures are with the Heads of Departments Heads. Overall monitoring of actual workload for the plant personnel is performed by the Division of Administration on a monthly basis. The staff turnover is rather low and is mostly due to retirement.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 12.
Article 13
Quality Assurance

Each Contracting Party shall take the appropriate steps to ensure that quality assurance programmes are established and implemented with a view to providing confidence that the specified requirements for all activities important for nuclear safety are satisfied throughout the life of a nuclear installation.

13.1 SNSA Quality Management System

In the year 2001 the decision was made to start with the preparation and implementation of an internal quality management system triggered by international experience and by the policy of the Slovenian Government to introduce a quality system in public authorities. It was agreed to develop the system in accordance with the standard ISO 9000:2000. As a supplement to this, the requirements defined in IAEA-TECDOC-1090 “Quality Assurance within the Regulatory Bodies” and IAEA Safety Series No. 50-C/SG-Q were implemented.

The commitment of the SNSA management to the development and implementation of the quality management system is reflected in adjusting the organisational structure by adding the function of a quality manager. At the end of the year 2001, members of the Quality Board and the Project Team were appointed. In 2002, the SNSA internal procedure was accepted, defining the responsibility of every employee for the implementation, maintenance and improvement of the quality management system within the scope of his or her activities. Training on quality of the SNSA employees was also performed during that period of time.

- The SNSA quality management system is built according to the processes that represent the implementation of the core functions of the SNSA.

The SNSA is in the phase of documenting and at the same time improving the existing processes, which are gathered in the second level documentation. Simultaneously, the third level documentation is also prepared when particular activities have to be prescribed.

13.2 The Krško NPP Quality Assurance System

The 2002 Act requires explicitly that the operator of a radiation or nuclear facility must, with a view to quality assurance, set up and implement a quality assurance programme.

The Krško NPP as the license holder is responsible for the overall quality of the design, construction, operation, maintenance and modification of the NPP. The quality assurance programme was implemented already for the design and construction of the plant, and was in full compliance with: the United States Atomic Energy Commission Appendix B to 10 CFR 50 Quality Assurance Criteria for NPP
and Fuel Reprocessing Plant and the QA guidance provided in WASH 12833 Guidance on QA Requirements During Design and Procurement Phase of Nuclear Power Plants and in WASH 1309 Guidance on QA Requirements During the Construction Phase of Nuclear Power Plants, both issued in 1974.

The Krško NPP Quality Systems Manual consists of six documents:
- Internal Policy and Goals of the Quality Systems Division,
- Krško NPP Quality Assurance Programme,
- Quality Control Programme,
- Training Programme of the Krško NPP Personnel in the Area of Quality Assurance,
- Programme of Inspection of the Secondary Systems - Erosion/Corrosion,
- Programme of Inspection of the Fire Protection System.

The Krško NPP Quality Assurance Programme is implemented and maintained to comply with the following codes and standards:
- 10CFR50, Appendix B,
- ANSI N 18.7-1976,
- ASME B&PV Code, Section III, NCA-4000;
- ANSI/ASME NQA-1,
- IAEA 50 C QA,
- Regulation E-1 from the year 1988.

It consists of the Statement of Policy and Authority, the QA Plan, and associated procedures. The Statement of Policy and Authority, issued by the Krško NPP Management Board, declares the overall policy for the Krško NPP, i.e. “to operate the Krško NPP in a manner which ensures the safety and health of the public, and the personnel on site”. This policy includes also a commitment that the Krško NPP shall comply with all the relevant codes, standards and guides applicable to the operation of the Krško NPP.

The Quality Assurance Programme includes all planned and systematic actions taken by the Krško NPP, including the suppliers, contractors and consultants, which provide adequate confidence that the structures, systems and components shall perform the intended safety function in a satisfactorily manner. The programme consists of the Quality Assurance Plan and applicable procedures, and is mandatory for all activities affecting safety-related functions of the nuclear power plant structures, systems and equipment. This can also be applied to non-safety-related items as deemed appropriate by the plant management.

The QA Plan is a top-level quality document for operational phase activities. The requirements, identified by the QA Plan, are implemented according to management directives, programs, plans, procedures or instructions, grouped in plant level manuals, division level manuals and department level manuals and programs.

The Quality Systems Division is responsible for:
- Design Modification Control,
- Procurement documents control,
Article 13 Quality Assurance

- QA review of Plant Procedures,
- Document Control,
- Procurement control,
- Control of special processes,
- Inspection control,
- Audits.

The Quality Systems Division is also responsible for executing and reporting on the effectiveness of the QA Program implementation to the Management Board.

Changes to the description of the QA Programme in section 17 of FSAR and to the QA programme as a separate document are subject to notification of and review by the SNSA prior to implementation.

Revision 4 of the Quality Assurance Plan of 1 April 1999 was the basis for the review within the scope of the Periodic Safety Review (PSR) project. Besides updating the Plan so as to be in compliance with the new organisation, the issues identified by an independent review of the PSR Chapter 4.2. Quality Assurance was also taken into account. The Krško Quality Committee, with the responsibility of advising the Management Board by providing an independent review and audit of QA implementing practices, and the Krško Safety Committee auditing of the QA Program were introduced. New Revision 5 was prepared and approved by the Management Board with the effective date 15 August 2003.

During the OSART mission at the Krško NPP in 2003, one recommendation was issued in the area of quality assurance which aims at plant senior management and requests them to take actions to ensure that the quality assurance functions provide an effective barrier to a potential decline in plant performance. The recommendation further states that “all quality assurance functions should be covered and there should be a common understanding of these functions across the plant”.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 13.
Article 14
Assessment and Verification of Safety

Each Contracting Party shall take the appropriate steps to ensure that:

(I) comprehensive and systematic safety assessments are carried out before the construction and commissioning of a nuclear installation and throughout its life. Such assessments shall be well documented, subsequently updated in the light of operating experience and significant new safety information, and reviewed under the authority of the regulatory body;

(II) verification by analysis, surveillance, testing and inspection is carried out to ensure that the physical state and the operation of a nuclear installation continue to be in accordance with its design, applicable national safety requirements, and operational limits and conditions.

14.1 Comprehensive and Systematic Safety Assessment

14.1.1 Regulatory Requirements

Assessment of safety before the construction of a nuclear facility is assured through provisions of the 2002 Act. It is ensured through the provision that an application for license shall contain project documentation, Safety Analysis Report and opinion of an appointed expert for radiation and nuclear safety.

The Safety Analysis Report must be amended when changes of the situation arise during the construction or decommissioning of the facility or during the period of trial operation.

Although the 2002 Act was adopted, the secondary legislation regulating the licensing has not changed, therefore all provisions of secondary legislation in relation to licensing remained the same as was reported during the First and the Second Review Meeting.

The licensee of a nuclear facility must ensure regular, full and systematic assessment and examination of radiation or nuclear safety of a facility by the periodic safety review (Article 81 of the 2002 Act).

In accordance with Article 82 of the 2002 Act the operator must draw up a report on the periodic safety review and hand it over to the SNSA for approval.

If the findings of a periodic safety review require changing of the conditions of operation or the limitations from the safety analysis report in order to improve radiation or nuclear safety, the licensee must draw up a proposal for the required changes. The report on the periodic safety review, approved by the SNSA, shall be a condition for the operating licence renewal.
14.1.2 Implementation

At the Krško NPP, a comprehensive program is established for design modification control, which defines roles and responsibilities of the site organisational units involved in the Plant Modification Process. Guidance is provided on the steps to be taken in performing plant modifications; this guidance is provided to the contractors as well. Screening criteria for determining the need for safety evaluations, guidance for performance of these safety evaluations and requirements for documentation review and approval are specified in accordance with United States 10 CFR 50.59.

A set of about 20 procedures cover all aspects of design modifications, from the request, prioritisation, safety screening, preparation of the design package, review, preparation of installation package, to the evaluation of impact, testing/commissioning requirements, documentation revision and modification hand over.

Control of temporary modifications is done through a specific procedure which requires safety screening and evaluation similarly to the one for permanent modifications.

The adequacy of the Krško NPP design modification process has been proven in practice through several major modifications.

Two major licensing activities in the period since the Second Review Meeting were:
- In the frame of the steam generator replacement project, the Krško NPP submitted to the Slovenian Nuclear Safety Administration in 1998 the application for licensing the Leak Before Break methodology in the replacement analysis and the power upgrading. In 2003 SNSA issued the license for the implementation of the Leak Before Break methodology, based on the performed analysis, the Krško NPP’s implementation of leakage detection in the primary reactor coolant system and international practice.
- In February 2004, the Krško NPP submitted to the Slovenian Nuclear Safety Administration an application for licensing of the Snubbers Reduction Program, which will start during the 2006 outage. The decision of the SNSA has not been issued yet.

14.2 Verification of Safety

The activities related to verification of safety, including the surveillance program stipulated by the Technical Specifications, were extensively described during the Second Review Meeting.

The Krško NPP follows the United States regulations and other international practices. It has implemented different programs used for the verification of the state of a nuclear power plant such as: In-Service Inspection (ISI) Program, Preventive Maintenance Program, Surveillance Testing Program, Erosion Corrosion Monitoring Program, specific programs due to accident analyses, Ageing Management Program, surveillance program of reactor pressure vessel material, etc. Evaluation results are available to the technical support organisations for review and assessment.

The extensive Operational Experience Feedback program for the plant is described in detail in Chapter 19 of this report.
**In-Service Inspection, Corrosion and Erosion Monitoring programs** are created by plant specialists for the primary and secondary side and are performed by the plant’s specialists and subcontractors. All programs are in compliance with the regulatory policy 10 CFR50.55 and ASME Code XI, Amendment 8. In Service Inspection results are reviewed and evaluated after each outage. The procedure for the correction of deviations has been established.

**Maintenance activities** at the Krško NPP are carried out by the Maintenance Department, which is also responsible for the management of contractors in the maintenance area. The long-term maintenance plans look 5 years ahead and take into account the material condition status of the plant. Preventive maintenance programs are based on the recommendations of the vendor manuals, industrial experiences obtained and the Preventive Maintenance Optimisation Analysis. Preventive maintenance programs are evaluated on the basis of plant cycles. The evaluation and modification of these programs are also based on the feedback and experiences obtained from predictive and corrective maintenance results. The trending and feedback are used for corrective actions in order to improve the material conditions of the equipment.

**Predictive Maintenance Program** is based on timely implementation with respect to previous results. Different predictive maintenance techniques are used to evaluate the equipment status. A list of equipment subject to the predictive maintenance programmes is established and maintenance cycles are defined.

Monitoring the effectiveness of maintenance is implemented by the **Maintenance Rule** program. Performances or conditions of structures, systems and components are evaluated and reported quarterly by the Maintenance Rule Expert Panel since mid-2001. Maintenance rule scooping, performance criteria and implementation are performed according to updated procedures.

There are several programs concerning the life-time management. Degradation processes have not been comprehensively identified. It would be beneficial to create a common, integrated program in order to ensure a focused approach to this issue. An ‘**Ageing Management Program**’, as a contribution to the 10-year Periodic Safety Review, phase 1 (Scooping and Screening), has been completed. The list of components that are susceptible to ageing degradation which could affect plant safety was established and the flowchart for re-evaluation of affected components for the second phase was prepared.

The Krško NPP maintains a “living” Probabilistic Safety Assessment (PSA) model. The description of recent activities in the area of PSA is given in Chapter 6.

### 14.3 Regulatory Surveillance

Besides daily control of facility operation and consideration of operational limits, both the personnel of the power plant and the regulatory body continuously control the nuclear safety status through additional activities. An example of this was examination of the reactor vessel head penetrations, triggered by the SNSA when damages were discovered at the Davis Besse power plant in March 2002.
Based on the information from the United States regulatory body for nuclear safety, the Slovenian Nuclear Safety Administration called upon the Krško NPP to check the penetrations of control rod drive mechanisms through the reactor vessel head. During a visual inspection deposits around the penetrations were found. Samples were taken and it was established by radiochemical analysis that the deposits had not been caused by leakage but had been deposited there by the ventilation system. Also no damages of the reactor vessel wall were found. Due to the modifications performed to date, it was impossible to remove completely the reactor head insulation and to directly visually examine all of the penetrations. Therefore the direct and indirect visual examination were combined and, by the use of an endoscope, indirect visual examination of inaccessible penetrations and of the reactor head surface was performed. With the eddy current method, 36 of the 40 penetrations were examined but there were no indications that would require reporting.

The Slovenian Nuclear Safety Administration carries out its surveillance responsibilities with a combination of inspections, scrutiny of documents, approval of modifications to the license, approval of modifications to the plant, and regular monitoring and evaluation of the station’s performance. During the refuelling period, Technical Support Organisations are engaged to cover (inspect and evaluate) parts of plant maintenance and testing. The Slovenian Nuclear Safety Administration does not have resident inspectors on site. Inspectors, who are based at their headquarters in Ljubljana about 100 km from the plant, visit the facility about twice a week. Yearly there are about 100 inspections on site during non-outage years and there is an additional daily presence during outages.

Independently from the Krško NPP, the SNSA analyses those operational events in the plant which could have safety significant root causes. The findings are extensively discussed with the plant personnel and the conclusions are presented to the Krško NPP staff.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 14.
Article 15 Radiation Protection

Each Contracting Party shall take the appropriate steps to ensure that in all operational states the radiation exposure of the workers and the public caused by a nuclear installation shall be kept as low as reasonably achievable and that no individual shall be exposed to radiation doses which exceed prescribed national dose limits.

15.1 Dose Limits and Control of Occupational Exposure

New limits of occupational and public exposure have been set in the Decree on dose limits, radioactive contamination and intervention levels (Official Gazette No. 49/04). The dose limits follow the IAEA Standard Series No. 115. The limit for effective dose is set to 20 mSv per year. For specially authorised exposures in exceptional circumstances, a higher limit can be allowed but not higher than 50 mSv per year and 100 mSv in five consecutive years. The limit for apprentices and students is 6 mSv/year.

In the year 2000 a computerised registration system of occupational radiation exposure was established and is governed by the SRPA. About 4500 radiation workers in Slovenia are registered and their dosimetric data have been collected from dosimetric service providers. Around one thousand workers (plant personnel and outside workers) are under dosimetric control in the Krško NPP each year.

Figure 15.1: Collective dose in the Krško NPP in the period of 1996-2003
Figure 15.1 shows collective doses in the Krško NPP in the period 1996-2003. A substantial increase appeared during the period 1997-2000 when maintenance work and modernisation of the plant took place: in the last year of this period both steam generators were replaced. In the recent years collective doses reached the values usually reported for pressurised water reactors. The maximum annual effective dose in that period was 15.81 mSv, received by an outside worker in the year 2001. The distribution of annual individual effective doses is shown in Figure 15.2.

![Dose distribution in the Krško NPP in 2003 (MDL = Minimum Detectable Level)](image)

Figure 15.2: Dose distribution in the Krško NPP in 2003 (MDL = Minimum Detectable Level)

The general annual dose limit for members of the public is 1 mSv. In special cases it could be higher but the average value in 5 consecutive years should not exceed the general limit of 1 mSv. The authorised dose limit for normal operation of the Krško NPP to members of the general public living outside a 0.5 km radius was set to 50 micro Sv per year due to radioactive discharges, taking into account all pathways of exposure, and additionally to 200 micro Sv/y due to external radiation from the plant facilities.

15.2 Radioactive Discharges and Environmental Monitoring

The exposure of population is additionally regulated by the limitations of gaseous and liquid discharges. Environmental radiological surveillance of the nuclear installation is defined in detail in the Regulations on Mode, Extent, and Frequencies of Monitoring of Radioactive Contamination in the Surroundings of Nuclear Facilities, Official Gazette SFRY, 51/86, based on the 1984 Act. The annual limits of discharged activities for effluents into the environment are stipulated by the operation licence. The limits of an annual liquid release are given for H-3, for the group of radioisotopes without H-3, C-14 and gases dissolved in liquids. Besides the annual limits also the limits for a three-month period are given. The annual limits for gaseous releases are given in the technical specifications of the Krško NPP, stating the limits for noble gases, radioiodine and aerosols in gaseous effluents.
The Slovenian Nuclear Safety Administration participates actively in the IAEA program related to reporting of releases from nuclear installations, the International Database on Discharges of Radioactive Material to the Environment (DIRATA), which started in 2002.

The gaseous release activity for noble gases, iodine and aerosols in the period 2001-2003 was always less than 2% of the limiting values. A higher percentage of the limiting values was obtained for the noble gaseous effluents. The annual liquid release of tritium in the period 2001-2003 was about half of the annual limit. The effluents activities are periodically reported to the Slovenian Nuclear Safety Administration.

The monitoring program includes measurements performed by the nuclear power plant and by the technical support organisations as well as inter-comparison measurements. The program comprises radioactivity measurements of surface and ground water, sediments and water biota, precipitation, air particulate and iodine, soil, crops and vegetation, and external radiation.

The automatic radiation monitoring system was developed in Slovenia in the early nineties. It comprises dose-rate measurements (in total 43 stations, 13 of these in the surrounding of the Krško NPP) and aerosol radioactivity measurements (in total 3 stations, 2 near the NPP). The automatic radiation monitoring system is shown in Fig. 15.3. The data are collected at the SNSA. The early warning radiation system is an automatic measuring system which instantaneously detects elevated radiation levels on the territory of the Republic of Slovenia. For a comprehensive assessment of the radiological situation the external radiation levels have to be known, as well as radioactivity in the air and radioactivity of deposition. The said system provides reliable measuring data. In the case of enhanced radiation levels, the alarm is set off.

**Fig. 15.3:** Map of Slovenia with probe locations for external radiation (different colours of the spots indicate the information on the gamma dose rate level in real time)
The annual effective dose for a member of the public due to the Krško NPP operation was estimated to be less than 1.5 micro Sv, mostly due to the intake of the radionuclide $^{14}$C.

### 15.3 ALARA

According to Article 4 of the 2002 Act, every radiation practice may cause exposure only up to the level which is as low as achievable with reasonable measures, taking into account economic and social factors (the principle of radiation protection optimisation). In addition, Article 34 of the 2002 Act prescribes the organisational structure of the radiation protection unit in the nuclear installation. The unit is responsible for implementing the radiation protection measures and must function separately from other organisational units. The tasks of the radiation protection unit are defined in detail in the Regulation on Obligations of the Person Carrying Out a Radiation Practice and of the User of a Radiation Source (Official Gazette, 13/2004).

The Radiation Protection Unit in the Krško NPP has a personnel of around 20 workers. All members were educated and trained according to a specialised radiation protection educational and training program. The unit performs tasks based on the internal, written procedures. The document Radiation Protection Manual is the main procedures manual of the unit.

The application of the optimisation principle is controlled by the ALARA Manual, and additional procedures are described in the ALARA Planning, Post Job ALARA Review or ALARA Groups document. The operational annual limit for the occupational exposure is 2 man Sv and the target value is less than 0.8 man Sv, long term strategic goal is 0.65 man Sv. The ALARA planning is required for all jobs where the individual dose is above 5 mSv or the collective dose is above 10 man mSv. The application of ALARA in the plant is reviewed by the internal ALARA committee, which is established at the highest managerial level of the NPP. The committee meets twice a year.

The Krško NPP officially participates in the Information System on Occupational Exposure (ISOE) programme of OECD/IAEA and follows operational experiences from other operators regarding source term reduction and managerial issues on radiation protection.

### 15.4 Regulatory Control Activities

The regulatory control is established through the regulatory tasks:

- on-site inspections,
- reporting of nuclear facilities to the regulatory authorities,
- licensing or notification procedures related to nuclear installation as well as to outside undertaking performing work in the nuclear installation,
- approval of radiation protection expert,
- approval of radiation and nuclear safety experts,
- approval of dosimetric services and establishing the central records of personal doses,
- approval of medical practitioners.
Due to the updating of legislation the above-mentioned regulatory tasks were also the subject of extensive changes in the period 2001-2004. The licensing and notification procedures related to nuclear installations or undertakings performing work in nuclear installations are assured by the Slovenian Nuclear Safety Administration. Both authorities, the Slovenian Nuclear Safety Administration and the Slovenian Radiation Protection Administration, perform regular on-site inspections of nuclear installations in addition to ad-hoc inspections. The approval of dosimetric services in the Krško NPP, providing external monitoring of the plant workers, was updated in 2004.

**Slovenian regulations and practices are in compliance with Article 15 of the Convention on Nuclear Safety.**

*Figure 15.4: The dam on Sava river near the Krško NPP*
Article 16
Emergency Preparedness

1. Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency. For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body.

2. Each Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent authorities of the States in the vicinity of the nuclear installation are provided with appropriate information for emergency planning and response.

3. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency.

16.1 Regulatory Requirements

The nuclear emergency preparedness and response in Slovenia is regulated with the Protection against Natural and Other Disasters Act (Official Gazette, 64/94) and the 2002 Act. The roles of the two organisations which play the key role in the emergency preparedness, i.e. the Administration for Civil Protection and Disaster Relief and the SNSA, were described in the first and second national report in detail.

The 2002 Act requires from the operator to forward in the safety analysis report, which is the principal licensing document, a complete radiological emergency plan, which is prepared in line with the civil protection regulations. The 2002 Act provisions mostly focus on the intervention measures in case of emergency. According to these provisions the operator needs to be capable to classify accidents, assess the consequences of the event and propose countermeasures. In the operator’s emergency plan the intervention measures should be planned upon the emergency class declared. The operator must provide to emergency planners all the requested data which are available to the operator. The operator must maintain the emergency preparedness and provide response as stipulated by the emergency plan. The prompt notification, without an undue delay, of an event is stipulated and the public needs to be informed about important facts in the emergency plans.

The Decree on Preparation of the Emergency Plans (Official Gazette 3/2002) stipulates that the nuclear emergency plan should be prepared on a national level, and the national nuclear emergency plan should be revised at least every five years. Emergency plans are public documents and should be presented to the public within 90 days after their adoption.
16.2 Implementation of Emergency Preparedness Measures

The emergency planning zones, the classification of emergencies, the structure of emergency plans and the relations between them were described in the first and the second national report and have not been changed.

The Administration for Civil Protection and Disaster Relief concentrated its activities mainly on the preparation of the national nuclear emergency exercise NEK-2002 and the revision of the National Nuclear Emergency Response Plan (the National Plan), which was adopted by the Government in January 2004.

In 2003 a complete revision of the SNSA internal emergency procedures was finished and some new procedures were written, which provided more specific guidance to the emergency staff and strengthened the preparedness with emergency equipment check and testing.

In 2001 the Krško NPP upgraded and declared functional its Emergency Off-site Facility, which takes over the liaison with off-site authorities, public information and a part of engineering support from the Technical Support Centre during the Site and General Emergency. The Emergency Off-site Facility is located in Ljubljana. In 2002 the Krško NPP commissioned a cellular telephone based automatic alarming system, modified the ventilation in the technical support centre and renovated the medical centre in the facility.

16.3 Informing the Public

In line with the Council Directive 89/618 EURATOM on informing the general public about the health protection measures the Krško NPP prepared an information brochure entitled “How to React in a Nuclear Emergency” for the people living within the area of planned urgent protective actions. The brochure was distributed to all households in the municipalities around the Krško NPP in 2002.

16.4 Training and Exercises

Slovenia took part in the JINEX-2000 exercise in May 2001. In the exercise the National Plan was tested for the case of accident in a foreign country.

On Saturday, 17.11.2001, the Krško NPP and the SNSA took part in the exercise “NEK-2001”, which was designed to test the emergency preparedness of the Krško NPP, but the SNSA exercised the emergency organisation without involvement of other off-site participants.

NEK-2002 was organised as a national exercise. The exercise started on 22 November at 23:00 local time and finished the next day late in the afternoon. The progress of events demanded a classification from the lowest to the highest emergency class. The exercise proved that an effective system of response to a nuclear accident had been established. However, this system should be improved taking into account the experiences obtained during the exercise. The communication system between
all parties involved in decision-making is absolutely vital and this system should be upgraded and redundancy enhanced.

In October 2003 an unannounced emergency exercise NEK-2003 was carried out, with the Krško NPP and the SNSA participating. The evaluation showed that the level of emergency preparedness was acceptable, but this type of exercise needs more planning in the area of exercise observers and exercise facilitators.

16.5 International Agreements and International Projects

Slovenia is a party to the Convention on the Early Notification of a Nuclear Accident and to the Convention on the Assistance in the Case of a Nuclear Accident or Radiological Emergency. Slovenia has a bilateral agreement with Austria, Croatia and Hungary on the early exchange of information in the event of a radiological emergency.

In 2002 the SNSA obtained all the necessary computer and telecommunication equipment for the operation of the CoDecS system (the system for immediate exchange of coded messages concerning nuclear and radiological accidents in Europe), which represents technical realisation of the obligations from the European Union acquis concerning urgent mutual notification of the member states in case of emergency (the ECURIE system).

In 2002, the British Department of Trade and Industry carried out an assistance program for the SNSA. In the framework of this programme the SNSA received equipment for upgrade of the information and telecommunication infrastructure, as well as an emergency electric power source. In 2003 the Department of Trade and Industry continued the program and provided technical support in training of the SNSA emergency organisation and development of the radiation monitoring team strategy.

The installation of RODOS (Real-time On-line DecisiOn Support System) in Slovenia was financed through a Phare programme. In October 2003 the contract for installation was signed and the project started. The beneficiary of the project was the SNSA and the contractual obligation of the beneficiary is to provide adaptation of the system to national conditions, i.e. to fill in the files with Slovenian specific data, such as maps, infrastructure objects, radioecological regions, etc. The estimated duration of the project is one year.

Slovenia actively participates in the regional project of the IAEA Harmonisation and Strengthening of Regional Preparedness and Response for Nuclear Emergencies, which has 22 participating countries.

The relations between the Republic of Slovenia and the Republic of Croatia were enhanced through the establishment of a Sub-committee on Harmonisation of Emergency Plans, which works in the framework of the Permanent Bilateral Committee for Implementation of the Agreement on Co-operation in the Area of Natural and Other Disasters. The first task of this Sub-committee was exchange of information and harmonisation of national nuclear emergency plans of both countries.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 16.
**Article 17**

**Siting**

Each Contracting Party shall take the appropriate steps to ensure that appropriate procedures are established and implemented:

(I) for evaluating all relevant site-related factors likely to affect the safety of a nuclear installation for its projected lifetime;

(II) for evaluating the likely safety impact of a proposed nuclear installation on individuals, society and the environment;

(III) for re-evaluating as necessary all relevant factors referred to in sub-paragraphs (I) and (II) so as to ensure the continued safety acceptability of the nuclear installation;

(IV) for consulting Contracting Parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing the necessary information to such Contracting Parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation.

Particularities regarding environmental assessment and public participation/review of new sites in the licensing procedure for a nuclear facility are contained in the 2002 Act, Regulation E-1, the Act on Environmental Protection (Official Gazette 32/93, 1/96) and in its subsidiary regulation, in the Decree on Environmental Interventions that Require Environmental Impact Assessment (Official Gazette 66/96, 12/00, 83/02) and the Guideline on Preparation of the Environmental Impact Assessment (Official Gazette 70/96), the Act on Land Use Planning (Official Gazette No. 110/2002) and the Act on Construction (Official Gazette No. 110/2002).

According to the 2002 Act, a nuclear facility may be constructed only on a site for which the national site development plan was prepared. The planning of the location of nuclear facilities and the conditions for their location in a spatially and functionally contained area shall be carried out with the national site development plan. This plan must have a foundation in the long-term spatial development plan of the Republic of Slovenia. The minister competent for the environment is responsible for the drawing up of a national site development plan.

The site for a nuclear facility is licensed on the basis of a special safety analysis assessment of all the factors in the area which may affect the nuclear safety of the facility during its operating lifetime and effects of the operation of the facility on the population and the environment. The detailed contents and the scope of the special safety analysis are defined by the SNSA.

Chapter II of the Regulation E-1 “Conditions for the Siting of a Nuclear Facility” determines in more detail the investigations and analyses of the site and of the impact of the nuclear facility on the environment, required for the application a licence for land use.

The 2002 Act determines that for the siting of a nuclear facility preliminary consent of the SNSA is a
condition for the land use approval by the regulatory body responsible for issuing environmental protection approvals.

In order to obtain a licence for land use, the Ministry of the Environment, Spatial Planning and Energy issues the environmental protection approval. Prior to this the Slovenian Nuclear Safety Administration defines the scope and content of the environmental impact report. In a review process of environmental impact assessment, the Slovenian Nuclear Safety Administration may request additional information or changes of the environmental impact report and may propose conditions for the environmental protection approval.

The environmental impact report is a public document. The Ministry of the Environment, Spatial Planning and Energy must perform a public presentation of the environmental impact report and must assure public hearing. The public presentation must last at least 15 days. The Ministry of the Environment, Spatial Planning and Energy shall announce its decision in the public media within eight days. The decision must include a statement that opinions and comments made in the public presentation, discussion, and hearing have been considered.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 17.
### Article 18

**Design and Construction**

Each Contracting Party shall take the appropriate steps to ensure that:

(I) the design and construction of a nuclear installation provides for several reliable levels and methods of protection (defence in depth) against the release of radioactive materials, with a view to preventing the occurrence of accidents and to mitigating their radiological consequences should they occur;

(II) the technologies incorporated in the design and construction of a nuclear installation are proven by experience or qualified by testing or analysis;

(III) the design of a nuclear installation allows for a reliable, stable and easily manageable operation, with specific consideration of human factors and the man-machine interface.

### 18.1 Provision of Several Reliable Levels and Methods of Protection

The license for the construction of a nuclear facility is issued by the Ministry of the Environment, Spatial Planning and Energy on the basis of the Act on Construction (Official Gazette No. 110/92); among other sub-conditions is the consent of the Slovenian Nuclear Safety Administration (2002 Act, Article 68). In issuing a consent, the Slovenian Nuclear Safety Administration evaluates the technologies incorporated in the design and construction of the nuclear facility with regard to nuclear and radiation safety and environmental protection.

According to the 2002 Act, the application for the construction license for a nuclear facility shall include project documentation, a Safety Analysis Report including relevant evaluations, and the opinion of an appointed expert for radiation and nuclear safety. The contents of the project documentation and other conditions shall be prescribed by the Minister’s Decree. The key document governing the technical and safety measures for the construction and operation of the nuclear facility is the Safety Analysis Report.

The safety report shall be amended in accordance with the changes which arise in the design of the facility during the construction, commissioning, start of operation, operation and decommissioning of the nuclear facility.

The principle of defence in depth should be applied to all activities related to safety.

The Design Modification Control Program, established in the Krško NPP, provides an overview of the roles, responsibilities and requirements of the plant divisions involved in the design modification process. The program specifically defines the activities performed by each group. The purpose of the program is to provide high quality, timely and cost effective modification solutions to plant problems and at the same time to reduce the cost and time of modification completion. The design modification control is achieved by innovative engineering, detailed planning, effective management and the
full participation, support and cooperation by all involved groups in a modification team approach.

An example of defence in depth is the Fuel Integrity Program, prepared at the Krško NPP. It comprises:

- continuous monitoring and trending of the fuel behaviour through the operating cycle,
- evaluation of key fuel performance indicators to determine whether any fuel defects exist,
- of appropriate actions to reduce and mitigate the consequences of fuel defects,
- examination of fuel to remove the defective fuel from operation (ultrasonic, in mast sipping and visual inspection),
- evaluating the world-wide experience and fuel performance,
- integrating the experience and knowledge into the new fuel design (ZIRLO™ cladding, debris filter bottom nozzle, removable top nozzle).

Implemented programs such as the In-Service Inspection Program, the Loose Parts Monitoring System, and the Control Rods Drive Mechanism Inspections Program also contribute to improving the defence-in-depth concept. The Krško NPP installed the Loose Parts Monitoring System to detect loose parts in the reactor primary system, even though no loose parts have been detected during the operation of the last several years.

18.2 Proven Technology

The major modifications in the Nuclear Power Plant Krško in the year 2001 - 2003 were:

- Complete **guide tube support pins exchange** was made in the 2001 outage. Control rods’ guides are connected to the upper core plate and supported at edges with guide support pins. Control rods’ pins at the NPP were made from Inconel X-750, material revision A, material which experiences strong tensile corrosion after a certain number of operating hours, which causes cracks in pins. Westinghouse informed the NPP Krško in 1997 about the pins problems and suggested exchange of all pins.
- **Distribution transformer station 400/110 kV** was built to support the electric power supply of the Nuclear Power Plant Krško. In case of a downfall of the electric system this can be solved by the connection of the gas power station Brestanica units either indirectly or directly to the electric equipment supply of the Nuclear Power Plant Krško.
- **Two compressors of compressed air** were replaced with new ones with greater capacity, and additionally the electric energy supply and the control room status display were improved.
- **Modification of containment leakage testing**, that is the transition from testing according to USNRC 10CFR50 Appendix J - Option A to Option B, was approved. The intervals during the testing can now be extended, depending on the success of the preceding tests. As part of the new testing program the NPP now also performs, at least once between two refuellings, an on-line monitoring test of containment leak tightness (by a method very similar to the one used by Belgian NPPs).
- **Reracking of the spent fuel pool project** was started in 2002 in order to facilitate the operation of the Krško NPP until the end of its designed lifetime in 2023. The capacity of the spent fuel storage pool was increased by partial replacement of the existing racks with new, high-density racks in spring 2003. High density racks with borated stainless steel neutron absorbing panels were installed as Region II racks. They were designed for the burnt fuel with U-235 enrichment of up to 5.0 %, taking credit also for reactivity reduction associated with fuel depletion. The remaining old storage racks are used to accommodate fresh fuel, the emergency core unload or the fuel
that can not be accepted into Region II. With the reracking project, the pool capacity was increased from 828 to 1694 fuel assemblies locations, which is sufficient for the projected 40 years of the plant’s lifetime. To ensure sufficient heat removal from the increased number of stored fuel assemblies in the spent fuel pool, an additional heat exchanger was installed. Burnup credit methodology approved by the Slovenian Nuclear Safety Administration was implemented, taking into account recent and significant methodology improvements. All necessary safety analyses were reviewed and approved. The reracking project was finished in March 2003.

- **Implementation of extended fuel cycle.** The implementation of an 18-month cycle (planned for the outage in 2004) is possible with some investments through the transitional 15-month cycle, which started in 2003. The Krško NPP has already implemented some of the activities needed for a longer fuel cycle, i.e. the technical capacities of the equipment and fuel were reached by the replacement of the main equipment (steam generators), implementation of ZIRLO cladding material and the already performed safety analysis for new operating conditions (steam generators replacement and power up-rate).

Other important modifications since the Second Review Meeting were:
- update of the reactor coolant pump vibration control system,
- replacement of dryers in the air instrumentation system,
- alarm installation in the system for the control of primary water sub-cooling,
- replacement of ex-core neutron detectors,
- on-line monitoring of containment leakage,
- thermo-elements replacement on the measuring drain of the reactor cooling system.

Some new programs which were established in the Krško NPP since 2001:
- annual examination of reactor vessel head penetrations, according to the NRC requirements since 2002,
- draft program of RCS leakage and detection of boron deposits,
- risk evaluation of preventive on-line maintenance.

**In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 18.**

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**Figure 18.1: Modification of fire protection hydrant system in the Krško NPP**
Article 19 Operation

Each Contracting Party shall take the appropriate steps to ensure that:
(I) the initial authorisation to operate a nuclear installation is based upon an appropriate safety analysis and a commissioning program demonstrating that the installation, as constructed, is consistent with design and safety requirements;
(II) operational limits and conditions derived from the safety analysis, tests and operational experience are defined and revised as necessary for identifying safe boundaries for operation;
(III) operation, maintenance, inspection and testing of a nuclear installation are conducted in accordance with approved procedures;
(IV) procedures are established for responding to anticipated operational occurrences and to accidents;
(V) necessary engineering and technical support in all safety-related fields is available throughout the lifetime of a nuclear installation;
(VI) incidents significant to safety are reported in a timely manner by the holder of the relevant license to the regulatory body;
(VII) programs to collect and analyse operating experience are established, the results obtained and the conclusions drawn are acted upon and that existing mechanisms are used to share important experience with international bodies and with other operating organisations and regulatory bodies;
(VIII) the generation of radioactive waste resulting from the operation of a nuclear installation is kept to the minimum practicable for the process concerned, both in activity and in volume, and any necessary treatment and storage of spent fuel and waste directly related to the operation and on the same site as that of the nuclear installation take into consideration conditioning and disposal.

19.1 Initial Authorisation for Operation

The operating license is issued by the SNSA after the Ministry of the Environment, Spatial Planning and Energy issues, in accordance with the Act on the Construction of Facilities, a license for the use of a facility.

The application for the operating license shall contain an updated Safety Analysis Report, an opinion from an approved expert for radiation and nuclear safety and other prescribed documentation. The safety report must be updated with the changes that occur during trial operation.

A license shall be issued by the Slovenian Nuclear Safety Administration within ninety days of receiving a complete application and information on the trial operation indicating that all the conditions for radiation and nuclear safety have been fulfilled.
19.2 Operational Limits and Conditions

In accordance with the 2002 Act, the proposed operational limits and conditions have to be submitted to the regulatory body as a part of the application for an operating license.

Regulation E-1 and Regulation E-2 define the contents of the Technical Specifications. Operational limits and conditions for the operation of a nuclear facility include:

- safety limits,
- limiting settings for safety systems,
- limiting conditions for normal operations,
- surveillance requirements,
- requirements for the operator of a nuclear facility relating to reporting.

It is also required that the operating staff should be familiar with the contents and objectives of the Technical Specifications.

The 2002 Act outlines the procedure for approval of the changes to the Safety Analysis Report. The procedure defines three classes of modifications depending on safety relevance:

- modifications for which it shall be necessary to notify only the SNSA,
- modifications for which the intention of their implementation must be reported to the SNSA,
- modifications of significance for radiation or nuclear safety and for the implementation of which a license from the SNSA must be obtained.

19.3 Operation, Maintenance, Monitoring, Inspection and Testing

In accordance with Article 34 of Regulation E-1, the documentation submitted for application for an operating license shall also contain a list of prepared operating procedures and rules together with the plant start-up report, the QA program report, the technical specifications, the Safety Analysis Report, etc. In the process of reviewing the safety report for licensing purposes, operating procedures are used as additional referenced documentation (Regulation E-2).

19.4 Anticipated Operational Occurrences and Accidents

In accordance with Section 38 of the Regulation E-1, the organisation operating the nuclear facility has to prepare procedures for all operational modes and accident conditions.

The Krško NPP has developed and applied a full set of Abnormal Operating Procedures (AOP), Emergency Operating Procedures (EOP) and Severe Accident Management Guidelines (SAMG). The AOPs and EOPs have been reviewed by the SNSA and the Technical Support Organisations. These sets of procedures have been verified during the operator’s simulator training.
19.5 Engineering and Technical Support

In-house capabilities have been developed to perform engineering and technical support at the Krško NPP. It is capable of processing minor design changes in-house. The capability of preparing purchase specifications, reviewing bids and bidder selection, Quality Assurance, Quality Control and engineering follow-up of the projects and review and/or acceptance testing of the product are available to a certain extent at the plant.

Other engineering and technical support is assured through outsourcing at Slovenian research and engineering organisations or from abroad. However, major projects require an open bidding process. The Ministry of Education, Science and Sport financially supports research and development projects in the field of nuclear safety in the Republic of Slovenia through a research fund, with the participation of the nuclear industry and the Slovenian Nuclear Safety Administration. In the 2001-2003 period, the SNSA also financially supported some projects in the area of application of probabilistic safety assessment and in the area of emergency planning.

19.6 Incidents Significant to Safety

Article 87 (reporting on the operation of facilities) of the 2002 Act stipulates that an operator must submit exceptional reports to the SNSA containing information on:
- equipment defects which could cause an emergency, emergencies and measures taken for the mitigation of the consequences of the defects or emergencies,
- errors made by workers while handling or operating a facility which could cause an emergency,
- deviations from operational limitations and conditions,
- all other events or operational circumstances which significantly affect the radiation or nuclear safety of the facility.

According to Article 108 of the 2002 Act, the license holder is required to report to the SNSA and to other competent agencies about the accidental condition in the shortest possible time.

The Regulation on the method and frequencies for keeping records, for reporting to the regulatory body by the appointed technical support organisations and by the organisations operating nuclear facilities (Official Gazette No.12/81) prescribes detailed requirements for reporting and for the notification of the regulatory body by the operator of a nuclear facility. The regulation distinguishes between routine reporting and notification, and reporting in the case of an abnormal event. It specifies the time period for each report. Reporting criteria are also given and abnormal events are specified.

The regulation for accident reporting is to be replaced by a new regulation which is under preparation.

Slovenia is a member of the IAEA INES reporting system. Events from the Krško NPP are rated in accordance with the INES scale and reported to the IAEA. There is no formal committee established to evaluate the event rating. The rating is done by the INES national officer and discussed with the licensee and internally in the SNSA.
19.7 Programs to Collect and Analyse Relevant Operating Experience

In accordance with Article 60 of the 2002 Act (the use of experiences gained during operational events) the operator of a nuclear facility must ensure that programs of recording and analysing operational experience at the nuclear facility are implemented.

In the assessment, examination and improvement of radiation and nuclear safety the operator of the nuclear facility must take into account the conclusions of the programs referred to in the previous paragraph.

At the Krško NPP, Root Cause Analysis of significant events is performed and the lessons learned are followed up and training is given where appropriate. The plant may consider aggregating the large number of cause categories into smaller categories to obtain a more meaningful trending analysis, to facilitate the preparation of management reports, and to make a selection of appropriate action plans covering an adequate scope. The plant policy for restart following a reactor trip requires the cause of the trip to be known, understood and corrected before the restart.

An Operating Experience Feedback Program is in place, which includes the consideration of in-house as well as external operating events. This activity is handled within the Independent Safety Engineering Group (ISEG). Recently the program has been expanded by developing a corrective actions program including low level events and near misses, all types of deviations, failures, malfunctions, and deficiencies.

In the area of assessment of operating experience, the Krško NPP has been collecting performance indicators for many years, preparing annual reports that provide results for the international performance indicators defined by the World Association of Nuclear Operators (WANO), the performance indicator index and some additional indicators. In 2003, the plant improved the Performance Indicators Program, in which a total of about 90 indicators are included.

19.8 Radioactive Waste Resulting from Operation

All operational radioactive waste from Krško NPP is stored within the plant area. The plant is responsible for radioactive waste management at the location. According to the 2002 Act, the dates for siting and final disposal of Low and Intermediate Level Waste are 2008 and 2013 respectively.

During the operation of the Krško NPP, various radioactive substances in liquid, gaseous and solid form are generated. The system is constructed for collecting, processing, storing and packaging of waste in a suitable form and to minimise releases into the environment. Three fundamental systems are used for radioactive waste management, namely for liquid, solid and gaseous radioactive waste.

Numerous program improvements, design changes and work practices improvements have been pursued at the plant to decrease the generation rate of radioactive wastes of different types (two super compaction campaigns, In-drum Drying System). With the 18-month fuel cycle, the generation of radioactive wastes will be additionally reduced.
To reduce the volume of solid radioactive waste to be stored, two super compaction campaigns have been carried out. The original Westinghouse procedure for evaporator bottoms and spent resins treatment was replaced with a treatment of these types of wastes called the In-Drum Drying System. The Krško NPP has started with the incineration of combustible wastes. In the year 2003 the Krško NPP sent 250 drums with total activity of about 2 GBq to Sweden for incineration. The total mass was about 21 tones.

According to the current strategy, the decision on a final solution for the spent fuel will be adopted by 2020. It is planned that the spent fuel will be disposed by the year 2050. Until then the fuel will be stored in the Krško NPP spent fuel pool or in dry storage at the reactor site.

The Agreement between the Governments of Slovenia and Croatia on the statutory and legal questions related to Krško NPP investment, exploitation and decommission entered into force in April 2003. Among other it was agreed that the decommissioning of the Krško NPP, and the disposal of radioactive waste and spent nuclear fuel are a joint responsibility of the contracting parties. Based on provisions of the agreement, a joint commission for the preparation of plans for post-operational radioactive waste and spent nuclear fuel management and for the disposal and preparation of the decommissioning plan was formed and started the work. It was also agreed that the contracting parties shall in equal shares assure funds for preparation of the decommissioning plan and its execution, as well as the funds for preparation of the radioactive waste and spent fuel management plan and for their disposal. If the contracting parties agree on joint solution they shall finance it in equal shares, otherwise each country shall finance its share of activities.

In conclusion, the Slovenian regulations and practices are in compliance with the obligations of Article 19.
Appendices

Appendix I
Provisions and Comments Relevant to Licensing from the 2002 Act

Use of land: Articles 64 to 67
The planning of the site of nuclear facilities and the conditions for their siting in a spatially and functionally contained area must be carried out with the national site development plan, which is drawn up by the Ministry of the Environment, Spatial Planning and Energy. An investor must obtain a license for the use of land, which is also issued by the Ministry of the Environment, Spatial Planning and Energy. One of the conditions for the issuing of the license is preliminary approval for the radiation and nuclear safety of a nuclear facility, which is issued by the SNSA.

Construction: Articles 68 to 77
An investor intending to construct or decommission a nuclear facility must obtain a construction license for the construction, reconstruction or decommissioning of a nuclear facility. The same applies to the investor intending to carry out construction work in an area of limited use which affects nuclear safety due to the vicinity of a nuclear facility. One of the conditions for the issuing of the license by the Ministry of the Environment, Spatial Planning and Energy is preliminary approval of the SNSA. During the approval procedure, the SNSA also assess and approves the safety analysis report.

Trial operation: Article 78
After the construction work is completed, every nuclear facility must first undergo a period of trial operation. It is necessary to obtain approval from the SNSA prior to the commencement of a period of trial operation of a nuclear facility. The SNSA also assesses and approves a safety analysis report, which must be supplemented in accordance with the changes occurring during the construction.

Operation and decommissioning: Article 79 - 80
An investor or operator who intends to commence or cease operation of a nuclear facility, commence the disposal of spent fuel in a repository of spent fuel or of radioactive waste in a repository of radioactive waste, close a repository of spent fuel or radioactive waste or commence or complete the decommissioning of a nuclear facility, must obtain a license from the SNSA. An investor or operator must attach to the application for a license a safety analysis report, which must be amended in accordance with the changes which have occurred during trial operation and the time of construction or decommissioning of the facility.

Periodic safety review (PSR): Articles 81 - 82
The provisions on PSR are a novelty in the 2002 Act, although based on SNSA decision and in accordance with the IAEA safety guide “Periodic Safety Review of Operational Nuclear Power Plants” No-50-
The 2002 Act requires that the operator of a nuclear facility ensures regular, full and systematic assessment and examination of radiation or nuclear safety of a facility by the PSR. The PSR must be approved by the SNSA. The approved report on the PSR is the condition for renewing an operation license.

**Modifications: Article 83 - 86**

With respect to every intended modification in the facility or to the management method used or to the operation of the facility, including maintenance work, inspection, testing or introduction of a technical, organisational or any other modification which affects or could indirectly affect the content of the safety analysis report, the operator must evaluate the intended modification in relation to its significance for radiation or nuclear safety.

With respect to their significance for radiation or nuclear safety, changes may be:

1. such that it shall be necessary only to notify the SNSA,
2. such that the intention of their implementation must be reported to the SNSA,
3. of such a significance for radiation or nuclear safety that for its implementation a license from the SNSA must be obtained.

The methodology to be used for the assessment and classification of the changes, as well as the method to be used to report the intention to introduce the changes and the form of the notification of the changes should take, shall be determined in a regulation issued by the minister for the Environment, Spatial Planning and Energy.

Article 86 also provides an exceptional review of a safety analysis report immediately after an emergency at the facility and after the completion of the work relating to the mitigation of the consequences of an emergency.

**Special Provisions on Issuing, Renewal and Amendment of the License**

The 2002 Act provides for special provisions on issuing, renewal, amendment and expiration of the license (Articles 110 - 117).

The Act determines the content of a license (details about the operator, a detailed description of the type, scope and the purpose of the use of the facility, the duration of the validity of the license, the operational conditions and limitations relating to the safety analysis report, obligations relating to the periodic safety review, the steps the licensee must take after the license expires, the financial warranties, the deadlines and conditions for a repeated review of the evaluation of the radiation protection of exposed workers and the protection and emergency plan), the duration of a license (a license may be issued for a maximum of ten years, except in the case of a license for the completion of a decommissioning of a facility or the closure of a facility) and the conditions for the renewal of the license (the same conditions and procedure as for the issuing of a license). A license may be amended on the request of the licensee or ex officio. A license can be amended ex officio when the conditions related to the nuclear or radiation safety have changed, when this is required for the protection of the environment or the life or health of the population, for public benefit or when due to external influences or natural phenomena a radiation source is under threat so that nuclear or rad-
ation safety is considerably reduced. The provisions applying to the issue of a license also apply to the procedure for amending a license.

**General Licensing Procedure**

The 2002 Act has only a few provisions on licensing procedure since there is a general Act on Administrative Procedures (Official Gazette 80/99 and 70/2000) stipulating all the general principles of the licensing procedure, which are to be followed also by the SNSA. The rules of the general Act on Administrative Procedures must be followed with regard to all procedure issues, unless some special acts provide for a different solution. For example, based on the provisions of the Act on Administrative Procedures, the licensee can appeal against any decision issued by any regulatory body. But the 2002 Act determines that in some cases there shall be no right to appeal against the SNSA’s decision. In these cases the licensee will have only the right for a judicial review of the decision.

**Prohibition of Operation without a License**

In Article 57 of the 2002 Act there is a general prohibition, which provides that:
“A nuclear facility, radiation facility or less important radiation facility may not be constructed, tested, operated or used in any other way, or permanently cease to be used without a prior approval or authorisation pursuant to this Act.”

In penal provisions of the 2002 Act, financial penalties are foreseen to be imposed on a legal entity which violates the provisions of the 2002 Act (also the above stated prohibition). In addition to this, financial penalties are to be imposed also on any responsible person appointed by a legal entity for the same violation.
Appendix II: Comprehensive List of Legal Documents in Force in Slovenia (as of 30 April 2004)

A. Legal Documents adopted and/or ratified in 2001-2004, stipulated by the 2002 Act

A.1 Governmental decrees and ministerial regulations issued on the basis of the 2002 Act:

- Regulation on Expert Council on Protection of People Against Ionising Radiation, Radiological Procedures and Use of Radiation Sources in Health and Veterinary Care SV1 (Off. Gaz. RS, 62/2003),
- Regulation on Conditions for Use of Radiation Sources in Health Care SV3 (Off. Gaz. RS, 111/2003),
- Regulation on Conditions and Methodology of Assessment of Doses for Protection of Workers and Population Against Ionising Radiation SV5 (Off. Gaz. RS, 115/2003),
- Decree on the Criteria for Determining the Amount of Compensation Due to the Limited Use of Land in the Area of Nuclear Facility UV8 (Off. Gaz. RS, 134/2003),
- Regulation on Medical Surveillance of Exposed Workers SV6 (Off. Gaz. RS, 2/2004),
- Regulation on Obligations of the Person Carrying Out a Radiation Practice and of the User of a Radiation Source SV8 (Off. Gaz. RS, 13/2004),
- Regulation on Approving Experts in the Area of Ionising Radiation SV7 (Off. Gaz. RS, 18/2004),
- Regulation on the Methods of Keeping Records on Personal Doses Due to Exposure to Ionising Radiation SV4 (Off. Gaz. RS, 33/2004),
- Decree on the Areas of Limited Use of Land Due to Nuclear Facility and on Conditions for Construction in such Areas UV3 (Off. Gaz: RS, 36/2004),
- Decree on Radiation Practices UV1 (Off. Gaz. RS, 48/2004),

A.2 International instruments

- Following a notification of termination of application of the Vienna Convention on Civil Liability for Nuclear Damage from the Republic of Slovenia, the Vienna Convention ceased to apply to Slovenia as of 12 November 2002.
On 7 March 2003 the Agreement between the Governments of the Republic of Slovenia and the
Republic of Croatia on Settlement of Status and Other Legal Relations Regarding Investments,
Exploitation and Decommissioning of the Krško NPP entered into force (it was signed on 19
December 2001).

B. Legal documents adopted and or ratified before 2001, which are in force

Nuclear and Radiological Safety, Physical Protection, Safeguards, Quality Assurance

On the basis of the 1984 Act, the following regulations for carrying into effect the radiation protec-
tion and nuclear safety provisions are still in force (until new regulations stipulated by the 2002 Act
are issued):

- On siting, construction, commissioning, start-up and exploitation of nuclear facilities (with an
  appendix on quality assurance), (Off. Gaz. SFRY, 52/88), - Regulation E-1;
- On preparation and content of the safety analysis report and other documentation relevant for
  the assessment of safety of nuclear facilities (Off. Gaz. SFRY, 68/88), Regulation E-2;
- On education, experience, examination and certification of personnel conducting specific work
  at the nuclear installation (Off. Gaz. SFRY, 86/87), Regulation E-3;
- On material balance areas and the mode of keeping records accounting for nuclear raw materials
  and nuclear materials, as well as to the submission of data contained in such records (Off. Gaz.
  SFRY, 9/88), Regulation E-4;
- On places, methods and frequencies of monitoring of contamination with radioactive materials
  (Off. Gaz. SFRY, 40/86), Regulation Z-1;
- On the mode, extent, and frequencies of monitoring of radioactive contamination in the sur-
  roundings of nuclear facilities (Off. Gaz. SFRY, 51/86), Regulation Z-2;
- On the mode of collecting, accounting, processing, storing, final disposal and release of radioac-
  tive waste into the environment (Off. Gaz. SFRY, 40/86), Regulation Z-3; partially derogated by
  secondary legislation (i.e. UV-1);
- On trading and utilisation of radioactive materials exceeding certain limits, X-ray machines and
  other apparatus producing ionising radiation, as well as measures for the protection from radia-
  tion of such sources (Off. Gaz. SFRY, 40/86 and 45/89), Regulation Z-4; partially derogated by
  secondary legislation (i.e. UV-1);
- On dose limits for members of the public and for occupational exposure, on measurements of
  occupational exposure and on monitoring of the working environment (Off. Gaz. SFRY, 31/89 and
  63/89), Regulation Z-6; partially derogated by secondary legislation (i.e. UV-2);
- On terms under which drinking water, foodstuffs and articles in common use may be traded if
  they contain radioactive materials exceeding the prescribed limits of activity (Off. Gaz. SFRY,
  23/86), Regulation Z-8; partially derogated by secondary legislation (i.e. UV-2);
- On maximum established limits for radioactive contamination of the environment and on decon-
  tamination (Off. Gaz. SFRY, 8/87 and 27/90), Regulation Z-9; partially derogated by secondary
  legislation (i.e. UV-2);
- On the mode of keeping records accounting for sources of ionising radiation and irradiation of
  the population and workers (Off. Gaz. SFRY, 40/86), Regulation Z-10; almost completely dero-
  gated by secondary legislation (i.e. SV 4) except Art. 2.
On the basis of the 1980 Act, the following regulation is still in force (until new regulations stipulated by the 2002 Act are issued):

- On the mode and frequencies for keeping records and for reporting to the regulatory body by the authorised TSOs and by the organisations operating nuclear facilities (Off. Gaz. SRS, 12/81).

The following regulations have already been derogated by new regulations, issued on the basis of the 2002 Act:

- On education, health condition and medical examination for the personnel working with ionising radiation sources (Off. Gaz. SFY, 40/86), Regulation Z-5 - derogated by the provisions of the new Regulation on Conditions for Use of Radiation Sources in Health Care, the new Regulation on Medical Surveillance of Exposed Workers and the new Regulation on Obligations of the Person Carrying Out a Radiation Practice and of the User of a Radiation Source;
- On conditions for the application of sources of ionising radiation for medical purposes (Off. Gaz. SFY, 40/86 and 10/87), Regulation Z-7 - derogated by the new Regulation on Conditions for Use of Radiation Sources in Health Care;
- On education, experience and compulsory qualification and training of personnel working with ionising radiation sources or in radiation protection services and on the procedure of verifying their qualification (Off. Gaz. SRS, 9/81) - derogated entirely by the new Regulation on Obligations of the Person Carrying Out a Radiation Practice and of the User of a Radiation Source.

Third Party Nuclear Liability

- Act on Third Party Liability for Nuclear Damage (Off. Gaz. SFY, 22/78 and 34/79),
- Act on Insurance of Liability for Nuclear Damage (Off. Gaz. SRS, 12/80),

Decommissioning of the Nuclear Power Plant Krško


Radioactive Waste

- Act on Cessation of Exploration of the Uranium Mine (Off. Gaz. RS, 36/92, 28/00),
- Decree on Mode and Conditions of Discharging the Public Service on Radioactive Waste Management (Off. Gaz. RS, 32/99).

Civil Protection and Disaster Relief


Administrative

• Act on Inspection (Off. Gaz. RS, 56/2002),
• Act on Administrative Procedures (Off. Gaz. RS, 80/99, 70/00 and 52/2002),
• Act on Local Autonomy (Off. Gaz. RS, 72/93, 57/94, 14/95, 26/97, 70/97, 10/98, 74/98, 70/00, 51/2002 and 108/2003),

Energy


General

• Guideline on Preparation of the Environmental Impact Assessment (Off. Gaz. RS, 70/96),
• Act on Minor Offences (Off. Gaz. RS, 7/2003),
• Construction Act (Off. Gaz. RS, 110//2002 and 97/2003),
• Act on Export of Dual Use Goods (Off. Gaz. RS, 31/2000),
• Decision on Determination of Dual Use Goods (Off. Gaz. RS, 45/2000),

C. Multilateral and bilateral treaties, conventions, agreements/arrangements

Based on the Slovenian Constitution all announced and ratified international treaties also constitute an integral part of the Slovenian legislation and can be applied directly. The following international instruments, to which Slovenia is a party, should be mentioned:
Multilateral agreements

- Statute of the International Atomic Energy Agency (including its Amendment of Articles VI and XIV),
- Agreement on the Privileges and Immunities of the International Atomic Energy Agency,
- Convention on the Physical Protection of Nuclear Material,
- Convention on Early Notification of a Nuclear Accident,
- Convention on Assistance in the Case of a Nuclear Accident of Radiological Emergency,
- Convention on Nuclear Safety,
- Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water,
- Treaty on the Non-Proliferation of Nuclear Weapons,
- Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction in the Sea-Bed and the Ocean Floor,
- European Agreement Concerning the International Carriage of Dangerous goods by Road (ADR),
- Convention on International Railway Carriage (COTIF) including Appendix B (RID),
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management,
- Comprehensive Nuclear-Test-Ban Treaty,
- Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as Amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982,
- Convention of the 31 January 1963 Supplementary to the Paris Convention of 29 July 1960, as Amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982,

Bilateral agreements

- Agreement with IAEA for the Application of Safeguards in Connection with the Treaty on the Non-proliferation of Nuclear Weapons,
- Protocol Additional to the Agreement between the Republic of Slovenia and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-proliferation of Nuclear Weapons,
- Agreement between the US NRC and the SNSA on Exchange of Technical Information and Co-operation in the Nuclear Safety Matters,
- Agreement between the Government of the Republic of Slovenia and the Government of Canada on Co-operation in the Peaceful Uses of Nuclear Energy with an Arrangement between the SNSA and AECB,
- Agreement between the Governments of the Republic of Slovenia and the Republic of Hungary on Early Exchange of Information in the Event of a Radiological Emergency,
- Agreement between the Governments of the Republic of Slovenia and the Republic of Austria on Early Exchange of Information in the Event of a Radiological Emergency and on Questions of Mutual Interest in the Field of Nuclear Safety and Radiation Protection,
- Agreement between the Governments of the Republic of Slovenia and the Republic of Croatia on Early Exchange of Information in the Event of a Radiological Emergency,
- Agreement between the Government of the Republic of Slovenia and the Government of the Slovak Republic for the Exchange of Information in the Field of Nuclear Safety,
• Arrangement between the Nuclear Safety Administration of the Republic of Slovenia and the Council for Nuclear Safety of South Africa for the Exchange of Technical Information and Co-operation in the Regulation of Nuclear Safety,
• Arrangement between the Nuclear Safety Administration of the Republic of Slovenia and the Ministry of Science and Technology of the Republic of Korea for the Exchange of Information and Co-operation in the Field of Nuclear Safety,
• Arrangement between the Nuclear Safety Administration of the Republic of Slovenia and the Nuclear Installations Safety Directorate of the Republic of France for the Exchange of Technical Information and Co-operation in the Regulation of Nuclear Safety,
• Arrangement between the State Office for Nuclear Safety in the Czech Republic and the Slovenian Nuclear Safety Administration for the Exchange of Information,
• Agreement between the Governments of the Republic of Slovenia and the Republic of Croatia on Settlement of Status and Other Legal Relations Regarding Investments.