IAEA-NS-IRRS-2011/05
ORIGINAL: English

INTEGRATED REGULATORY REVIEW SERVICE (IRRS)

MISSION

TO

THE REPUBLIC OF SLOVENIA

Ljubljana, Republic of Slovenia

25 September to 4 October 2011

DEPARTMENT OF NUCLEAR SAFETY AND SECURITY

REPUBLIC OF SLOVENIA
MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING
SLOVENIAN NUCLEAR SAFETY ADMINISTRATION

INTEGRATED REGULATORY REVIEW SERVICE (IRRS)
REPORT TO
THE REPUBLIC OF SLOVENIA

Ljubljana, REPUBLIC OF SLOVENIA
25 September to 4 October 2011

INTEGRATED REGULATORY REVIEW SERVICE (IRRS)

REPORT TO

THE REPUBLIC OF SLOVENIA

Mission date: *25 September to 4 October 2011*
Regulatory body: *SNSA*
Location: *SNSA HQ in Ljubljana, REPUBLIC OF SLOVENIA*
Regulated facilities and activities: *Nuclear power plant, Research Reactor, Waste storage facility, Former Uranium Mine and uses of Radiation Sources in research and industry*
Organized by: *International Atomic Energy Agency (IAEA)*

IRRS REVIEW TEAM	
Colin **PATCHETT**	Team Leader (United Kingdom)
Olivier **ALLAIN**	Deputy Team Leader (France)
Kathleen **O'DONOHUE**	Reviewer (United States of America)
Marcela Alejandra **MEDICI**	Reviewer (Argentina)
Pascal **GUILLAUD**	Reviewer (France)
Cantemir Marian **CIUREA-ERCAU**	Reviewer (Romania)
Erik **WELLEMAN**	Reviewer (Sweden)
Rosa **SARDELLA**	Reviewer (Switzerland)
Istvan Janos **VEGVARI**	Reviewer (Hungary)
Petr **KRS**	Reviewer (Czech Republic)
Adriana **NICIC**	IRRS Coordinator (IAEA)
Hilaire **MANSOUX**	IRRS Deputy Coordinator (IAEA)
Ivan **LUX**	IRRS Review Team Coordinator (IAEA)
Peter **ZOMBORI**	IRRS Review Team Coordinator (IAEA)
Martyn O. **UBANI**	IRRS Administrative Assistant (IAEA)

IAEA-2011

The number of recommendations, suggestions and good practices is in no way a measure of the status of the regulatory body. Comparisons of such numbers between IRRS reports from different countries should not be attempted.

CONTENT

EXECUTIVE SUMMARY

At the request of the Government of the Republic of Slovenia, an international team of ten senior safety experts met representatives of the Slovenian Nuclear Safety Administration (SNSA), from 25 September to 04 October 2011, in order to conduct an Integrated Regulatory Review Service (IRRS) Mission. The mission took place at the headquarters of SNSA in Ljubljana.

The purpose of this IRRS mission was to review the effectiveness of the Slovenian framework for safety as implemented by SNSA. This IRRS mission was the second to be conducted after the occurrence of the TEPCO-Fukushima Dai-ichi accident. Accordingly, special attention was given to the regulatory implications of the TEPCO-Fukushima Dai-ichi accident in the Slovenian framework for safety, as part of a newly developed core IRRS module.

The review compared Slovenian regulatory framework for safety against IAEA safety standards as the international benchmark for safety. The mission was also used to exchange information and experience between the IRRS review team members and the Slovenian counterparts in the areas covered by the IRRS.

The IRRS review team consisted of ten senior regulatory experts from nine IAEA Member States, four staff members from the IAEA and an IAEA administrative assistant. The IRRS review team carried out the review in the following areas: responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body including the authorization, review and assessment, inspection and enforcement processes; regulations and guides; emergency preparedness and response; waste management; decommissioning; public and environmental exposure control; and transport.

The IRRS mission also included the following Regulatory Policy Issues for discussion: response to the TEPCO-Fukushima Dai-ichi accident; long term operation of nuclear power plant and waste management. The IRRS review addressed all facilities and activities regulated by SNSA: one nuclear power plant, one research reactor, one radioactive waste storage facility, the former uranium mine and all use of radiation sources outside the health and veterinary sectors. Radiation sources in the health and veterinary sector (not regulated by SNSA) were not included in the scope.

The mission included observations of regulatory activities and a series of interviews and discussions with SNSA staff and other organizations to help assess the effectiveness of the regulatory system. These activities included visits to: the Krško nuclear power plant, Off-Site Emergency Facility (NEK EOF) Emergency Centre, the Brinje TRIGA Mark II research reactor and the industrial radiography facility at the Institute for Metal Construction Throughout the review of the various areas and policy issues, special consideration was given to the implications of the TEPCO-Fukushima Dai-ichi accident for the Slovenian Regulatory System. The IRRS team members observed the working practices during inspections carried out by SNSA, including discussions with the licensee personnel and management.

SNSA provided the IRRS review team with advanced reference material and documentation including the results of the self-assessment in all areas within the scope of the mission. Throughout the mission, the IRRS review team was extended full cooperation in regulatory, technical, and policy issues by all parties; in particular the staff of SNSA provided the fullest practicable assistance.

The IRRS review team identified a number of good practices, made recommendations and suggestions that indicate where improvements are necessary or desirable to continue enhancing the effectiveness of regulatory functions in line with the IAEA Safety Standards.

The main observations of the IRRS review team were the following:

Through its legal framework the Slovenian government, has a process in place for regulation of the nuclear programme. The government has appointed SNSA to regulate its nuclear safety program. SNSA has in place an effective process for carrying out this responsibility. Other regulatory bodies also have a role in the regulation of the Slovenian nuclear industry. SNSA works with these organisations to ensure the regulatory interfaces are managed.

SNSA is a small sized organisation with a broad range of regulatory responsibilities. The IRRS review team recognised that through the development of its quality management system, SNSA is able to improve its regulatory effectiveness.

Slovenia's response to the accident at the TEPCO-Fukushima Dai-ichi power plant has been prompt and effective. Communications with the public, development of actions for improvement within the Slovenian nuclear industry and coordination with international stakeholders were considered effective. Further lessons learned should be adequately addressed.

Among the good practices identified by the IRRS review team are the following:

- The IRRS team recognized that through the development of its quality management system, SNSA is able to improve its regulatory effectiveness.
- SNSA has developed, maintains and uses an integrated information management system
- SNSA is performing a comprehensive National Monitoring Program and control of Operational Monitoring. Environmental data are regularly assessed and published in a transparent manner.

The IRRS review team identified certain issues warranting attention or in need of improvement and believes that consideration of these would enhance the overall performance of the regulatory system.

- The development of a national policy and strategy for nuclear safety which would be supported by a national co-ordinated plan to ensure that appropriate national infrastructure is in place to secure its delivery.
- Consideration should be given to possible alternative methods of financing SNSA to provide it with the flexibility to meet its regulatory responsibilities whilst also ensuring it operates effectively. This should include provision for research and development.
- SNSA should develop and implement a process for carrying out a systematic review of its organisational structure, competencies and resource needed to effectively discharge its current and future responsibilities.
- SNSA should continue development of the management system to even further improve the effectiveness of its regulatory activities.
- SNSA should develop a long term plan for development of *Practical Guidance* in order to complete the framework of principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based. The plan should be periodically tested with plans for legislative actions of the SNSA.
- The Government should make the necessary provision for the Low and Intermediate Level Waste (LILW) Repository to ensure radioactive waste can be disposed at the appropriate time.
- SNSA should, through the inter-ministerial committee, promote the organization of full scope field exercises more frequently, to test the coordination of all stakeholders.

The IRRS review team findings are summarized in Appendix V and VI.

An IAEA press release was issued at the end of the mission.

I. INTRODUCTION

At the request of the Government of the Republic of Slovenia, an international team of ten senior safety experts met representatives of the Slovenian Nuclear Safety Administration (SNSA), from 25 September to 04 October 2011, in order to conduct an Integrated Regulatory Review Service (IRRS) Mission to review the Slovenian regulatory framework for nuclear and radiation safety and its effectiveness.

There was a preparatory mission in May 2011 carried out at SNSA Headquarters to discuss the objective, purpose and consequently the preparations of the review as well as its scope in connection with the areas regulated by SNSA and selected safety aspects.

The IRRS review team consisted of ten senior regulatory experts from nine IAEA Member States, four staff members from the IAEA and one IAEA administrative assistant. The IRRS review team carried out the review of SNSA in the following areas: responsibilities and functions of the Government; global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body including the authorization, review and assessment, inspection and enforcement processes; regulations and guides; emergency preparedness and response; waste management, decommissioning, public and environmental exposure control and transport.

This IRRS mission was the second one to be conducted after the occurrence of the TEPCO-Fukushima Dai-ichi accident. Accordingly, special consideration was given to the regulatory implications of the TEPCO-Fukushima Dai-ichi accident in the Slovenian framework for safety, as part of a newly developed core IRRS module.

In addition, policy issues were addressed, including: response to the TEPCO-Fukushima Dai-ichi accident; long term operation of nuclear power plant and waste management. The additional areas added to the core modules of the IRRS were waste management, decommissioning, public and environmental exposure control and transport.

SNSA prepared substantial documentation as advance reference material and a well prepared self-assessment. During the mission the IRRS review team performed a systematic review of all topics using the advance reference material, conducted interviews with management and staff from SNSA and performed direct observation of the working practices during inspections. Meetings with other administrations involved in the national regulatory infrastructure for safety were also organized, with the Slovenian Radiation Protection Administration (SRPA) and the Civil Protection and Disaster Relief Administration (CPDRA).

Meetings were also organized with the State Secretary of Ministry of Health, State Secretary of Ministry for Environment and Spatial Planning, Director General for Energy at the Ministry of Economy.

All through the mission the IRRS team received excellent and open co-operation from SNSA, questions from the IRRS team members were fully answered, documents requested were presented and explained

II. OBJECTIVE AND SCOPE

The purpose of this IRRS mission was to conduct a review of the Slovenian nuclear regulatory framework and regulatory activities to review its regulatory effectiveness and to exchange information and experience in the areas covered by IRRS. The facilities and activities addressed by the review were all facilities and activities regulated by SNSA, namely the Krško nuclear power plant, the Brinje TRIGA Mark II research reactor, the Central Interim Storage Facility for Radioactive Waste, the former uranium mine and all uses of radiation sources outside the health and veterinary sectors, transport and decommissioning. The review was carried out by comparison against IAEA safety standards as the international benchmark for safety.

It is expected that the IRRS mission will facilitate regulatory improvements in the Republic of Slovenia and throughout the world from the knowledge gained and experiences shared by SNSA and the IRRS reviewers and through the evaluation of the effectiveness of the Slovenian nuclear regulatory framework and its good practices.

The key objectives of this mission were to enhance nuclear safety and emergency preparedness:

- ✓ Providing SNSA, through completion of the IRRS questionnaire, with an opportunity for self-assessment of its activities against international safety standards;
- ✓ Providing the Republic of Slovenia (SNSA) with a review of its regulatory programme and policy issues relating to nuclear safety and emergency preparedness;
- ✓ Providing the Republic of Slovenia (SNSA) with an objective evaluation of its nuclear safety and emergency preparedness regulatory activities with respect to international safety standards;
- ✓ Contributing to the harmonization of regulatory approaches among IAEA Member States;
- ✓ Promoting the sharing of experience and exchange of lessons learned;
- ✓ Providing reviewers from IAEA Member States and the IAEA staff with opportunities to broaden their experience and knowledge of their own field;
- ✓ Providing key staff with an opportunity to discuss their practices with reviewers who have experience of other practices in the same field;
- ✓ Providing the Republic of Slovenia (SNSA) with recommendations and suggestions for improvement;
- ✓ Providing other States with information regarding good practices identified in the course of the review.

III. BASIS FOR THE REVIEW

A) PREPARATORY WORK AND IAEA REVIEW TEAM

At the request of the Slovenian Government authorities, a preparatory meeting for the Integrated Regulatory Review Service (IRRS) was conducted from 23 to 24 May 2011. The preparatory meeting was carried out by the appointed Team Leader Mr Collin Patchett, and the IRRS IAEA Team Coordinator and Deputy Team Coordinator, Ms Adriana Nicic and Mr Hilaire Mansoux.

The IRRS mission preparatory team had extensive discussions regarding regulatory programmes and policy issues with the senior management of SNSA represented by Mr Andrej Stritar, Director General of SNSA, and other members of SNSA senior management and staff. The discussions resulted in the following areas to be covered by the IRRS mission:

- Nuclear power plant;
- Research reactor;
- Central intermediate storage for radioactive waste;
- Former uranium mine;
- Industrial and research facilities and activities;
- Emergency preparedness and response;
- Transport;
- Waste management, Decommissioning and public and environmental exposure control;
- Selected policy issues.

Mr Stritar and the SNSA staff made comprehensive presentations on the current status of SNSA and the self-assessment results to date. IAEA staff presented the IRRS principles and methodology, including the self-assessment phase. This was followed by a discussion on the work plan for the implementation of the IRRS in Slovenia in September 2011.

The proposed IRRS review team composition (senior regulators from Member States to be involved in the review) was discussed and the size of the IRRS review team was confirmed. Logistics including meeting and work space, counterpart identification, lodging and transportation to accommodate site visits and observations were also addressed. In August 2011, SNSA provided IAEA with the advance reference material for the review, including the self-assessment report.

The Liaison Officer for the preparatory meeting and the IRRS mission was Mr Igor Grlicarev.

B) REFERENCE FOR THE REVIEW

The most relevant IAEA safety standards used as review criteria are: GSR Part 1, Safety Requirements on Governmental, Legal and Regulatory Framework for Safety, GS-R-2, Preparedness and Response for a Nuclear or Radiological emergency and GS-R-3, Safety Requirements on The Management System for Facilities and Activities. The complete list of IAEA publications used as the reference for this mission is given in Appendix VIII.

C) CONDUCT OF THE REVIEW

An opening IRRS review team meeting was conducted on Sunday, 25th September 2011 in Ljubljana by the IRRS Team Leader and the IRRS IAEA Team Coordinator to discuss the general overview, the focus areas and specific issues of the mission, to clarify the basis for the review and the background, context and objectives of the IRRS and to agree on the methodology for the review and the evaluation among all reviewers.

In addition, IAEA Team Coordinator presented the new module on the IRRS "Regulatory implications from TEPCO-Fukushima Dai-ichi Accident" to be applied.

The Liaison Officer was present at the opening IRRS review team meeting, in accordance with the IRRS guidelines, and presented the agenda for the mission. The reviewers also reported their first impressions of the advance reference material.

The IRRS entrance meeting was held on Monday, 26th September 2011, with the participation of SNSA senior management and staff. Opening remarks were made by Mr Colin Patchett, the IRRS Team Leader. Mr Stritar, Director General of SNSA, gave an overview of SNSA status and activities.

During the mission, a systematic review was conducted for all the review areas with the objective of providing SNSA with recommendations and suggestions as well as identifying good practices. The review was conducted through meetings, interviews and discussions, visits to facilities and direct observations regarding the national practices and activities.

The IRRS review team performed its activities based on the mission programme given in Appendix II.

The IRRS exit meeting was held on Tuesday 4 October 2011. The opening remarks at the exit meeting were presented by Mr Stritar, Director General of SNSA. The results of the IRRS mission were presented by Mr Colin Patchett. The closing remarks were made by Mr Jim Lyons, IAEA Director, Division of Nuclear Installation Safety.

1. RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT

1.1. NATIONAL POLICY AND STRATEGY

Through its Act ZVISJV referred to as the "Ionising Radiation Protection and Nuclear Safety Act" the Slovenian Government has set out its fundamental safety objectives in Article 1 and fundamental safety principles in Article 4. The fundamental safety objectives cover: reducing the detrimental effect on human health; minimising the level of radioactive contamination on the environment; enabling the development, production and safe use of radiation sources; ensuring safety measures are in place when using nuclear materials. The fundamental safety principles cover: the integrity principle; the justification principle: radiation protection optimisation; dose limits; peaceful use of nuclear material; the principle of primary responsibility; causer pays principle; the principle of subsidiary intervention; and the publicity principle.

However, the Slovenian Government has not produced a separate document describing its national policy and strategy for nuclear safety. The objective of producing such a document is to demonstrate the Government commitment to safety and provide a national co-ordinated plan to ensure the appropriate national infrastructure including education; training; planning and co-ordination for the development or construction of new facilities; financial provision for existing and proposed facilities; development of regulation and guidance; and research which will need to be put in place to secure its delivery. It is the view of the IRRS team that this process should be developed and implemented to ensure the appropriate focus and commitment to safety is maintained and to fulfil the safety objectives and principles of the Ionising Radiation Protection and Nuclear Safety Act.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 1 states that** *"The Government shall provide a national policy and strategy for safety."*
R1	**Recommendation:** The Government should produce a document that sets out the national policy and strategy for safety. This document would then be supported by a national co-ordinated plan to ensure the appropriate national infrastructure is in place to secure its delivery.
S1	**Suggestion:** SNSA should draft a National Policy and Strategy for Safety and promote its adoption.

1.2. ESTABLISHMENT OF A FRAMEWORK FOR SAFETY

In Slovenia, the Public Administration Act defines the functions of Government Ministries. Governmental Decree on Administrative Authorities within Ministries (published in the Official Gazette No. 58/2003) defines the names of those organizations responsible for administering the functions of the Ministries. The Slovenian Nuclear Safety Administration's (SNSA) responsibilities and competences are therefore also given through this Governmental Decree SNSA is one of several Regulatory Bodies empowered to ensure that the fundamental safety objectives and safety principles of »ZVISJV« are met and to implement its requirements.

The main Government Bodies in Slovenia responsible for administering and keeping the Nuclear Act under review are: Ministry of Environment and Spatial Planning; Slovenian Nuclear Safety Administration (SNSA); Slovenian Radiation Protection Administration (SRPA); Administration for Civil Protection and Disaster Relief; and Ministry of Interior.

The Slovenian Ionising Radiation Protection and Nuclear Safety Act covers among others: protection of people against ionizing radiation, radiation and nuclear safety, carrying out radiation practice; use of land; construction and mining activities; commissioning of radiation and nuclear facilities; operation of nuclear facilities; emergency response; shipment of nuclear materials and radioactive waste; issuing, renewal, amendment and withdrawal of Licences; records of nuclear materials; financial resources and compensation; inspection; competence of workers, physical protection of nuclear materials and nuclear facilities, monitoring radioactivity levels in the environment, and penal provisions in case of non-compliance.

Based on this Ionising Radiation Protection and Nuclear Safety Act, several Governmental Decrees and Regulations of ministers of Environment, Health and Interior were adopted.

The Ionising Radiation Protection and Nuclear Safety Act (in the following text the Nuclear Act) requires cooperation of the SNSA with other institutions. i.e. SRPA and the Administration for Civil Protection and Disaster Relief. The interface with SRPA involves a number of important areas such as the radiological dose to workers at nuclear plant licenced by SNSA and the storage of radioactive waste transferred to the Waste Facility licenced by SNSA. In the case of worker dose, it is important that SRPA staff have knowledge of nuclear plant operations to ensure balanced decisions are made when improvements to nuclear safety of the plant are proposed by the licensee. The interface with the Administration for Civil Protection and Disaster Relief involves providing guidance and support in the development of national and regional emergency plans and the provision of advice to the Commander responsible for managing the response to a nuclear event.

The IRRS team did discuss the interface between SNSA and SRPA to determine the effectiveness of the working arrangements between the two bodies. Whilst the IRRS team recognizes the views of both organizations on the advantages of independence, the IRRS team considers the arrangements should be kept under review to establish whether the overall regulatory effectiveness would be improved by merging the two organizations. Of particular concern is best use of the limited resource in both organizations.

1.3. ESTABLISHMENT OF A REGULATORY BODY

SNSA is the Regulatory Body responsible for the regulation of the nuclear power plant, the research reactor, the former uranium mine, the radioactive waste management facilities, and all uses of radiation sources outside the health and veterinary sectors. SNSA regulates these facilities through the Ionising Radiation Protection and Nuclear Safety Act. In addition SNSA also uses Rules to regulate the nuclear industry in Slovenia. The authority to use Rules is given through the Nuclear Act. These Rules are prepared by SNSA, but issued by the Ministry of Environment and Spatial Planning. Examples reviewed by the IRRS team were: Rule JV5 which was produced in relation to proposed ‘new nuclear power plant’; and Rule JV9 which refers to existing plant and covers matters such as, ageing management and operational experience feedback. Further details on these Rules are given in Chapter 9.

Slovenia is a small country with a broad range of nuclear activities which SNSA is responsible for regulating. Thus making provision for building and maintaining the competence of the regulatory body's

staff presents a significant challenge for SNSA. SNSA is a part of the Ministry of Environment and Spatial Planning and because of its size does not have its own human resource staff within it. Support for human resource activities and financial services are provided by staff within the Ministry of Environment.

SNSA has presented to the IRRS team a project which consists in creating a public agency with a system of funding based on fees paid by the licensees. Such an agency would manage its own budget and human resources. The IRRS team recognises the challenges faced by SNSA and considers that it needs more flexibility in terms of human resources in order to adapt a sufficient number of qualified and competent staff to meet its responsibilities. The team therefore suggests consideration should be given to securing alternative methods of financing SNSA to provide it with the flexibility to meet its regulatory responsibilities whilst also ensuring it operates effectively. This should include provision for research and development.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1, Req. 2 states that** *"The government - shall establish and maintain an appropriate governmental, legal and regulatory framework for safety within which responsibilities are clearly allocated."*
(2)	**BASIS: GSR Part 1, Req. 18 states that** *"The regulatory body shall employ a sufficient number of qualified and competent staff, commensurate with the nature and the number of facilities and activities to be regulated, to perform its functions and to discharge its responsibilities".*
(3)	**BASIS: GSR Part 1, para. 4.45 states that** *"In the process of its review and assessment of the facility or activity, the regulatory body shall take into account such considerations and factors as relevant research and development plans or programmes relating to the demonstration of safety."*
S2	**Suggestion:** The Government should consider alternative methods of financing SNSA to provide it with the flexibility to meet its regulatory obligations whilst also ensuring it operates effectively. This should include provision for research and development.

1.4. INDEPENDENCE OF THE REGULATORY BODY

Independence of the nuclear safety regulator is important to ensure it is able to effectively discharge its responsibilities. General provisions for independence are included in the Public Administration Act, Article 2. In Slovenia, the Ministry of Economy is responsible for developing strategies for the promotion of the use of nuclear technologies. SNSA is part of the Ministry of the Environment and Spatial Planning, which does not have a role in the promotion of nuclear technologies. The IRRS team considered the measures put in place for ensuring the independence of SNSA are appropriate.

The IRRS team also reviewed independence in relation to appeals against regulatory decisions, budgets and resource. An appeals process is in place through the Nuclear Act; this allows appeals from the licensee to the Ministry of Environment and Spatial Planning against SNSA on whether the regulatory body had followed the relevant processes in making its decision. However, there were specific matters such as: the Periodic Safety Review Art 81 and 82; Modifications Art. 83 and 84; and trial operation Art 78 for which appeals using the administrative procedure cannot be made; in these cases, the court procedure is possible.

Discussion also took place on the capability to SNSA to obtain additional technical support when it considers necessary. The Nuclear Act enables SNSA to independently finance Technical Support Organisations (TSO), or any other expert, when it considers additional expertise is needed in support of making a regulatory decision on nuclear safety matters. An example chosen for review by the team was the determination of the adequacy of the flood defences around the Krško Nuclear Power Plant. SNSA sought expert opinion on the determination of extreme flooding levels. The IRRS team was satisfied with the process used by SNSA.

1.5. PRIME RESPONSIBILITY FOR SAFETY

The prime responsibility for safety is covered in Article 4, of the Nuclear Act. Article 6 of the Act states 'The user of a radiation source shall be responsible for radiation protection and the facility operator shall be responsible for the nuclear safety at the facility (the principle of primary responsibility). The IRRS team considered the requirements of the Nuclear Act met the IAEA requirement for assigning the prime responsibility for safety.

1.6. COMPLIANCE WITH REGULATIONS AND RESPONSIBILITY FOR SAFETY

The legal framework for compliance with regulations in Slovenia is provided through the Ionising Radiation Protection and Nuclear Safety Act and relevant Rules, such as JV5 and JV9, issued by the Ministry of Environment and Spatial Planning, as described in section 1.2 of this report. SNSA is entrusted with powers for carrying out inspections and assessments within its mandate to satisfy itself the licensees have the necessary processes in place to meet their legal obligations. Further details of how SNSA uses its regulatory framework are described in section 7 and 8 (Inspection and Enforcement) of this report.

1.7. COORDINATION OF DIFFERENT AUTHORITIES WITH RESPONSIBILITIES FOR SAFETY WITHIN THE REGULATORY FRAMEWORK

Collaboration with SRPA

In the legal and the regulatory framework of Slovenia, the SNSA is an administrative authority within the Ministry of Environment and Spatial Planning.

SNSA has interfaces with other administration especially with the Slovenian Radiation Protection Administration (SRPA) an administrative authority within the Ministry of Health. Missions of those two administrations are clearly described in article 11 and others articles of the Nuclear Act.

The IRRS team recognised that SNSA and SRPA report to two different ministers and from the discussion with the staff of both organisations, it was considered that there is neither confusion nor risk of omission, nor undue duplication. However, the IRRS team considers that the effectiveness of the interface between SNSA and SRPA could be improved by planning and performing joint inspections.

Collaboration with other authorities

SNSA has also cooperation with other Slovenian authorities, e.g. for emergency preparedness and response.

The organizational arrangements adopted in case of a radiological or nuclear emergency are described in the National Emergency Response Plan for Nuclear and Radiological Accidents (NERPNRA). It involves

coordination between different organizations (e.g.: Ministry of Environment and Spatial Planning, Ministry of Health, Ministry of Defence, Ministry of Interior, Ministry of Transport, etc.).

In order to coordinate the action of the stakeholders, the NERPNRA gives SNSA the responsibility to lead a special inter-ministerial committee appointed by the Government, whose mission is to plan, coordinate, monitor and evaluate the implementation of the plan. Committee members are ministry representatives (Ministry of Defence, Ministry of Environment and Spatial Planning, Ministry of Health, Ministry of Interior, etc.).

In Section 10.1 of this report extension of the scope of regulatory inspection to emergency preparedness is encouraged. In line with that and for the same reasons as mentioned above on the collaboration with SRPA, the IRRS team considers that joint inspections with the Administration for Civil Protection and Disaster Relief should be performed for a better effectiveness.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 7 states that** *"Where several authorities have responsibilities for safety within the regulatory framework for safety, the government shall make provision for the effective coordination of their regulatory functions, to avoid any omissions or undue duplication and to avoid conflicting requirements being placed on authorized parties."*
S3	**Suggestion:** SNSA should consider establishing a joint coordinated and effective inspection programme with other regulatory bodies such as SRPA and the Administration for Civil Protection and Disaster Relief.

1.8. COMPETENCE FOR SAFETY

Licenced staff

Licensing of the operating staff at Krško NPP is administrated by SNSA. This process contains two components: initial licensing and requalification testing. The initial licensing requires the operator to complete a written and a practical exam. The licenced individuals will be tested for requalification purposes on the first anniversary of their initial licensing and every five years thereafter. The performance of the licenced staff is monitored by SNSA inspectors during the announced and unannounced inspection activities. The performance of the licenced staff is evaluated by the SNSA inspection staff as adequate. This protocol is also applicable to the research reactor operation staff. Additional information on licensing of operating personnel is included in section 5.2.2 of this report.

Regulatory body

The nuclear industry in Slovenia is rather important, in terms of the variety of facilities and activities, as compared to the size of the country. Making provision for building and maintaining the competence of the regulatory body's staff presents a real challenge for SNSA.

SNSA has 42 staff members with high level of education (9 Ph.D., 12 Masters of Science, 21 graduated engineers) and 1 technical staff. These members are considered to have many years of experience in nuclear safety; the average age of the staff is between 40 and 45 years old.

SNSA has started the development of a systematic process to establish the organizational structure and competences necessary for it to meet its regulatory responsibilities; however this has not been fully

implemented. The IRRS team considers it is important for SNSA to systematically determine the size of the organization and the competence for individuals at all levels to justify it is capable of meeting its regulatory responsibilities.

R&D and Academic Institutions

The government of Slovenia provides for research and development programmes which are mostly conducted at the Jožef Stefan institute. SNSA is not directly associated with research programmes carried out in key areas for safety by the Ministry of Higher Education, Science and Technology and currently SNSA has no annual programme for its research and development needs.

It is suggested that SNSA develops a strategy and an annual programme of research and development work to support its regulatory activity.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1, Req. 2 states that** *"The government shall establish and maintain an appropriate governmental, legal and regulatory framework for safety within which responsibilities are clearly allocated."*
(2)	**BASIS: GSR Part 1, Req. 18 states that** *"The regulatory body shall employ a sufficient number of qualified and competent staff, commensurate with the nature and the number of facilities and activities to be regulated, to perform its functions and to discharge its responsibilities".*
(3)	**BASIS: GSR Part 1, para. 4.45 states that** *"In the process of its review and assessment of the facility or activity, the regulatory body shall take into account such considerations and factors as relevant research and development plans or programmes relating to the demonstration of safety."*
R2	**Recommendation:** SNSA should develop and implement a process for carrying out a systematic review of its organisational structure, competencies and resource needed to effectively discharge its current and future responsibilities.
S4	**Suggestion:** SNSA should develop a strategy for research and development and establish an annual programme of work which it considers necessary to meet its regulatory responsibilities.

1.9. PROVISION OF TECHNICAL SERVICES

The technical services in relation to safety, such as services for personal dosimetry or environmental monitoring, are provided by two organizations: the laboratory of the Institute Jožef Stefan (IJS); and the laboratory of the Institute of Occupational Safety (ZVD)

Those laboratories are both accredited according to the ISO/IEC 17 025 standards *General requirements for the competence of testing and calibration laboratories*.

2. GLOBAL NUCLEAR SAFETY REGIME

2.1. INTERNATIONAL OBLIGATIONS AND ARRANGEMENTS FOR COOPERATION

International co-operation and exchange on nuclear safety is important in developing a global nuclear safety regime. The IRRS team reviewed the extent of international conventions, multilateral agreements; bilateral agreements; and agreements on emergency preparedness requiring participation from SNSA. For a small regulatory body such as SNSA ensuring the availability of an appropriate level of competent resources, in order to meet commitments arising from international obligations is a challenge. In addition, SNSA has to ensure having continued capability and competence to be effective in its contribution to international activities. The IRRS team discussed these matters with SNSA staff and recognised the commitment given by them in supporting and leading international activities aimed at ensuring the effectiveness of the global nuclear safety regime. It is recognized that SNSA has priorities for its involvement in international activities

2.2. SHARING OF OPERATING EXPERIENCE AND REGULATORY EXPERIENCE

The SNSA operating experience feedback process is based on the IAEA Safety Guide NS-G-2.11. The Operating Experience Feedback Group is divided into two parts which cover: the collection, dissemination and analysis of international events; and the collection and analysis of events reported to SNSA from licensees. The IRRS team discussed the processes used by SNSA with its staff and reviewed a number of examples where it had carried out its own analysis and used international information to secure safety improvements at those nuclear sites they regulate.

From the information presented the IRRS team concluded that the process for collecting and distributing international information was effective; the methods used by the SNSA team for analysing events were appropriate; the interface between the inspection team and the operating experience feedback team could be improved by lowering the licensee event reporting threshold to ensure availability of the data used for evaluating and analysing the effectiveness of the licensees' operating experience programme. In addition, the number of SNSA staff trained in using root-cause analysis techniques should be expanded to ensure its regulatory effectiveness of the licensees' oversight of operating experience feedback is not compromised.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1, Req. 15 states that** *"The regulatory body shall make arrangements for analysis to be carried out to identify lessons to be learned from operating experience and regulatory experience, including experience in other States, and for the dissemination of the lessons learned and their use by authorized parties, the regulatory body and other relevant authorities."*
S5	**Suggestion:** SNSA should expand its number of staff trained in using root cause analysis techniques to ensure its regulatory effectiveness is not compromised.
S6	**Suggestion:** SNSA should review the current licensees' event reporting threshold to ensure the data used in for evaluating and analysing the effectiveness of the licensees' operating experience programme is appropriate.

3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY

3.1. ORGANIZATIONAL STRUCTURE OF THE REGULATORY BODY AND ALLOCATION OF RESOURCES

The current organisational structure of SNSA is described in Appendix IX. The structure of the organisation has been developed taking account of the Governmental "Decree on internal organisation, posts and titles in the bodies of public administration and justice" with regard to minimal sizes of divisions, services and sections. The most recent development in SNSA was the creation of the Emergency Preparedness Division.

SNSA is composed by 42 staff with a high level of knowledge in nuclear and radiation safety. SNSA has allocated approximately 25 % of its staff to work on nuclear safety and 25 % to work on radiation safety and materials. 16 % of SNSA staff is dedicated to general affairs including legal office, 7 % to emergency preparedness and 7 % to international activities and SNSA has 5 inspectors on radiation and nuclear safety (12% of its staff) and a quality manager.

The IRRS team reviewed the scope of activities SNSA needed to carry out for it to effectively discharge its broad range of responsibilities both nationally and internationally. The IRRS team noted that the staff of SNSA was professional and committed to their work. However, it was also recognised SNSA faced many challenges such as responding to the impact of TEPCO-Fukushima Dai-ichi accident, the need to develop internal guidance for its staff when making regulatory judgements, the development and implementation of performance measures, development and implementation a process for determining organisational structures and competencies, and preparation and delivery of planned research and development needed to support its work.

3.2. EFFECTIVE INDEPENDENCE DURING CONDUCT OF REGULATORY ACTIVITIES

SNSA organization and staff

The IRRS team recognised SNSA staff has a high level of academic qualification and significant experience in the field of nuclear safety. The discussions and observation of SNSA staff performing their activities confirmed they were free from external pressure which could adversely influence their professional judgement. The IRRS team therefore concluded that SNSA organization and its staff met the safety requirements of the IAEA on effective independence.

Technical and expert professional advice or services in support of Licensee's Activities

Based on article 58 of the Ionizing Radiation Protection and Nuclear Safety Act, "operators of radiation or nuclear facilities must get opinion from authorized experts for radiation and nuclear safety with regard to specific issues related to radiation and nuclear safety". In addition, article 83 of the Act indicates that an expert opinion, from an authorized expert for radiation and nuclear safety, is requested for changes of significance for radiation or nuclear safety. This opinion is submitted to SNSA, as part of the application for change approval and provides (information on the technical) justification of the change. Furthermore, expert opinions are for example also requested for application for a licence (Article 80 of the Act) and for a report on Periodic Safety Review (Article 82 of the Act).

All financial costs for these activities are covered by licensees according to a contract signed between both parties. As SNSA is not formally involved in the financial process, this situation could lead to a conflict of interest.

If SNSA is not satisfied with experts/TSOs' opinions, it may request additional opinion, from an authorised or non-authorised expert/TSO, through a contract managed by SNSA; the associated costs will be later also covered by licensees.

An example of using TSO in support of regulatory activities is the NPP outage. During the last NPP outage a number of 8 TSOs (about 20 persons) were contracted to provide support to SNSA inspectors, by witnessing various activities. The results were reported, on a regular basis to SNSA and meetings were held to discuss them with NPP representatives and SNSA inspectors. A combined TSOs' report was prepared at the end of the outage and submitted to SNSA.

The IRRS team was informed that the scope of the contract for TSO support for outage activities was drafted, reviewed and agreed by SNSA.

The authorization process of experts and/or TSO is conducted by SNSA, through a special commission, appointed by the Ministry of Environment and Spatial Planning, at the proposal of SNSA. (*Ionizing Radiation Protection and Nuclear Safety Act*, Article 58 and 59 and JV3, *Rules on Authorized Radiation and Nuclear Safety Experts*)

The Jožef Stefan Institute is one of the TSO and, at the same time, it has a licence for the TRIGA research reactor. It was explained to IRRS team that SNSA considers that there is no conflict of interest, because Jožef Stefan Institute is not allowed to act as a TSO for providing authorized expert opinion for safety issues (e.g. modifications) related to the research reactor.

Currently there are 12 authorized TSOs and three individual experts. The list of authorized experts and TSOs is available on the SNSA website.

SNSA has the competent, qualified and experienced staff that is able to form an independent assessment of the quality of the information reported by these subcontracted activities.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 20 states that** *"The regulatory body shall obtain technical or other expert professional advice or services as necessary in support of its regulatory functions, but this shall not relieve the regulatory body of its assigned responsibilities."*
(2)	**BASIS: GSR Part 1 para. 4.18 states that** *"The regulatory body may decide to give formal status to the processes by which it is provided with expert opinion and advice. If the establishment of advisory bodies, whether on a temporary or a permanent basis, is considered necessary, it is essential that such bodies provide independent advice, whether technical or non-technical in nature."*
S7	**Suggestion:** SNSA should establish a process for directly obtaining and financing technical or other expert professional advice or services in support of its regulatory functions (e.g. inspections), in order to ensure impartiality of advice and avoid conflict of interest.

3.3. STAFFING AND COMPETENCE OF THE REGULATORY BODY

Although the SNSA staff is highly educated there is no formal well-defined training programme to ensure that its entire staff acquires and maintains the proper skills. The IRRS team took note that the inspection staff does have a more defined programme, which requires attendance to technological courses; this training also defines some requirements for inspector refresher training. In addition, many training session are available to SNSA staff by various entities such as the Jožef Stefan Institute, NRC, IAEA or others. SNSA staff has also the opportunity to follow session training programme performed on the Krško nuclear power plant operator's simulator. The IRRS team could not find a systematic training programme. It is noted that SNSA has also identified this issue and started the development of the Systematic Approach to Training system (see Action plan after first Self-Assessment).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 18 para. 4.13 states that** *"A process shall be established to develop and maintain the necessary competence and skills of staff of the regulatory body, as an element of knowledge management. This process shall include the development of a specific training programme on the basis of an analysis of the necessary competence and skills. The training programme shall cover principles, concepts and technological aspects, as well as the procedures followed by the regulatory body for assessing applications for authorization, for inspecting facilities and activities, and for enforcing regulatory requirements."*
S8	**Suggestion:** SNSA should consider the establishment of a systematic training programme to develop and maintain the competence and skills of its entire staff.

3.4. LIAISON WITH ADVISORY BODIES AND SUPPORT ORGANIZATIONS

Technical and expert professional advice or services in support of SNSA Activities

The IRRS team considers that the term "with regard to specific issues", used in the Nuclear Act and as described in section 3.2 of the report, is not clear enough to set the scope of the activities performed by the experts under their authorization without any ambiguity. It is therefore suggested that SNSA should initiate the modification of Article 58 of the Nuclear Act in order to better define the term "specific issues related to radiation and nuclear safety".

Although SNSA considers that these experts are monitored during their activities, it appears that there is no formal review process performed to review and assess their competence and performance nor their independence. The IRRS team therefore considers a structured monitoring and review process should be in place in order to evaluate the performance of authorized experts and to ensure their effectiveness.

A suggestion addressing this issue is included in chapter 4 of this report.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 20 para. 4.19 states that** *"Technical and other expert professional advice or services may be provided in several ways by experts external to the regulatory body. The regulatory body may decide to establish a dedicated support organization, in which case clear limits shall be set for the degree of control and direction by the regulatory body over the work of the support organization. Other forms of external*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	support would require a formal contract between the regulatory body and the provider of advice or services."
S9	**Suggestion:** SNSA should initiate the modification of Article 58 of the Nuclear Act in order to better define the term "Specific Issues related to Radiation and Nuclear Safety".

Expert council

According to article 5 of the Nuclear Act, the Minister for Environment and Spatial Planning appoints an expert council in relation with radiation and nuclear safety. The modality of functioning of this council is described in the rules JV1 *Rules on the specialist council on radiation and nuclear safety*. This council is composed by five members nominated by the Minister of the Environment and Spatial Planning. The chair of the council is also nominated by the Minister of the Environment and Spatial Planning among the members. Each member is nominated for six years. Article 6 of the ZVISJV prescribes in general terms the duties of the expert council.

The process of nomination avoids simultaneous endings of mandates and allows for re-appointments of members.

Articles 6 and 7 of the rules JV1 *Rules on the specialist council on radiation and nuclear safety* include requirements which take into account the potential conflict of interest that could occur.

3.5. LIAISON BETWEEN THE REGULATORY BODY AND AUTHORIZED PARTIES

The IRRS team reviewed the arrangements for liaison between SNSA through consideration of the documentation supporting the process and direct observation of the process through inspection and discussion with the licensees. Routine planned meetings are held with the nuclear power plant to discuss operational performance, regulatory compliance and strategic nuclear safety issues such as future planned improvements to the plant. In addition, interactions also take place with the licensee's through routine and unannounced inspections and discussions on safety submissions presented by the Licensee. The IRRS team was satisfied that processes enabling SNSA to carry out oversight of licensees' facilities and activities were in place. More detailed descriptions on the review carried out by the team are covered in chapters 5 to 11 of the report.

3.6. STABILITY AND CONSISTENCY OF REGULATORY CONTROL

The IRRS team carried out a review of the process used by SNSA to ensure consistency and control of its regulatory activities. This was undertaken by the team considering the SNSA management system which is reported in chapter 4 and the application of the management system through sections 5 to 11. The team also considered how SNSA carried out its reviews and assessments to ensure international commitments such as those of the European Union through EU Directives, and Western Nuclear Regulators Association (WENRA) were met.

The overall conclusion reached by the IRRS team was that processes had been developed by SNSA but in some areas further development was needed to improve its regulatory effectiveness. These details are reported in the following chapters of the report.

3.7. SAFETY RELATED RECORDS

Records Management for radiation practices

The team had an opportunity to get a demonstration of the register used to keep track of all licenced radiation practices and sources. In that register, all vital information from the licensing process is recorded. The system has additional functions, e.g. modules that automatically flags those licences whose assessments need to be renewed or are due to expire, which allows SNSA to utilize the register as an oversight tool The register also serves as a notification tool for the applicant, for example it automatically sends e-mail to those companies that need to be reminded that renewals of assessments or licences are needed.

Management of SNSA and Nuclear Facilities safety related records

SNSA is controlling its safety records, including those received from the licensees, using the processes and procedures described in the *Management System Manual*, which are supported by IT tools and a hard-copies filing system.

In respect to regulatory requirements for record keeping by the licensees, the *Act of Ionizing Radiation Protection and Nuclear Safety* contains requirements for records of personal doses, qualifications of persons carrying out radiation protection activities, radioactive waste and spent fuel, on nuclear material and radiation sources and radiation practices, etc. These requirements do not address records relating to the safety of facilities. Neither the *Rules on Radiation and Nuclear Safety Factors* (JV5) nor the *Rules on Operational Safety of Radiation or Nuclear Facilities* (JV9), which were developed in support of the Act, contain requirements related to safety records. SNSA has recognised this issue and has initiated in 2010 a change of regulation, which is currently in the internal SNSA process.

The IRRS team was informed that, despite the absence of regulatory requirements, safety records are maintained by the operators of nuclear facilities and SNSA inspectors address record management in their inspection activities.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1, Req. 35 para. 4.63 states that** *"The regulatory body shall make provision for establishing and maintaining the following main registers and inventories:* - *Registers of sealed radioactive sources and radiation generators;* - *Records of occupational doses;* - *Records relating to the safety of facilities and activities;* - *Records that might be necessary for the shutdown and decommissioning (or closure) of facilities;* - *Records of events, including non-routine releases of radioactive material to the environment;* - *Inventories of radioactive waste and of spent fuel."*
GP1	**Good Practice:** SNSA has designed and use a register for licenced practices and sources which not only fulfil the IAEA requirements but also incorporates functions and tools that enables SNSA to be proactive in its licensing and supervisory roles.
(1)	**BASIS: GSR Part 1 Req. 35 para. 4.65 states that** *"Applicants shall be responsible for ensuring the recording of information relating to facilities and activities in registers and inventories*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	and analysing it, where relevant, for the purposes of demonstrating safety. Moreover, the regulatory body shall use such records in support of its regulatory functions and to support the enforcement of regulatory requirements."
S10	**Suggestion:** SNSA should finalize the revision of regulations to include regulatory requirements for keeping records related to safety of nuclear facilities, including requirements for retention period, disposal of records and notification to the regulatory body.

3.8. COMMUNICATION AND CONSULTATION WITH INTERESTED PARTIES

One of the fundamental safety principles of the *Ionizing Radiation Protection and Nuclear Safety Act* is the publicity principle. The IRRS team reviewed the following areas: development of regulations and guides; reporting of regulatory decisions made by SNSA; and information to the public during a nuclear emergency. There was clear evidence that SNSA does issue information on its activities to the public, which includes regulatory decisions and newsletters on safety matters relevant to industry.

However, from the information provided by SNSA it was not evident that a systematic process was in place to ensure interested parties and the public were provided with justification of the decisions made by SNSA. SNSA should therefore consider implementing a process to ensure the public are routinely informed on its decisions, using a graded approach.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 36 states that** *"The regulatory body shall promote the establishment of appropriate means of informing and consulting interested parties and the public about the possible radiation risks associated with facilities and activities, and about the processes and decisions of the regulatory body."*
S11	**Suggestion:** SNSA should provide interested parties and the public with reasons and justification for its decisions, using a graded approach.

4. MANAGEMENT SYSTEM OF THE REGULATORY BODY

In 2001, SNSA started to develop and implement a *Quality Management System* based on the IAEA Safety Series No. 50-C/SG-Q, *Quality Assurance for Safety in Nuclear Power Plants and other Nuclear Installations*, *Code and Safety Guides* Q1-Q14, ISO 9001:2000, *Quality Management Systems – Requirements* and IAEA-TECDOC-1090 *Quality Assurance within Regulatory Bodies.*

In 2005, SNSA started to align its management system to the requirements of the IAEA Draft Safety Standard 338, later issued as GS-R-3 *The Management System for Facilities and Activities*.

The SNSA management decided to acquire the ISO 9001:2000 certificate. In the year 2007 five internal audits of management system as well as the management review were performed and the SNSA successfully acquired the ISO 9001:2000 certificate for the management system. Upon certain minor adjustments, the SNSA also acquired the new ISO 9001:2008 certificate in 2009.

In April 2010, SNSA has performed a self-assessment in view of the IRRS mission and has benchmarked its *Management Manual* against the GS-R-3 requirements. As a result of this self-assessment, the SNSA *Management Manual* has been revised in October 2010 (revision 6, in force at the time of the IRRS mission).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-G-1.1 para. 3.9 states that** *"For a regulatory body to fulfil its statutory obligations, it should develop a regulatory management system with the necessary arrangements for achieving and maintaining a high quality of performance in regulating the safety of nuclear facilities under its authority."*
GP2	**Good practice:** The resources allocated to the development and implementation of the management system, as well as the considerable effort deployed to align it with GS-R-3 requirements and ISO 9001, are considered as proof of the commitment of the SNSA management to the continual improvement of the effectiveness of the organization.

The revised *Management Manual* of the SNSA adequately covers all the requirements of GS-R-3. It provides a description of the SNSA organization and management system, its mission, vision, values and management policy, the responsibilities and authority of the management, the management of resources, the internal and external interfaces and lines of communication and the organizational processes.

Appropriate resources have been allocated for the development, implementation and continual improvement of the management system. There are currently one QA Manager and four staff members qualified for and responsible for performing internal audits. The responsibilities of the QA Manager are specified in Section 5.2 of the SNSA Management Manual and are in line with the requirements in para. 3.13 of GS-R-3. However, the job position of the QA Manager is not reflected in the figure provided in the *Management Manual* to represent the organizational structure of the SNSA. The depiction of the structure should be revised for better visibility of the QA Manager position reporting directly to the senior management.

A description of the SNSA processes is provided in the *Management Manual*, together with details about the process owners, interfaces between the process, key activities within each process, inputs and outputs, etc. Performance indicators have been established and are monitored for all the processes.

The processes described are:

1. Managing (having as key activities Project Management, Quality Management System, Employees and Knowledge Management, Financial Resources, Measurement, Analysis and Improvement);
2. Radiation and Nuclear Safety Control;
3. Inspection;
4. Preparation of Legislation;
5. Emergency Preparedness;
6. Monitoring;
7. Preparation of Annual and National Reports;
8. International Cooperation;
9. IT, Infrastructure and Working Environment.

According to Section 4.1.3 "Management system processes" in the SNSA *Management Manual*, "The processes are divided into two groups: key processes and supporting processes. The key processes enable the SNSA to fulfil its mission, while the supporting processes enable the performance of the key processes. All activities and management functions of the SNSA are covered by these two groups of processes." Processes 2 – 8, listed above, are considered key processes and are briefly described in Section 7.2 of the SNSA Management Manual.

Although GS-R-3 does not provide guidance on the categorization of processes, GS-G-3.1 gives an example of categorization, covering Core (Key) processes, Support processes and Management Process (see GS-G-3.1, paragraph 5.5.). It appears that some of the processes considered as "support processes" by SNSA could be re-named as "management processes" (Process 1 – Managing, corresponds to a "management process", while Process 9 is a "support process")

Besides the Manual, the management system documentation includes also procedures defining the processes. It was found that, in some cases, the interfaces between processes are described in the management manual but are not clearly described in the process guidelines. These guidelines should also define the sequence and interaction of the processes (for example, the interaction and iteration between the safety assessment and review process and the inspection process should be clearly reflected in the process flowcharts and internal guidelines content or references made to the specific section of the management system manual) or to give guidance to the specific section of the manual. SNSA should consider conducting a systematic analysis of the processes guidelines in order to insure that all processes sequences and interactions, as implemented in practice and described in the management system manual are properly reflected in this document (e.g. input from review and assessment into the inspection process and vice-versa, identification of needs for new legislation arising from the licensing process, etc.).

Regarding the control of processes contracted to external organizations, it was found that SNSA does not assess the capability and independence of expert organizations during the period of the authorization in a systematic manner. The IRRS team therefore suggests that a process of periodic review should be put in place.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-R-3, para. 5.10. states that** *"The control of processes contracted to external organizations shall be identified within the management system. The organization shall retain overall responsibility when contracting any processes."*
S12	**Suggestion:** SNSA should establish a process to routinely assess the competence and independence of its authorized experts.

Section 4.1.1. "Safety Culture" in the SNSA *Management Manual* states that "The SNSA promotes the development of safety culture by ensuring of the management that the employees understand the key points of safety culture and that they follow the latest international achievements in this field". This is done in an informal manner, on a continuous basis, through coaching and mentoring, without necessarily formalizing the process. However, a suggestion in this direction was received at the IRRT mission (1999) and in the SNSA Self-Assessment Report from April 2010, in Appendix III - Previous IRRT Mission to Slovenia in 1999 – Findings and Follow-Up, in response to the Suggestion "The SNSA could perform its own safety culture assessment" (see last page of the report) it was written "Done through self-evaluation and questionnaires".

In the SNSA *Management Manual* there is a single paragraph dedicated to the graded approach (Section 4.1.2, introduced as a follow-up to the self-assessment conducted in 2010): "Graded approach - The application of the SNSA management system requirements, are graded so as to deploy appropriate resources. It takes into account the significance and complexity of each activity and its results as well as the hazards and the potential impacts (risks) and consequences in case the action was not taken properly or its results would have been inadequate." This appears insufficient to enable understanding of the expectations regarding the application of the graded approach. The graded approach needs to be better described and formalized in a manner that applies to all management system processes. For example, it could be explained how the graded approach is reflected in the levels of approval, depth of the regulatory reviews, degree of detail provided in the internal procedures, training and qualification requirements, etc.

However, from the answers provided in the responses to the questions in the SAT (Self-Assessment Tool), and subsequently during the interviews, it appears that the graded approach to review and assessment is implemented in practice and is formalized for some of the regulatory activities (a specific example is the regulatory review of design modifications, where the application of the graded approach is evident). The IRRS team was informed that in the new amendments of ZVISJV the "graded approach principle" was introduced and that there are several such provisions in ZVISJV, JV5 and JV9.

GS-G-3.1 provides more guidance on the implementation of the graded approach, in paragraphs 2.37 – 2.44, and may be used to further develop the definition of the graded approach in the SNSA *Management Manual*. It is however recognized that the formalization of the graded approach for all processes of the management system is not an easy task.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-R-3, para. 2.6. states that:** "*The application of management system requirements shall be graded so as to deploy appropriate resources, on the basis of the consideration of:* - *The significance and complexity of each product or activity;*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	- *The hazards and the magnitude of the potential impact (risks) associated with the safety, health, environmental, security, quality and economic elements of each product or activity;* - *The possible consequences if a product fails or an activity is carried out incorrectly.*
(2)	**BASIS: GS-R-3, para. 2.7. states that:** "*Grading of the application of management system requirements shall be applied to the products and activities of each process.*"
S13	**Suggestion:** SNSA should take measures to better define and formalize the graded approach of its management system requirements and to ensure that the graded approach is consistently applied for all the management system processes.

Regarding the management of organizational changes, limited information is provided in the *Management Manual* (Section 1.1.4.1 Managing organizational changes) and there is no specific internal procedure addressing this generic management system process. Up to date, the SNSA has managed organizational changes in accordance with the Governmental Decree on internal organisation, posts classification, posts and titles in the bodies of public administration and justice. Since the management of organizational change for a nuclear safety authority entails specific considerations, it is suggested that SNSA develops its own internal procedure for managing organizational changes, this including the definition and classification of "organizational changes" (i.e. besides changes affecting organizational structure, resources, etc., changes to processes may also be treated as organizational changes).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-R-3, para. 5.28 states that** "*Organizational changes shall be evaluated and classified according to their importance to safety and each change shall be justified.*"
(2)	**BASIS: GS-R-3, para. 5.29 states that** "*The implementation of such changes shall be planned, controlled, communicated, monitored, tracked and recorded to ensure that safety is not compromised.*"
S14	**Suggestion:** SNSA should establish a specific procedure for implementing the process for management of organizational changes.

The effective fulfilment of the management system requirements is verified through self-assessments, internal and external audits and management system reviews. Section 8 of the *Management Manual* is dedicated to "Measurement, Analysis and Improvement" and covers monitoring and measurement, independent assessment (including internal and external audits), self-assessment, control of non-conformities, analysis and improvement. The scope of the "Analysis" (Section 8.4) appears to be similar to the scope of the "Management Review" (Section 5.6) and they both correspond to the Management System Review required by GS-R-3 (Section 6, para. 6.7 – 6.10).

There is evidence of annual self-assessments and internal audits performed for all the processes. The implementation of all the SNSA action plans (strategic goals, annual plans, inspection plans, etc.) is

regularly reviewed (e.g. annual plans are reviewed every 3 months). External audits were received as part of the ISO certification process. Management reviews are performed annually, having as inputs the results from all other types of assessment.

The non-conformances identified and the corresponding corrective actions are maintained in an electronic database. In addition, practical examples were presented as evidence to illustrate the way in which the opportunities for improvement are identified and implemented. The status of the implementation of the corrective and improvement actions is periodically reviewed (every 3 months) and any missed deadlines are automatically highlighted in the electronic database. It was found that although reviews of all non-conformities identified are regularly carried out by processes' owners, who keep records on control of non-conformities, the analysis of the causes of non-conformances is not performed systematically.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-R-3, para. 6.11. states that:** "*The causes of non-conformances shall be determined and remedial actions shall be taken to prevent their recurrence.*"
S15	**Suggestion:** SNSA should specify in the Management Manual that the causes of non-conformances have to be systematically analysed.

5. AUTHORIZATION

5.1. GENERAL

Slovenia has one operating nuclear power plant (Krško NPP), one research reactor (TRIGA research reactor of the Jožef Stefan Institute), one central radioactive waste storage for low and intermediate level solid radioactive waste from non-power users of nuclear technology and one uranium mine and mill in a decommissioning stage. In July 2009, the local municipality gave consent to the final location of the low and intermediate level radioactive waste repository at Vrbina site near the Krško NPP. The Slovenian Government adopted the Decree on the national spatial plan for this repository at the end of 2009.

The Krško Nuclear Power Plant, situated in the south-eastern part of Slovenia, is a Westinghouse two loop pressurised water reactor with originally installed capacity of 632 MWe net electrical output power. The plant has constantly been modernised. The modernisation resulted not only in improved safety but also in increased output power. After the replacement of steam generators, the power was uprated to 707/676 MWe (gross electrical power/net electrical power). During the outage in 2006, the low pressure turbines were replaced and the nominal output power reached 727/696 MWe.

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

The authorization system in its essential principles is the same for all nuclear facilities and foresees as main steps a siting procedure that includes an environmental impact assessment, a construction and finally an operation licensing phase. For research reactors the graded approach principle applies.

The process of modifying a licence is *mutatis mutandis* the same as that of issuing it.

5.2. NUCLEAR FACILITIES

Licensing of nuclear facilities is performed in parallel along two main legislative lines, one being the nuclear legislation and the other the spatial development legislation for siting facilities of national importance in Slovenia.

5.2.1. LEGAL BASIS

The legal basis for the authorization of nuclear power plants is the *Ionising Radiation Protection and Nuclear Safety Act* (in the following text Nuclear Act). The second level legislation consists of so called rules; the most important ones are the Rule JV5 *Rules on the radiation and nuclear safety factors* and the Rule JV9 *Assuring safety after start of operation of nuclear or radiological facilities*. Rule JV5 describes the documentation to be submitted, as well as the details of the licensing procedure, while Rule JV9 gives instruction as to which methodology should be used for the classification and notification of plant changes. Complementary instructions are issued as practical guidance by the regulatory body, e.g. PS 1.01 *The content and scope of periodic safety review of a radiation or nuclear facility*.

As far as siting and civil construction are concerned further acts apply, namely the Spatial Planning Act, the Act regarding the siting of spatial arrangements of national significance in physical space, the

Environment Protection Act and the *Construction Act*. Procedural instructions are provided by the *General Administrative Procedure Act*.

Licensing decisions of SNSA are issued in the form of written orders. According to the nuclear legislation the authorized party has a right to appeal all written decisions of the regulatory body. First instance of appeal is the Ministry of the Environment and Spatial Planning. Exemptions are clearly indicated in the act and are related to decisions on significant safety issues (e.g. the decision of start of trial operation, decision to halt operation, decision on periodic safety review, etc.). In parallel, as a general principle of the civil legislation, all decisions can be challenged in front of a civil court.

5.2.2. TYPES OF AUTHORIZATIONS AND REQUIREMENTS OF AUTHORIZATION

A) National Strategic Spatial Plan

The National Strategic Spatial Plan, which is drafted by the Ministry of the Environment and Spatial Planning, defines, among others, the boundaries for the use of nuclear energy in Slovenia. It has to be adopted by the National Assembly of the Republic of Slovenia on a proposal of the government, which after approval sets the timeline for its implementation. Currently the National Strategic Spatial Plan, as a prerequisite for new build, is still in a draft stage.

B) Licence to perform activities related to the production of energy and Energy permit

The licence, which is issued by the Energy Agency, grants the right to perform activities of energy production through a nuclear power plant. The subsequent permit is issued by the Ministry of Economy and is granted for a specific facility.

C) National Spatial Plan

The National Spatial Plan, issued by the Ministry of the Environment and Spatial Planning the Plan is the central instrument for the siting of the nuclear installation.

The role of SNSA is to review the so called Special Safety Analysis that has to be submitted by the applicant. The Special Safety Analysis focuses on the impact of the site on the plant and vice versa. SNSA has compiled a draft guidance document illustrating the scope of the Special Safety Analysis. This guidance makes reference mainly to IAEA and USNRC guides which contain requirements and acceptance criteria for siting. The list of referenced documents is rather long and does not clearly identify how to cope with not fully compatible methods, e.g. for flooding assessment reference is made to USNRC Reg. Guide 1.59 from August 1977 and to IAEA NS-G-3.5, a much more updated IAEA document from the year 2003.

The drafting of the National Spatial Plan involves the participation of other national administrative authorities and foresees public involvement in the form of hearings. At this point foreign countries are also consulted for trans-boundary impacts within the frame of the Espoo Convention.

The effort to identify applicable IAEA guides and USNRC guidance documents as regards the content and review of the environmental impact assessment is here explicitly recognized. Nevertheless the IRRS team would suggest that such documents be clearly prioritized and ranked in an order of applicability. This can foster a better understanding and a more consistent application of the requirements.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1, para. 4.62 states that** *"The regulations and guides shall provide the framework for the regulatory requirements and conditions to be incorporated into individual authorizations or applications for authorization. They shall also establish the criteria to be used for assessing compliance."*
S16	**Suggestion:** SNSA should consider defining a prioritized structure of which requirements and acceptance criteria apply, indicating the order of applicability of referenced international standards and other regulatory bodies' guides.

D) Environmental protection consent

Issued by the Environmental Agency it requires the submittal of an Environmental Impact Assessment.

The role of SNSA is to review the relevant part of the Environmental Impact Assessment, which focuses on the radiological impact of the plant on the environment. SNSA has compiled a draft guidance document illustrating the scope of the Environmental Impact Assessment for its field of responsibility. For environmental impact statements, this guidance makes reference to IAEA NS-R-3 and to USNRC guidance.

The drafting of the environmental protection consent involves the participation of other national administrative authorities and foresees public involvement in the form of hearings. At this point foreign countries are also consulted for trans-boundary impacts within the frame of the Espoo Convention.

E) Construction consent and Construction licence

The construction consent, issued by SNSA is a precondition for the construction licence. The basis for issuing the consent is the approval of the preliminary Safety Analysis Report, decommissioning programme and the programme for the pre-operation monitoring of radioactivity. Further documents to be submitted refer to the waste management programme, management system documentation including documentary evidence that any contractors will comply with the same standards as the applicant, a physical protection plan, etc. The application must include also the opinion of an authorized expert for radiation and nuclear safety.

The construction licence is issued by the Ministry of the Environment and Spatial Planning and once granted allows the start of construction work on site.

It is estimated that SNSA issues the consent for construction in 2 years' time after receiving all required documentation, while the Ministry of the Environmental and Spatial Planning issues the construction licence in 2 months' time after receiving the required documentation (including SNSA consent).

F) Consent for start of trial operation and Decision for start of trial operation

Before the licence for use of the facility is issued, technical checks and trial operation must be performed. SNSA issues the consent for start of trial operation and subsequently the Ministry of the Environment and Spatial Planning formalizes its decision.

Basis for issuing the SNSA consent is the review of the as build design. SNSA has to approve the Safety

Analysis Report and the trial operation programme. Further programmes, like the aging management programme, the SSC qualification programme, in-service inspections and maintenance programme, etc. are part of the documentation. The application must include also the opinion of an authorized expert for radiation and nuclear safety. Furthermore, before trial operation can actually start additional documentation has to be made available to SNSA, such as the operating procedures, the results of operation tests of specific systems and components, the evidence of plant personnel qualification, etc.

In fact trial operation together with the technical checks of the plant represents the commissioning phase, which lasts up to 3 years.

G) Licence for use of the facility

The Licence for use of the facility, issued by the Ministry of the Environment and Spatial Planning, requires the previous verification that the environmental impact of the facility as determined during trial operation is within the prescribed limits.

H) Operating Licence

The operating licence is issued by SNSA after review and approval of the Final Safety Analysis Report and of the report on trial operation. Further application documents include updates of the programmes required under the consent for trial operation. The application must include also the opinion of an authorized expert for radiation and nuclear safety. In the operating licence SNSA essentially confirms that the plant fulfils all safety requirements and can be operated within the set limits.

OTHER AUTHORIZATIONS

Besides the licensing of nuclear facilities specific authorizations for defined activities are also foreseen in the legal framework. These are most specially:

I) Licence for an authorized expert for radiation and nuclear safety

Introduced in Article 58 of the Nuclear Act the licence was issued by SNSA according to the prescription of the Nuclear Act and of the Rule JV3 *Rules on authorized radiation and nuclear safety experts*. Authorizations as experts may be issued to single natural persons as well as to technical support organizations. An expert commission led by SNSA Director performs the review of the applications evaluating the technical expertise in the area which the application has been submitted for, and also general appreciation of the basic principles in the field of nuclear and radiation safety. The licence has a maximum validity of five years. The list of the authorized experts is published on SNSA website.

The authorized experts play an important role in the authorization process since it is mandatory for the applicant to enclose the opinion of an authorized expert to on applications for the construction consent, for the consent for trial operators, for the operating licence as well as for modifications thereof.

J) Licence for workers performing safety significant tasks at nuclear or radiation facilities

Introduced in Article 62 of the Nuclear Act the licence is issued by SNSA according to the prescription of the Nuclear Act and of the Rule JV4 *Rules on conditions to be fulfilled by workers performing safety significant tasks at nuclear or radiation facilities*. An expert commission led by SNSA Chief Inspector is in charge of reviewing and testing the competences and skills of the candidates. The testing includes a written, an oral and a simulator exam. Furthermore the yearly training programme is formally approved by SNSA. The validity of the licence is limited to one year the first time it is issued and to a maximum of five years the successive times.

5.2.3. CONDITIONS AND LIMITATIONS OF AUTHORIZATION

Authorization is conditioned by the full submittal of the documentation required: the time to process the applications, as indicated by way of an approximation in the previous subchapter, are to be understood after the application documentation is completed.

An operating licence may be issued for a maximum of ten years as per new dispositions in the Nuclear Act (Art. 111). According to Art. 110 of the Nuclear Act the operating licence must include, as regards the main conditions imposed on the licence-holder: the operational conditions and limitations relating to the Safety Analysis Report; the obligations relating to periodic safety review; the deadlines and conditions for a next review of the radiation protection assessment of exposed workers against radiation and for the next review of emergency plan. Further conditions can be inserted in the operating licence if deemed important by SNSA as explicitly foreseen by the Nuclear Act. The operating licence itself does not normally contain the numerical values for the limiting parameters, but makes reference to the limiting conditions of operation (LCOs) as part of the Safety Analysis Report. This is a licensee's document and becomes the most important licensing reference.

5.2.4. LICENCE AMENDMENTS AND RENEWAL

Operating Licence amendments are regulated according to Art. 83 of the Nuclear Act and require a similar process as the one adopted for issuing the licence. Details are set in the Rule JV9. Plant modifications are divided in three categories according to their significance. Category 1 changes are those that do not have any implication on radiation or nuclear safety and are reported to SNSA once a year (in the yearly report). In order to assess that a change is category 1 the operator has to perform a safety evaluation screening based on Annex 7 of Rule JV9. Category 2 changes are those that have minor impact on radiation or nuclear safety. After the screening the operator has to perform a safety evaluation as detailed in Annex 8 of Rule JV9 in order to demonstrate the minor impact and to submit it to SNSA. With a written decision SNSA confirms the categorization made by the operator. In case SNSA cannot confirm it, the change is categorized in the third category. Category 3 changes are those that have a substantial impact on radiation or nuclear safety. Classification in category 3 is determined based on the screening and safety evaluation previously mentioned. Category 3 changes are typically changes that affect the design base of the plant as described in the Safety Analysis Report or changes to the LCOs. Category 3 changes are treated as amendments to the Operating Licence and require that the operator submits, as part of the application, an opinion from an authorized expert for radiation and nuclear safety. After the application is completed SNSA has 90 days to perform its review and assessment and communicate its decision in writing.

According to Article 82 of the Nuclear Act performing of a periodic safety review and approval by SNSA is a precondition for renewing an operating licence. The procedure is the same as that for category 3 changes.

For category 3 changes of a bigger extent, as well as for the periodic safety review, the decision of SNSA is formed over a longer period of time and is documented in several internal reports and minutes of official meetings (hearings) with the licence-holder and very succinctly summarized in the final written order by SNSA. As a consequence, the rationale of the regulatory decision is fragmented over several documents. The traceability of the regulatory decision could benefit from a conclusive report by SNSA that at the end of the process would include the technical explanation of the main safety issues and their regulatory solution. The IRRS team noted that in many IAEA Member States an evaluation report of the change, including rational for decision is prepared by the regulatory body.

During discussions it was mentioned by SNSA that the permission of starting up the nuclear power plant after a planned outage is not given directly by SNSA. The technical support organisation following the outage on behalf of SNSA is giving the written consent after approval of the outage report(s). In fact SNSA does not endorse explicitly with a formal document/report of the conclusions of the technical support organisation, but has the right to stop the procedure at any time. The IRRS team noted that in many IAEA Member States reactor start-up after an outage requires a formal regulatory approval.

5.2.5. TERMINATION OF LICENCE

Conditions and procedures for the termination of licence are described in the Nuclear Act (Art. 113 to Art 117). The Operating Licence may be suspended by a written decision of SNSA.

5.2.6 GRADED APPLICATION TO RESEARCH REACTORS

There is one research reactor operating in Slovenia. The Jožef Stefan Institute (JSI) operates a TRIGA Mark-II 250 kW reactor with the operating licence issued in 1992 for modernization and pulse operation.

The principle of graded approach for research reactors is anchored at the level of the Rules in the regulatory framework. For example in Rule JV5 there is a differentiation as to which is the design basis for research reactors compared to nuclear power plants. In addition special exemptions may apply to the existing TRIGA reactor and these are clearly identified in the Rules (e.g. in Art 9 of Rule JV9 the existing TRIGA reactor is exempted from performing data collection and evaluation in view of a probabilistic safety analysis).

5.3. RADIATION PRACTICES IN INDUSTRY AND RESEARCH

Article 11 of the *Ionizing Radiation Protection and Nuclear Safety Act* (ZVISJV) states that prior to the commencement of a radiation practice it is necessary to obtain a licence for it. Activities requiring a licence are found in paragraph 3 and 4 of article 11 but are more specifically defined in governmental decree on *Practices Involving Radiation* (UV1). In UV1, SNSA is appointed as competent authority for cases concerning the use of radioactive substances or devices and equipment which emit ionizing radiation due to operation at voltages above 5 kV. Similarly SRPA is given role as competent authority for cases concerning the use of sources or practices involving radiation in health care or veterinary medicine.

Article 12 of ZVISJV gives general requirements on what an application for a licence to carry out a radiation practice should contain. In article 4 of *Rules on the Use of Radioactive Sources and on Practices Involving Radiation* (JV2) the requirements on the contents of an application are specified in detail. One important part of the application is the Assessment of the Radiation Protection of Exposed Workers which is approved by SRPA.

Further to the licence to carry out a practice, a licence is also required for each source to be used in the licenced practice. The requirements on the contents of an application to use a radiation source are found in Article 5 of JV2.

The IRRS team took notice of the graded approach that is applied to licensing in such way that for some sources, devices and circumstances the need for obtaining a licence is replaced by a requirement for entry into the register of sources (i.e. registration). Example of such circumstance is the use of e.g. an unsealed radiation source when its activity or specific activity does not exceed the exemption levels by more than a factor 10. The IRRS team found that this graded approach reduces the burden on the applicant and the authority without impairing on the regulatory control over the practice or the source.

As mentioned, one of the licensing documents is an assessment of radiation protection for the workers involved in the practice or the use of the source. In this document, the nature and extent of the radiation

risk is to be assessed in advance; also a program for optimization of radiation protection measures in all working conditions is made. The document must be prepared by the applicant who, according to article 27 of ZVISJV, is obliged to consult an authorized radiation protection expert (TSO). The assessment can also be prepared directly by an authorized TSO. The governmental organization to approve the assessment is SRPA and in 2010 SRPA approved 219 such assessments.

In 2010 SNSA issued 47 licences to carry out radiation practices, 79 licences for the use of a radiation source and 2 certificates of registration of sources. At the end of 2010, 102 organisations in industry, research and state administration were using 209 X-ray devices most of them for cargo and luggage inspection; 1093 sealed sources were used in 88 organizations mostly for the calibration and testing of instruments; and 41 sources stored at 18 organizations were to be handed over to the ARAO. Further to that about 30000 ionising smoke detectors is estimated to be in use, although all are not accounted for.

The IRRS team found that SNSA, by following its licensing process for radiation practices and sources and the use of its highly functional and proactive register over licenced practices and sources, sets the foundation for it to exercise a strong regulatory control of the practices and sources that are licenced.

5.4. WASTE FACILITIES

The municipality council of Krško gave its consent to the proposal of the National Spatial Plan in July 2009. The ARAO successfully accomplished the siting procedure for the LILW repository and the site was approved in December 2009. According to the *Act on Spatial Planning* many governmental organizations and public companies gave their official opinion to the proposed plan and prescribed design conditions for the preparation of the project documentation. Some changes of the proposed Decree followed and at the end of the year 2009 the Slovenian government adopted the *Decree on the Detailed Plan of National Importance for a Low and Intermediate Level Waste Repository* at Vrbina in the Krško municipality. In 2009 and 2010 the conceptual model of near and far field in the Vrbina area was upgraded based on the results of field investigations which were performed during these years. It will be included in the preparation of environmental impact assessment which started in 2010.

* * *

In summary the IRRS team acknowledges that, within the Slovenian legal framework, SNSA has established an adequate process for the authorization and licensing of nuclear facilities. Authorization of changes is smoothly functioning, periodic safety reviews are required by law. The effort of providing guidance documents for the applicants of new builds is commendable and should be completed.

6. REVIEW AND ASSESSMENT

6.1. GENERAL

In accordance with provisions of the *Ionising Radiation Protection and Nuclear Safety Act*, SNSA is empowered to request from the licensees, or from the applicants for a licence, all the documentation needed for the regulatory decision making process on safety related matters.

The general regulatory review and assessment principles and the regulatory process implemented by SNSA are established in the regulations (Rules JV5 and JV9) and described in the SNSA *Management Manual* and in an internal procedure (staff guidance ON 2.1.4 *Priročnik za izvajanje pregledov in ocen* (Guide on performing review and assessment)).

As the only responsible for regulatory decision-making, SNSA has to conduct its own review and assessment, taking into account and evaluating both the safety assessments conducted by the licensees and the independent safety assessments performed by authorized expert organizations, as well as other safety relevant information. The independent opinion of an expert organization is therefore only one of the evidences considered in the licensing procedure and SNSA is not bound by this opinion and can, in case of any doubt, obtain a second expert opinion, if necessary.

For major reviews, such as those performed by SNSA on the occasion of the periodic safety reviews, interdisciplinary teams are established. These teams include experienced staff from the technical divisions and units to ensure the necessary expertise to cover all the areas of review. Most of the experts responsible for the assessment of the safety related documentation also participate in the teams that perform the inspections. The assessments and inspections performed as part of the major reviews mentioned above are supplementary to the assessment and inspection activities deployed by each division on a regular basis. In some specific cases, assistance from external specialists is required to supplement the assessment needs of SNSA.

There are several mechanisms in place for communication between SNSA and the licensees in support of the regulatory review process, consisting of regulatory requirements established in regulations and guides, regulatory letters, licensing meetings, regulatory inspections, regular reports (daily, monthly, quarterly, annual reports, etc.), telephone, fax, etc., all of them supported by regulations and specific procedures that address the interface between regulator and licensee. During the reviews, regular contacts are arranged between the licensee and SNSA representatives.

6.2. COMPETENCES FOR REVIEW AND ASSESSMENT AND ORGANIZATIONAL ASPECTS

The Nuclear Safety Division (NSD) of the SNSA is in charge of performing the regulatory review and assessment function for nuclear facilities. It consists of two units (the Operational Safety Section and the Analysis and Licensing Section) and it has a total of eleven (11) positions, all currently filled. The inspectors in the Radiation and Nuclear Safety Inspection Division also participate in safety reviews, in cooperation with NSD.

The current number of staff is generally sufficient to cover the activities for the routine regulatory reviews. However, in case of more demanding activities such as major modifications, regulatory oversight during NPP outages, review of the "Stress test report" prepared by the licensee as part of the safety

reassessment performed after the TEPCO-Fukushima Dai-ichi accident, the SNSA internal review capability could be exceeded. In such situations, SNSA decisions are mostly based on the independent expert opinion contracted by the licensee as per provisions of the law. Usually, SNSA is not performing extensive independent safety analysis (i.e. with computer codes); only simplified or partial safety analyses are performed by the SNSA staff to support decision-making.

The staff involved in review and assessment of nuclear facilities has limited expertise in deterministic safety analyses. It was generally sufficient for ensuring that all major areas of review and assessment are properly addressed provided that independent safety analyses are performed by external organizations. However, the SNSA needs external expert assistance in reviewing nuclear safety issues related to the modernization program of the Krško NPP and the application for long term operation, PSRs, review of the licensee's Stress Test Report, etc.

SNSA performs occasional reviews of the licensee's provision or resources, organisational changes, and management of contractors. In accordance with paragraphs 3.44 - 46 of GS-G-1.2 and its Appendix, the regulatory review should cover also these aspects.

Given the future challenges that SNSA should deal with, it is suggested that SNSA takes immediate actions for enhancing its in-house expertise and for securing sufficient staffing in order to build up its competence and experience.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1, Req. 25, para 4.45 states that** *"In the process of its review and assessment of the facility or activity, the regulatory body shall take into account such considerations and factors as: […]* *(7) The applicable management system"*
(2)	**BASIS: GS-G-1.2, paragraph 3.46. states that** "*The review and assessment by the regulatory body should cover all aspects of the operator's managerial and organizational procedures and systems which have a bearing on nuclear safety, such as: feedback of operational safety experience; the development of operational limits and conditions; the planning and monitoring of maintenance, inspection and testing; the production and revision of safety documentation; and the control of contractors (see the Appendix for further details). The regulatory body should also review and assess the operator's procedures for the control and justification of changes to the operator's managerial and organizational procedures and systems which could have an impact on nuclear safety."*
S17	**Suggestion:** SNSA should take measures to address more systematically the regulatory review and assessment aspects related to the licensees' management system.

6.3. REFERENCE DOCUMENTS FOR REVIEW AND ASSESMENT AND UTILIZATION OF LESSONS LEARNED

The basic set of national requirements issued in support of regulatory review and assessment activities consist of the following regulations:

- JV5 - *Rules on Radiation and Nuclear Safety* – establishing provisions for approval of the siting, design, construction and operation of the nuclear installation;

- JV9 - *Rules on Operational Safety of Radiation or Nuclear Facilities* – providing requirements related to facility management, use of operating experience feedback, ageing management, use of PSA, reporting, operational safety, plant modifications, PSR and other safety related aspects relevant during commercial operation phase of the nuclear facility.

Some other related regulatory requirements are included in UV3 – *Decree on the areas of limited use of space due to a nuclear facility and the conditions of facility construction in these areas*.

The basic set of regulatory requirements for nuclear safety set forth in Slovenian nuclear legislation was thoroughly reviewed in recent years against the WENRA reference levels. However it is recognized that additional technical regulatory guidance should be developed/ endorsed based on the international standards and guides in order to properly cover all the technical areas subjected to regulatory review.

Additional guidance used by the SNSA staff in performing their regulatory reviews includes several internal guidelines (e.g. for the review of proposed modifications to safety related systems, structures and components, for the review of the licensees' operational experience feedback processes, etc.), but significant reliance is placed on the IAEA Safety Standards and US NRC regulations and guides, which are referenced in the internal SNSA procedures and are used by the reviewers to derive assessment principles, objectives and criteria. In accordance with the recommendations in GS-G-1.2, paragraph 3.23, when the regulatory body uses objectives and requirements developed and issued by international organizations or by regulatory bodies in other States, a good understanding of their basis should be acquired by means of appropriate contact with the relevant bodies.

The consistency and objectivity of the regulatory review can benefit from the development of a set of internal procedures and guidelines to cover all the main areas of safety assessment and to specify the safety objectives to be met by licensees and applicants, therefore it is suggested that SNSA takes steps in this direction (i.e. this would imply having more detailed technical review guidelines, such as, for example, the one developed for the review of licensees' operational experience feedback processes).

There is no specific procedure specifying principles for the application of a graded approach to all regulatory safety assessments. Also, a system for categorization of regulatory findings arising from the review and assessment is neither fully formalized nor implemented. This was already noted in the section dedicated to the review of the management system of the SNSA, together with the observation that the sequence and interactions between the regulatory review and assessment process and the inspection process are not fully described in internal procedures.

The application of the graded approach is formalized only in specific cases, such as the regulatory review of plant modifications. The 2002 Act distinguishes three categories of modifications according to their significance for radiation or nuclear safety. The criteria for ranking the safety significance of modifications are defined in Rule JV9, art 35 and 36. Licensee has to perform safety assessment for every modification, by safety screening. For categories 2 and 3, a safety evaluation is required. The safety evaluation is composed of 8 questions, which also address the effect of a modification on the existing safety analysis e.g. on the probability of design basis accidents and their consequences. For category 3, an expert opinion by a technical support organisation is required to evaluate the proposal for change and its effect on radiation and nuclear safety.

While it is recognized that the graded approach inherently depends on the complexity of the safety documentation submitted by the licensee in support of various steps and activities that are part of the licensing process and evidence was found of the graded approach being implemented in practice by the SNSA, it is recommended that the SNSA formally describes the principles and factors taken into account

in the application of the graded approach to safety assessment in its internal procedures. A suggestion addressing the need to apply a graded approach for management system processes is included in chapter 4 of this report and this approach should also be applied to the review and assessment regulatory process.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1, Req. 25, para 4.45 states that** *"In the process of its review and assessment of the facility or activity, the regulatory body shall take into account such considerations and factors as:* *1. The regulatory requirements;* *2. The nature and categorization of the associated hazards;* *3. The site conditions and the operating environment;* *4. The basic design of the facility or the conduct of the activity as relevant to safety;* *[…]."*
(2)	**BASIS: GS-G-1.2, para. 3.2 states that** "*The regulatory body should provide internal guidance on the procedures to be followed in the review and assessment process and guidance on the safety objectives to be met. Detailed guidance on specific topics for review and assessment should also be provided, as necessary.*
S18	**Suggestion:** SNSA should consider expanding and further developing its own set of internal technical review guidelines and provide the necessary training in their application for regulatory review and assessment, in order to cover all areas important to safety (such as for the regulatory review of PSA, SAR, PSR, Safety Analyses, radioactive waste management applications, etc.)

6.4. WASTE FACILITIES

Assessment of safety before the construction of a spent fuel management facility or a radioactive waste management facility is assured through Article 71 of the 2002 Act. It is ensured through the provision that an application for licence shall contain project documentation, a Safety Analysis Report and an opinion of an authorised expert for radiation and nuclear safety.

After construction work has been completed, every nuclear facility shall undergo a period of trial operation. Prior to the start of trial operation of a nuclear facility it is mandatory to obtain the consent of the SNSA. An application for consent for the start of trial operation shall contain a Safety Analysis Report updated with the changes which occurred during the construction, an opinion from an authorised expert for radiation and nuclear safety and other prescribed documentation.

In regard of the Central Interim Storage Facility, ARAO performs its own review and assessment of the installation once a year. Additional assessments are performed if bigger activities are done. Those assessments are carried out before and after the activity. All modifications are performed in accordance with the Article 83 of the Nuclear Act and subsequent legislation.

A periodic safety review is performed every 10 years as a condition from SNSA for the renewal of the operational licence.

No specific internal technical guidance regarding review and assessment of radioactive waste facilities are available at SNSA.

POLICY ISSUE - LONG TERM OPERATION (LTO) OF THE KRŠKO NUCLEAR POWER PLANT

With regard to Long Term Operation (LTO) aspects, in view of the world's demand for electric power and the environmental impact of the use of fossil fuels, nuclear power plant life management for long term operation is seen as a viable and economically attractive alternative. Since there are clear benefits to be gained in terms of both safety and economics, as well as ensuring supplies of power, plant life management is recognized as an essential part of nuclear power plant operation, and facilitates the achievement of long term operation.

Long term operation represents an operating organization's decision, subject to regulatory approval, and shall be based on a sound technical and economic justification. Plant life management plays a key role in ensuring that safety and design margins are adhered to.

The operating licence of Krško NPP is periodically extended for a period of up to 10 years based on PSR (Periodic Safety Review) results. Although the term "design lifetime" is not explicitly defined in the current regulations, the design lifetime of some components and systems is mentioned in the SAR, defined as years of full power operation or as a number of different transients that a component/system can withstand. The components which limit the "design lifetime" of the NPP up to the year 2023 are identified in the SAR.

Within the scope of the 1st PSR, which was finalized in 2003, Krško NPP performed scoping and screening of structures, systems and components (SSC) that should be covered in the Ageing Management Program. This action was part of the licensee's strategy to prepare for the long term operation. The action had been followed by a review of the ageing management program, based on the experience of the US nuclear industry.

In 2007, Krško NPP informed SNSA about their plans for long term operation and started developing a new program for ageing management, as a step in preparing for an application to SNSA for obtaining regulatory approval for long term operation. This programme was supported by a specific R&D project dedicated to LTO problems and financed by the Ministry of Science and Technology with the goal of preparing the technical support organisations for the tasks related to LTO.

In 2009, new regulations JV5 and JV9 have been issued in Slovenia, incorporating WENRA reference levels that specifically address design extension aspects (including preparedness for beyond design basis accidents). In addition, the new regulations include provisions requiring that, in a case of a design lifetime extension, practicable improvements to the protection against severe accidents shall be determined and implemented.

Krško NPP submitted its application for approval of an extended design lifetime by 20 years, after 2023, including the relevant changes to the safety analysis report, at the end of March 2009. The review of the application represents a challenge for the SNSA, being demanding in terms of resources.

In line with the Slovenian legislation, SNSA required Krško NPP to have an independent review and assessment performed by a technical support organization with a scope equivalent to that of the US NRC Safety Evaluation Reports (SER) prepared as a part of US NRC review of US licence renewal applications.

The review, performed by a group of international experts contracted by the technical support organization, was presented to the SNSA in 2011. The experts' opinion upon completion of the review

was positive and no significant issues were identified that could impact on the plans for LTO. The regulatory review of the selected parts of the plant application and TSO review report is still in progress.

During the discussion with the IRRS team, apart from technical aspects regarding plant ageing management programme for the NPP system and components important to safety, other specific issues were recommended to be taken into account such as capability to preserve additional amount of spent fuel on site, knowledge management, as well as NPP staff succession plan. A good practice for transferring technical excellence is to involve young nuclear power plant employees in major replacement projects under the leadership of experienced personnel. Young employees will thus be motivated to acquire essential knowledge through participation. A process should be in place to ensure that all personnel who leave a nuclear power plant are fully debriefed with respect to their knowledge gained and their accumulated experience.

From the above said facts it is concluded that timely implementation of an ageing management programme and actions taken for the improvement of the design and replacement of the critical and obsolete components (reactor pressure vessel head, etc.) of the Krško NPP, as part of the current maintenance programme, is considered a good practice and a sign of positive attitude and commitment to safety in support to the application for Long Term Operation and request for regulatory body's approval. Compliance with the current licensing basis will ensure that all safety and legal requirements are satisfied and will facilitate long term operation.

The review of the licensees' safety analyses in support of LTO represent a challenge to any regulatory body and it considered a good practice that SNSA has addressed LTO aspects in a timely manner, by providing an adequate regulatory framework and a strategy for covering all safety relevant aspects of the licensee's application well in advance of the actual date when the licence for extended operation is expected.

7. INSPECTION

7.1. GENERAL

The inspection program is described in the *Inspection Rules of Procedure*. This document requires the development of an annual inspection plan. The Annual Plan for Radiation and Nuclear Safety Inspection consists of sections that address administrative requirements, inspection of Krško NPP, inspection of the research reactor, inspection of ARAO, inspection of the Žirovski vrh Mine and inspection of radiation practices and sources.. Through discussion with staff from several divisions, the IRRS team understands that the inspection plan is developed in a collaborative process which includes other divisions, input from operating experience, recommendations from outages reports (when applicable) and follow-up activities from the inspection reports, to list a few of the contributors. A consensus is achieved in regard to the listed items, and specific inspection targets are identified throughout the year, including specific modification inspections or specific reactive inspections based on plant or radiation practices events.

The plan itself is an upper tiered document that contains broad requirements such as "perform ISI inspections." The specific ISI inspection to be performed is determined based on input from Nuclear Safety ISI engineer and plant performance indicators as well as inspector judgement.

7.2. ORGANIZATION FOR INSPECTION

The organization for inspection consists of a director of inspection and four inspectors. This inspection staff is supplemented, on invitation as needs arise or as designated by the Annual Plan for Radiation and Nuclear Safety Inspection, by topic specialists from other divisions such as the Division for Nuclear Safety. The inspection staff reports to the Director of SNSA.

The inspection staff is divided into two areas of concentration: 2 inspectors primarily inspect radiation practices and 3 inspectors concentrate on the Krško NPP and Research Reactor. The inspectors also have the responsibility of developing some level of expertise in specialties such as fire protection and quality assurance. In addition to addressing the assigned inspection areas, all 5 inspectors maintain a working knowledge of all the SNSA inspection responsibilities such that they are able to provide 24 hour coverage as assigned duty inspectors to address emergent issues, in particular emergent issues that occur after hours.

Occasionally the inspection staff for nuclear facilities is supplemented by the use of TSOs employed by the SNSA during such times as outages and special topic inspections. The TSO does not receive inspector training and does not get assigned as an inspector. Rather, the regulator views the use of TSOs in the plant as more of a fact gathering role, after which the TSO provides the information to the SNSA staff for evaluation and enforcement consideration as appropriate. The specific TSO employed at any one time is selected by SNSA and paid for by the Krško NPP operator. Given that the TSO is providing direct support to SNSA's inspection program in times of increased inspection needs such as plant outages during which the individual SNSA inspectors are not able to witness all activities, and are dependent on the independent gathering of information by the TSOs, there is the potential for conflict of interest. The fact that the TSO is currently paid by the Krško NPP operator has the potential to influence the TSO's performance in regard to the TSO's possible concern for repeated employment. This issue has been addressed in section 3.2. of this report.

There is no base frequency set for inspections of certain radiation practices, areas or programmes per se. However, according to article 93 in JV2 a TSO shall carry out surveillance of a radioactive source prior to putting it into service and then in regular intervals varying between 6 months and 5 years depending on

the category of the source and the practice the source is used in. In 2010, the Institute of Occupational Safety examined a total of 1252 radiation sources of which 453 were done for sources in use in industry and research area. The Jožef Stefan Institute examined 14 radiation sources. The IRRS team considers this system to be sufficient to ensure that no practice or source is left completely out from surveillance or inspection even though some practices, for reasons of available resources, may never by inspected by the SNSA.

The SNSA inspection staff performs its duties in an independent manner. The inspection documentation and enforcement decisions are reviewed by the management and the inspectors' conclusions are rarely revised. They interview all levels of licensee staff and perform direct observation inspections in the field. The inspectors are provided the authority to address issues as they are identified in accordance to the enforcement Act and Rules. Based on discussions with the licensee's staff, the IRRS team determined that the inspection staff fosters an open and cooperative relationship with the licensees. This kind of professional and respectful relationship further enables the inspectors to be fully aware of conditions at the various licensees.

Interviews with SNSA staff revealed that the employees are sometimes tasked to perform activities other than their primary assignments. Due to the limited size of the SNSA, there is a high level of inter-divisional collaboration and support. Because of this, it is not unusual for a member of the inspection staff to be assigned for support to an effort other than inspection. This may limit the use of inspectors in regard to field inspections associated with licensing activities they may have worked on as a temporary assignment (for example). This could be restrictive in regard to availability for inspectors depending on what tasks they are assigned. During review of the Act of Inspection, the IRRS team identified that Article 15 states that inspectors may not perform duties for another employer in the field in which they perform inspections.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 para. 4.7 states that** *"The regulatory body shall prevent or duly resolve any conflicts of interests or, where this is not possible, shall seek a resolution of conflicts within the governmental and legal framework."*
(2)	**BASIS: GSR Part 1 para. 4.30 states that** *"[…] The regulatory body shall verify, by appropriate means, the competence of individuals having responsibilities for the safety of authorized facilities and activities."*
S19	**Suggestion:** SNSA should consider taking steps in order to relieve the limitations on the personnel who may perform inspections.

7.3. SCOPE FOR INSPECTIONS

The SNSA's Annual Plan for Radiation and Nuclear Safety Inspection describes, in general terms, the areas of inspection for the NPP, Research Reactor and the radiation sources. The plan includes inspection such as:

- The NPP annual training for licenced operators
- NPP Quality Management
- In service inspection (ISI)
- Predictive and Corrective maintenance
- Control of liquid waste

- Corrective Action Program
- Radiological and Effluent Control
- Outage activities
- Control room observations

This inspection plan also includes requirements for unannounced inspections which are primarily accomplished through the inspections of the control room for Krško NPP. This is fairly limited in the scope of inspection and is contrary to the intent of unannounced inspections

The SNSA inspection program also includes Jožef Stefan Institute, located near the village Brinje. The inspection program applied regularly for research reactor located there is identical to the NPP with some adjustment to accommodate the graded approach of inspection in respect to the limited safety risk. Periodic inspections are also performed at the research reactor per the Annual Plan for Radiation and Nuclear Safety Inspection discussed in section 7.1. They consist of two planned inspections per year and with allowances for reactive inspection, if needed.

Due to the decreased operational activities at the facility, the research reactor is not currently subjected to unannounced inspections. Although the circumstances introduce difficulties with the scheduling, the inspection staff should make every effort to incorporate unannounced inspections into the research reactor inspection planning.

The intent of the unannounced inspection is to verify the field performance is maintained according to established procedures and guidance in a consistent and predictable manner. There would be benefit in expanding the unannounced inspections to include more interactive activities such as on-line maintenance (for NPP) and surveillances and updating the rules to provide for no notification prior to unannounced inspections.

The central interim storage facility is inspected by SNSA and SRPA. SRPA inspects the facility in 2/3 yearly basis and also once a year they have a meeting where aspects like monitoring are addressed. The frequency for SNSA inspection is once a year during normal operation.

In the appendix to the Rules of Procedure there are some checklists on what to inspect for different practices. However, the IRRS team found little documented support on how to inspect certain areas and how to assess performance-based requirements. The performance of the inspector and the findings and results and consequences of the inspection may depend on the competence and expertise of the individual inspector.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 22 states that** *"The regulatory body shall ensure that regulatory control is stable and consistent."*
(2)	**BASIS: GSR Part 1 para. 4.26 states that** *"The regulatory process shall be a formal process that is based on specified policies, principles and associated criteria, and that follows specified procedures as established in the management system. The process shall ensure the stability and consistency of regulatory control and shall prevent subjectivity in decision making by the individual staff members of the regulatory body. The regulatory body shall be able to justify its decisions if they are challenged. In connection with its reviews and assessments and its inspections, the regulatory body shall inform applicants of the*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	objectives, principles and associated criteria for safety on which its requirements, judgements and decisions are based."
S20	**Suggestion:** To better increase the transparency and predictability of the inspection, SNSA should further develop the internal guidance material with methods on how to inspect different areas and practices and how to evaluate and act upon findings against requirements.
(1)	**BASIS: GSR Part 1 para. 4.52 states that** *"[…] the regulatory body shall have the authority to carry out independent inspections […]"*
(2)	**BASIS: GSR Part 1 para. 2.8 states that** *"To be effectively independent, the regulatory body shall have sufficient authority and sufficient staffing and shall have access to sufficient financial resources for the proper discharge of its assigned responsibilities. The regulatory body shall be able to make independent regulatory judgements and decisions, […]"*
(3)	**BASIS: GSR Part 1 para. 4.9 states that** *"To maintain its effective independence, the regulatory body shall ensure that, in its liaison with interested parties, it has a clear separation from organizations or bodies that have been assigned responsibilities for facilities or activities or for their promotion."*
(4)	**BASIS: GSR Part 1 para. 4.52 states that** *"[…] These inspections may include, within reason, unannounced inspections. The manner, extent and frequency of inspections shall be in accordance with a graded approach."*
S21	**Suggestion:** SNSA should perform more unannounced inspections and in a broader scope than in its current practice for nuclear facilities as appropriate.

7.4. UTILIZATION OF INSPECTION RESULTS AND INSPECTION EXPERIENCE

During discussion with the staff and review of the documentation associated with inspection results, the IRRS team determined that the inspections results and inspection experience are utilized by the SNSA. The inspection reports information is transferred in a data base that is used as a basis for the next annual inspection plan. It is also reviewed for trending and to inform the performance indicators. The newly improved version of InfoURSJV also sends emails to affected divisions, ensuring a timely notification of field conditions based on inspection results. The data base also assists inspection staff in tracking due dates in regard to field commitments and completion of specific corrective actions identified through inspection. This feature is especially useful during the inspection planning phase. Additionally, interviews with the inspection staff indicated that operator experience is considered during inspection planning, informing the selection of the specific component or system for inspections such as ISI or surveillance testing. Additionally, the data base has an informative role in the development of the following year's Annual Plan for Radiation and Nuclear Safety Inspection.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 Req. 35 states that** *"The regulatory body shall make provision for establishing, maintaining and retrieving adequate records relating to the safety of facilities*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	and activities."
GP3	**Good Practice:** At the end of each NPP outage, SNSA prepares a report with the summary, analysis and action plan based on the inspection findings.
GP4	**Good Practice:** SNSA has developed, maintains and uses an integrated database (InfoURSJV) that contains all information important for the activity of the regulatory body and what is available for the entire regulatory staff.

7.5. RISK INFORMED INSPECTIONS AND GRADED APPROACH

The current program is deterministic with consideration of some aspects of risk. The program is developed by a cooperative process that incorporates inputs from several informed sources such as the Nuclear Safety Division, Nuclear Materials Division, operating experience (both international and specific to the NPP/RR), and recent inspection information. During discussions with the Nuclear Safety Division personnel the IRRS team determined that there is an aspect of risk consideration as part of that division's analysis and inspection contribution. Additionally, SNSA staff emphasizes systems designated as safety related and those addressed by the maintenance rule.

In the SNSA *Management Manual* there is a single paragraph dedicated to the graded approach (Section 4.1.2, introduced as a follow-up to the self-assessment conducted in 2010): "Graded approach - The application of the SNSA management system requirements, are graded so as to deploy appropriate resources. It takes into account the significance and complexity of each activity and its results as well as the hazards and the potential impacts (risks) impacts and consequences in case the action was not taken properly or its results would have been inadequate."

The inspectors use a graded approach in several manners: one consideration is the use of the performance indicators such that if there is an area with a downward trend the inspections would be increased for that area. Another is increased inspection on systems, components or activities where performance issues were previously identified by the inspectors. A third is that SNSA inspection staff conducts reactive inspections as plant conditions dictate. The inspection staff is available 24 hours a day through the assignment of duty officer which enables a timely and appropriately reactive response by the inspection staff, as described in their guidance procedures.

7.6. INSPECTOR TRAINING AND QUALIFICATION

Inspection training starts with obtaining the training required for all inspectors as described in the procedure for inspector training. The training for inspector certification requires specific technical training such as reactor technical training (USNRC courses) for the NPP/RR inspector and IAEA courses for the materials inspectors. After approximately two years of training, the inspectors must pass a certification test.

The majority of the training occurs as on-the-job training during which the inspector-in-training (trainee) directly observes the qualified inspectors performing field inspection activities. The trainee will also perform specific aspects of inspections under the guidance and supervision of the certified inspectors during his training period. The heavy use of direct observation of individual inspectors introduces a concern for subjectivity in inspection performance. A descriptive training program for providing guidance

on activities and performance expectations is not currently available specific to SNSA. It should be noted that SNSA personnel are committed to employing external documents from international sources such as IAEA standards and other regulatory bodies. These sources may provide sufficient guidance for inspector training when training only one inspector, however, SNSA would benefit from the development of a descriptive training program element specific to SNSA dependence on the on-the-job training. Detailed guidance for the on-the-job observation activities enables consistent and sustainable training resulting in the continuum of an inspection force that delivers consistent inspection performance.

The fully qualified inspector participates in continued training which includes various topics such as operations training using the NPP simulator on off hours. This is viewed as especially effective by the inspectors.

It should be noted that through interviews with SNSA staff, the IRRS team determined that the TSOs mentioned in section 7.2 do not receive the same training. The TSO receives the training required to pass the certification test to be authorized as a TSO in the area of expertise. If selected for support in the field, the TSO will undergo limited training specific to the NPP and the intended assignment.

8. ENFORCEMENT

8.1 GENERAL

The establishment of the Slovenian Nuclear Safety Administration (SNSA) and its responsibilities are given through the Governmental Decree 58/2003 published in the Official Gazette on 18.06.2003. The Slovenian Nuclear Safety Administration (SNSA) is one of several Regulatory Bodies empowered to ensure that the fundamental safety objectives and safety principles of the *Ionising Radiation Protection and Nuclear Safety Act* are met and to implement its requirements. Article 138 places the inspection and enforcement of nuclear and radiation safety with the SNSA.

The responsibility of enforcement rests first with the inspection staff. The inspectors, based on the inspection observations and document research, may issues decisions, conclusions and orders. They may also issue the cessation of an activity or the use of a radiation source in limited situations such as the lack of a licence or deviation from prescribed methods of handling radiation sources.

The enforcement tools available to the SNSA are (not in order of application):

- Verbal warnings
- Written warnings
- Orders
- Cessation of activities
- Fines
- Initiation of prosecution for some administrative offenses or criminal offences as defined by law.

The *Inspection Act* regulates the general principles of inspection and includes specific responsibilities and authorities of the inspectors. It specifies authority to identify issues of concern and to set time limits for the corrective action. In alignment with ensuring the responsibility of safety lies primarily on the licensee, the inspectors reframe from defining the specific corrective action to be taken. The inspectors do ensure the corrective action is reasonable and adequate through follow-up inspections. In addition to defining the authority of the inspectors, the *Inspection Act* provides guidance in regard to a graded approach to enforcement. Article 7 states that during determination of the appropriate level of enforcement the inspector should consider the gravity of the offense. To accomplish this, SNSA fosters an environment of cooperation. The most frequent level of enforcement is verbal warnings. An aspect of the verbal warning is thorough discussion of the technical issue, the safety aspect of the concern, the requirement not being met and the appropriate time line for correction. Most frequently the SNSA staff and the NPP staff are able to align on the issue and the need for corrective action. Through interviews with the SNSA staff, SNSA managers, NPP staff and NPP managers, the IRRS team determined that approach is well understood by all parties and is effective in regard to timeliness and safety significance.

There is an appeals process included in the enforcement guidance, allowing the licensee an alternative in the case that there is disagreement of the inspectors' conclusions. The appeal process does not apply to the case of mandate cessation of activities but is applicable to all other enforcement actions.

8.2. NUCLEAR FACILITIES

In regard to the enforcement actions associated with the inspections conducted at Krško NPP and the Research Reactor, the principle of a graded approach is being correctly applied. The IRRS team determined that this is supported by the inspection statistics available for the year 2010 which include statistics of enforcement actions taken by SNSA. To summarize: out of 110 inspections there were 47 written recommendations for corrective actions, only two of which were written warnings and none of which were more severe.

During interviews with the inspection staff and NPP managers, it was determined that the verbal warnings are viewed as an effective and efficient method to ensure safety of the plant. It was also concluded by the IRRS team that in the cases were the verbal warning is not sufficient there is a common understanding that the increased enforcement options will be applied, as appropriate. Review of the *Act of Minor Offences*, and the *Ionizing Radiation Protection and Nuclear Safety Act* revealed that there is adequate guidance available to the inspection staff such that the level enforcement is predictable and consistent.

Discussions with SNSA staff indicate that the need to apply increased enforcement is rare and that few cases of fines or orders occurred in the more recent inspection history. This is seen as evidence of the alignment to the graded approach and the current inspection environment.

The IRRS team reviewed the circumstances of the two 2010 written warnings and found the basis for the increased enforcement to be sound. The level of enforcement was determined to be consistent with the guidance.

8.2.1. ENFORCEMENT POLICY AND PROCEDURES

The enforcement guidance, based on limited review, appears to be more than adequate to enable consistent and effective enforcement by SNSA. The SNSA staff and the NPP staff share a common understanding of the guidance resulting in a cooperative environment which enables timely corrective actions when needed. Based on interviews with NPP and SNSA staff and limited document review appear the increased level of enforcement actions are understood and appear to be applied judicially.

9. REGULATIONS AND GUIDES

9.1. GENERAL

Specific provisions for the regulation in area of peaceful use of nuclear energy are established in a set of legally binding governmental Decrees and ministerial Rules which are prepared and maintained by competent authorities within the governmental structure. *Public Administration Act* (articles 8 and 9) requires administration of the Government (including SNSA) to initiate a legislative process - prepare draft laws, regulations or other pieces of legislation – in order to fulfil its respective competencies. SNSA is drafting regulations in area of its competence and is responsible for its technical content. In accordance with general administrative law regulations prepared by SNSA are adopted through the Ministry of Environment and Spatial Planning.

9.1.1. EXISTING REGULATIONS AND GUIDES

Regulations in area of peaceful use of nuclear energy and ionizing radiation are done on basis of 7 Decrees issued by the Government and 22 Rules issued by Ministries for Environment and Spatial Planning, for Health and for Interior.

Decrees by the Government regulate areas where several bodies of the Government exercise their competencies. It is mainly the area of radiation protection, transport of radioactive materials and safeguards.

Area of SNSA competences is regulated by ten rules issued by the Ministry of Environment and Spatial Planning. Individual Rules from this set stipulate basic regulatory requirements on safety of nuclear facilities and radiation practices with exception of Rule JV1, which stipulates the framework for Council of specialist on nuclear and radiation safety.

This framework of regulations is maintained by different competent authorities and regulatory requirements are in some areas distributed among several Guides and Rules. For example see chapter 9.4 “Waste facilities”. In such a situation aspects of completeness and consistency of regulations need to be observed very carefully. The project of harmonisation of Slovenian regulations for nuclear safety with WENRA reference levels was an example of structured approach in this area.

A project of development of new regulatory *Practical Guidance* was started recently by SNSA. The intention is to supplement regulatory safety requirements in regulations by giving detailed explanations and guidance for applicants/ licence holders in areas where appropriate. A well-developed system of regulatory guidance may help both to increase effectiveness of the regulatory interface with licensees and in specific areas to ensure consistency in regulatory approach.

Since the major nuclear installation in the country is the Krško NPP, historically NRC standards and guides are extensively used in many cases. Formal process should be in place for incorporation of these documents in different regulatory activities such as review and assessment (see Chapter 6 of this report).

9.1.2. PROCESS FOR DEVELOPMENT OF REGULATIONS AND GUIDES

There is an internal SNSA instruction (OP 4.1 *Preparation of the Legislation*) for development of drafts of legislation, including regulatory requirements for safety. This instruction defines the procedure for development of legislation (acts, decrees, rules), including all interfaces with the Ministry of Environment

and Spatial Planning, other parts of the Government administration and other stakeholders. The procedure pointing out methods of monitoring and changing of legislation doesn't include any formal provisions for systematic periodical screening of legislation which may be one of another trigger for initiating change/modification in the legislation. Initiative to change or expand any part of legislation is at SNSA mainly with technical departments which also screen international standards. Formal procedure exists for the whole government administration in case the European law transposition.

Possibility of public involvement in legislative process is on a high level in Slovenia. Interested parties may be invited to the process of development regulations already even in drafting stage. After the draft is ready there are three hold points envisaged in the formal legislative process where interested parties, including general public, can step into and give their comments/opinions. First, any interested party can apply to the SNSA to be included among consulted parties when the legislative plan is announced. Second, the draft legislation is posted on internet for comments before it goes to the final stages of the adoption process. Thirdly, the members of the Advisory committee representing major players in the nuclear infrastructure have to give their opinion/consent to every draft.

Cooperation between SNSA and other Slovenian authorities/regulators in nuclear area is in case of legislation development (regulations and guides), governed by the Government's Rules of Procedure.

Development of *Practical Guides* follows practically the same procedure as for legislation containing regulatory safety requirements, including public scrutiny. There is a two years plan (2011 – 2012) for development of *Practical Guides*. Some of the actions from the plan are postponed.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GRS Part 1, para. 4.62 states that** *"[…]The regulations and guides shall be kept consistent and comprehensive, and shall provide adequate coverage commensurate with radiation risk associated with the facilities and activities, in accordance with a graded approach."*
S22	**Suggestion:** SNSA should perform systematic periodic screening/review of nuclear safety legislation, to ensure keeping regulatory safety requirements complete and up-to-date.
S23	**Suggestion:** SNSA should establish a long term legislative plan to improve the use of its limited resources and enhance awareness of applicants/ licence holders of possible changes in regulatory requirements.

9.1.3. RELATION TO THE IAEA SAFETY STANDARDS

The set of regulatory requirements for safety set forth in Slovenian nuclear legislation was thoroughly reviewed in recent years against the WENRA reference levels. This review included international peer review organized by WENRA member countries. Based on result of this review SNSA identified corrective actions which were put afterwards to SNSA action plan for harmonisation with WENRA reference levels. Last items on this action plan were completed in 2011.

WENRA reference levels correspond in vast majority with IAEA requirements. There are only few cases were WENRA reference levels go beyond existing IAEA requirements. Thus, above mentioned check and subsequent WENRA peer review gave quite exact picture of compliance of Slovenian nuclear legislation with IAEA standards.

IAEA standards are used by SNSA for development/modification of legislation.

9.2. NUCLEAR POWER PLANT

The basic set of regulatory requirements for nuclear safety is grouped to two Rules JV5 and JV9 ("pre-operational" phases JV5 and "operational phases" JV9). Other related regulatory requirements are included in JV3 and JV4.

Decrees and Rules specify regulatory principles and requirements for safety. "Practical Guides" are intended to provide more details on specific regulatory requirements and associated criteria on basis of which the regulatory judgements are made. It is the licence holder/applicant which proposes for each individual regulatory case a detailed set of standards which shall ensure compliance with general regulatory requirements in Rules. This proposal is scrutinised by SNSA staff.

At the moment, there is only one *Practical Guide* approved and published by SNSA director for conduct of PSR. Two other are in advanced stage of preparation. Short term plan envisage development of several other *Practical Guides* in near future in areas such as content of SAR, implementation of safety related modifications to nuclear facilities, collection and evaluation of operational experience, I&C systems, and others. But there is no formal long term strategic plan for development of *Practical Guides*.

Generally there are arrangements in place at SNSA for establishing regulatory requirements for nuclear safety and resources are devoted to this task both on technical and legislative side. Composition of nuclear safety legislation corresponds in general with complexity and risk of nuclear facilities that are on territory of Slovenia. Due to the size of organization the capacity of SNSA for development of regulations and mainly guidance is limited. This situation may require from management of SNSA to seek for compensating measures in this area such as external support and/or introducing new tools or procedures for development. Long term planning may be one of the organisational tools to help increase effectiveness of use of SNSA resources in this area.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GRS Part 1, para. 4.61 states that** *"The government or the regulatory body shall establish, within the legal framework, processes for establishing or adopting, promoting and amending regulations and guides."*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(2)	**BASIS: GRS Part 1, para. 4.62 states that** *"[…]The regulations and guides shall be kept consistent and comprehensive, and shall provide adequate coverage commensurate with radiation risk associated with the facilities and activities, in accordance with a graded approach."*
R3	**Recommendation:** SNSA should develop long term plan for development of *Practical Guidance* in order to complete the framework of principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based. The plan should be periodically tested with plans for legislative actions of the SNSA.
S24	**Suggestion:** Where possible, SNSA should consider use of external support for development of *Practical Guides*.

9.3. RADIATION PRACTICIES IN INDUSTRY AND RESEARCH

SNSA has issued guidance to applicants in the form of downloadable forms to be used when applying for a licence to carry out a practice and for the use of a source. The use of the form is voluntary, but it does provide the applicant necessary information and functions as a checklist both for the applicant and the authority when reviewing the application.

Further to that, SNSA has drafted guidance directed at the TSO's on how to perform the technical control and measurements required in accordance to article 93 in JV2/SV2. This is a follow-up of action #26 in the Self-assessment action plan (Chapter 4 of the Self-Assessment Report, April 2010) and the IRRS team recognises this to be a work that is soon to be completed.

9.4. WASTE FACILITIES

The regulatory requirements for safe management of radioactive waste are distributed among different parts of current legislation.

The safety approach in this area is implemented through Articles 11 and 12 of the Rule JV7 and Article 13 of the Rule JV2-SV2. Contents of an application for authorisation of construction of a radioactive waste facility or a spent-fuel repository are stipulated in Article 23 of the Rule JV5.

Obligation of SNSA to set dose constrains for radiation practices is stipulated in the Decree UV2. Clearance levels are established in the Decree UV1.

Articles 11/3 of the Nuclear Act contain provisions for decommissioning. Nuclear Act Article 123 and the Rule JV10 stipulate responsibilities in the monitoring.

Systematic approach in maintenance of such a framework is important (see text above, mainly 9.1.1 and 9.1.2)

10. EMERGENCY PREPAREDNESS AND RESPONSE

10.1. BASIC RESPONSIBILITIES

The arrangements for emergency response actions, both within and outside facilities, are dealt with through the regulatory process. The *Act on Protection against Natural and Other Disasters* (2006) gives the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief (Ministry of Defence) the responsibility for elaborating National Emergency Response Plans, in cooperation with other ministries. In this framework, 9 *National Emergency Response Plans* have been elaborated, in line with the "all-hazard" approach, covering the different hazards in Slovenia. In the field of nuclear and radiological emergencies, these arrangements are to be in compliance with the provisions of the *Ionizing Radiation Protection and Nuclear Safety Act* (2002).

The *National Emergency Response Plan for Nuclear and Radiological Accidents*, Version 3.0, was adopted by the Government of the Republic of Slovenia, on 22 July 2010. This Plan was prepared by the Administration for Civil Protection and Disaster Relief in close cooperation with the Slovenian Nuclear Safety Administration (SNSA). It deals with accidents at the Krško NPP and radiological emergencies and accidents in other nuclear and radiation facilities in Slovenia and abroad with potential impact on Slovenia.

The functions of the different national authorities and of the municipalities are clearly defined in the *National Emergency Response Plan for Nuclear and Radiological Accidents*. In case of nuclear or radiological emergency, the SNSA would:

- analyse the incident and support the work of the Civil Protection Commander and Headquarters;
- propose protective measures;
- prepare the first national-level press release and submit it for publication, and cooperate in the preparation of further press releases;
- inform the IAEA and the neighbouring countries of an accident in Slovenia, and receive information from them in the event of an accident abroad;
- coordinate emergency radioactivity monitoring – directs the work of mobile field units through the national Rapid Response Unit (RRU), and receives, collects and submits data from the automatic radioactivity meters.

Furthermore, the *National Emergency Response Plan for Nuclear and Radiological Accidents* gives the SNSA the responsibility to lead a special inter-ministerial committee appointed by the Government, in order to plan, coordinate, monitor and evaluate the implementation of the plan. Committee members are ministry representatives (Ministry of Defence, Ministry of Environment and Spatial Planning, Ministry of Health, Ministry of Interior, etc.).

Assessment of threats

Slovenia uses the threat categorization approach according to the IAEA Safety Standards Series No. GS-R-2. They use 5 categories with the same definition of the threats as recommended by GS-R-2. During the interviews the counterpart presented the results of the threat assessment, taking the most significant sources of threat into consideration: Krško Nuclear Power Plant (cat. I), TRIGA Mark II Research Reactor in Brinje (cat. III), industrial radiography sources, teletherapy and brachytherapy sources (cat. IV).

While GSR part 1, para. 4.52 states that regulatory inspections shall cover all areas of responsibility of the

regulatory body, and the regulatory body shall have the authority to carry out independent inspections, the inspections carried out by SNSA in the field of emergency preparedness are partial and do not cover the whole aspect of this subject. Joint inspections with the Administration for Civil Protection and Disaster Relief should be encouraged (see section 1.7 of this report).

10.2. FUNCTIONAL REQUIREMENTS

Establishing emergency management and operations

Among the functional requirements, GS-R-2 sets a strong requirement for the establishment of emergency management and operations. The country is required to make arrangements to coordinate the emergency responses of the entire off-site response organization with the on-site response to include a command and control system for the local and national response to any nuclear or radiological emergency.

The general scheme of the National Radiological Emergency Response system is defined by the *Act on Protection against Natural and Other Disasters* (2006), the *Ionizing Radiation Protection and Nuclear Safety Act* (2004) and the *National Emergency Response Plan for Nuclear and Radiological Accidents* (NERPNRA).

The management of the emergency on the site is the responsibility of the operator, or of the local authorities in case of an emergency occurring outside a facility. If it becomes necessary to activate the NERPNRA, all decisions concerning the off-site response are made by the Civil Protection Commander or his deputy in Ljubljana, with the support of the relevant ministries and authorities.

Identifying, notifying and activating

The operator of Krško NPP is responsible for the initial classification of the emergency, within the shortest time after its occurrence. The emergency classification system adopted in Slovenia is basically corresponding to the system recommended by GS-R-2, except for "Facility emergencies" that have not been defined.

In case of an actual or potential emergency the operator of the NPP immediately activates its response plans for the necessary actions on the site and sends a notification to the Regional Notification Centre in Brežice, to the Notification Centre of the Republic of Slovenia and to the SNSA. The off-site response organization is partially or totally activated, depending on the classification of the emergency.

For other facilities or activities, the SNSA would be alerted either directly or by the Notification Centre of the Republic of Slovenia. The response organization would be activated fully or partially by the Civil Protection Commander after a consultation with the SNSA.

The SNSA has its own emergency organization based on 2 officers on duty who could activate the emergency director and two expert teams in charge of technical assessment and dose assessment. The full staffing of the emergency would require 19 people out of the pool of 46 employees, including 2 experts from SRPA and 1 expert from a TSO. The minimum staffing requirements set in procedure OP.5.2 mention 5 people (1 emergency director, 1 communication officer, 2 technical assessment team members and 2 dose assessment team members). To ensure that all the staff required would be available in case of an emergency the on-call duty officers have a call out list, which is updated on a monthly basis. In addition a simulation of a call out and activation of the SNSA emergency team is performed two times per year. These simulations and activations for real events have not raised any problem so far. However, the IRRS team considers that these arrangements should be strengthened in order to ensure that the minimum

staffing requirements continue to be met in case of a general emergency.

According to the Administration for Civil Protection and Disaster Relief (ACPDR), first responders are trained and equipped to identify a radiological emergency (e.g. transport accident involving radioactive materials). This generally positive statement would deserve a more detailed review, by the ACPDR, in order to identify possible weaknesses.

Taking mitigatory actions

The requirements of GS-R-2 related to mitigatory actions are globally met. The SNSA is organized to provide expertise in radiation protection to officials and first responders at any time. In case of a severe accident, one of its responsibilities would be to advise the Civil Protection Commander.

However, arrangements have not been made to initiate a prompt search and to issue a warning to the public in the event of a dangerous source possibly being in the public domain.

Taking urgent protective actions

Optimized Intervention Levels and Operational Intervention Levels are set in the *Decree on Dose Limits, Radioactive Contamination and Intervention Levels* (UV 2 – 2004). These levels are in compliance with the recommended values of the international standards (GS-R-2), and the relevant administrations (SRPA, Ministry of Agriculture) were involved in the process.

According to the *Act on Protection against Natural and Other Disasters*, the Civil Protection Commander has the authority to take urgent public protective actions. The Decree on Dose Limits, Radioactive Contamination and Intervention Levels and the NERPNRA prescribe in detail the decision-making criteria on urgent public protective actions with respect to those aspects such as: sheltering and evacuation depending on the expected dose level, distribution of stable iodine tablets, temporary relocation and permanent resettlement, in accordance with the requirements of GS-R-2.

The arrangements adopted for urgent protective action around Krško NPP are based on the concept of emergency planning zones: Precautionary Action Zone (within a 3 km radius), Urgent Protective Action Planning Zone (within a 10 km radius). In addition, a Long-Term Protective Action Planning Zone has been defined within a 25 km radius of the Krško NPP. It should be noted that this latter zone spreads to Croatia and that there is no harmonization regarding the actions to be taken on the other side of the border.

According to SNSA, the requirements of GS-R-2 – para 4.50 – are not fully met in the jurisdictions within the Precautionary Action Zone and the Urgent Protective Action Planning Zone. Arrangements have not been made for implementing appropriate urgent protective actions.

Providing information and issuing instructions and warnings to the public

In 2008, leaflets have been distributed to the public within the precautionary action zone and in the urgent protective action planning zone, in order to provide information on the response to a nuclear radiological emergency.

Upon declaration of a general emergency at Krško NPP, the public would be warned by an alarm signal (siren) indicating imminent threat. The instructions are to switch on the radio / television for further information. However, there is currently no operational agreement between the Government and radio-stations to deliver protection recommendations.

Protecting emergency workers

Dose limits for workers undertaking an intervention are set in the *Decree on Dose Limits, Radioactive Contamination and Intervention Levels* (UV2 – 2004). These levels are in compliance with the recommended values of the international standards (GS-R-2).

Every employer of emergency workers (e.g. NPP, police, fire brigade…) is responsible for training, protecting its workers and for managing, controlling and recording the doses received during an emergency.

From an interview with SRPA representative, it appears that approved dosimetry laboratories have an obligation to report all the individual doses, therefore SRPA would be capable to control compliance with the dose limits in UV2.

According to the Administration for Civil Protection and Disaster Relief (ACPDR), first responders have appropriate protection and dose monitoring. This generally positive statement would deserve a more detailed review, by the ACPDR, in order to identify possible weaknesses.

Assessing the initial phase

The decision-making criteria (OILs) for urgent actions to protect the public, as well as the specific details of the public protective actions are prescribed in the *Decree on Dose Limits, Radioactive Contamination and Intervention Levels* and in the NERPNRA.

In case of an emergency at Krško NPP, the assessment of radioactive contamination and dose distributions around the facility would be calculated by the operator and SNSA's emergency team. According to the NERPNRA, the SNSA is responsible for coordinating emergency radioactivity monitoring.

3 mobile laboratories are currently capable to perform advanced radiation measurements in the country. Initial OILs are defined on the basis of the IAEA standards and they can be revised based on the actual contamination measurements.

Managing the medical response

The general arrangements for medical response are described in the NERPNRA.

First aid in the event of a nuclear accident at the Krško NPP, would be provided by first aid units. There is a contract between the operator of the NPP and Rebro hospital in Zagreb for the treatment of injured workers.

Further arrangements should be made at the national level and at local levels to provide appropriate treatment to people who have been exposed or contaminated in every part of the country due to nuclear practices or activities.

The SNSA is aware of the possibility of requesting international assistance from IAEA, based on the *Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency* (1986).

Keeping the public informed

After an accident, national-level draft press releases are prepared by the SNSA and, if possible, coordinated with the licensee. The first national-level press release is formulated and submitted for

publication by the SNSA. It can be directly emitted by the SNSA on behalf of the Government.

Further press releases are drafted by the SNSA and submitted to the Civil Protection Commander for publication (after activation of the CP Headquarters).

The elaboration of press releases is covered by an internal procedure, and the SNSA has developed templates for press releases including the major information to be provided to the public.

In addition, the SNSA should consider having a pro-active communication policy in order to provide information concerning its activities to people around the NPP on a regular basis.

Taking agricultural countermeasures against ingestion and longer term protective actions

The *Decree on Dose Limits, Radioactive Contamination and Intervention Levels* defines the intervention levels and action levels based on GS-R-2 recommendations. The NERPNRA deals with agricultural countermeasures and longer term protective actions, such as temporary relocation.

In an emergency, the SNSA would make dose assessments and formulate recommendation to the Civil Protection Commander.

However, there is no operational document outside the SNSA for the implementation of these arrangements yet nor for the management of radioactive wastes in case of a large scale emergency.

Conducting recovery operations

GS-R-2, para 4.99 recommends that arrangements shall be established for the transition from emergency phase operations to routine long term recovery operations. Such arrangements have not been made in Slovenia.

10.3. REQUIREMENTS FOR INFRASTRUCTURE

Plans and procedures

The *Ionizing Radiation Protection and Nuclear Safety Act* (2004) requires every operator who applies for a licence to enclose, in the application file, arrangements related to emergency preparedness. It also requires operators of radiation or nuclear facilities to elaborate protection and rescue plans.

The Krško NPP has an on-site emergency plan, which is periodically exercised by the operator. The TRIGA research reactor is situated in the Podgorica Reactor Centre and has a set of emergency procedures. Currently they have already drafted emergency plan for all the facilities of the Jožef Stefan Institute on site including the TRIGA reactor. This plan is in the process of approval.

The off-site response in case of a radiological or nuclear emergency is covered by the NERPNRA. However, the implementation rulings are missing or may not be up to date, and the operating organizations involved in the performance of functions mentioned in the national plan may not all have a plan compliant with the requirements of the NERPNRA.

Logistical support and facilities

For facilities in threat category I, GS-R-2 (para 5.27) requires an on-site emergency control centre separated from the facility control room.

Krško NPP is fitted with a Technical Support Centre (TSC) and an Operating Support Centre (OSC) dedicated to emergency management. Besides, an Emergency Off-site Facility (EOF) has been set up in the premises of the Civil Protection administration. This EOF is at a distance of 110 km (2 hours) from the NPP. In case of an emergency, key functions of the emergency management would be transferred from the NPP to the EOF.

The representative of the operating organisation made a presentation of the equipment and the documentation at the EOF. Clear procedures have been elaborated describing the stage of the accident at which members of staff would leave the NPP to the EOF and the positions (in the organization chart) that would be transferred. Technical data transfer from the NPP to the EOF is achieved by optical fibres. No assessment was made to check that this system would resist in case of a severe accident combined with natural disaster.

Regarding communications between responding organizations (at local and national level), they often rely only on land-based systems (no satellite). The reliability of these liaisons and communication means also has to be assessed.

Training, drills and exercises

The operator of Krško NPP performs regular emergency response exercises, including the activation of the EOF mentioned above (at least once per year).

The SNSA also elaborated an annual training program, which includes training courses and table top exercises in the field of emergency preparedness for every staff member having a role during an emergency.

Joint table top exercises with the Civil Protection Commander are normally programmed every 3 years (the last one took place in 2008).

The last full scope field exercise was organised in 2002. SNSA should promote the organization of such exercises on a more frequent basis.

Quality assurance program

Emergency preparedness is one of the key processes of the management system set up by the SNSA. 30 procedures have been elaborated, covering all aspects of emergency management by this organization. The annual action plan contains goals and measurable indicators related to emergency preparedness (activation delays, training/exercises, etc.).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-R-2 para. 5.13 states that:** *"Plans or other arrangements shall be made for co-ordinating the national response to the range of potential nuclear and radiological emergencies […]."*
GP5	**Good practice:** Coordination principles between all stakeholders at the national level are set in the *National Emergency Response Plan for Nuclear and Radiological Accidents*, and an efficient mechanism for this coordination is provided through the establishment and operation of an inter-ministerial committee chaired by SNSA.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-R-2 para. 5.25 states that:** "*Adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation (such as procedures, checklists, telephone numbers and manuals) shall be provided for performing the functions specified in Section 4. These items and facilities shall be selected or designed to be operational under the postulated conditions (such as the radiological, working and environmental conditions) that may be encountered in the emergency response, and to be compatible with other procedures and equipment for the response (such as the communication frequencies of other response organizations), as appropriate. These support items shall be located or provided in a manner that allows their effective use under postulated emergency conditions."*
GP6	**Good practice:** The SNSA has developed a *Communication System During an Emergency* (MKSID), which is a web tool for communication between emergency response organizations, at the national level (14 organizations).
S25	**Suggestion:** SNSA should require the operator of Krško NPP to assess the reliability of the means of communication in order to verify that data transfer between the NPP and the NPP Emergency Off-Site Facility in Ljubljana would still be ensured in case of both natural disaster and nuclear accident (lessons from the TEPCO-Fukushima Dai-ichi accident)
(1)	**BASIS: GS-R-2 para. 3.2 states that:** *"The arrangements for emergency response actions both within and outside facilities, if applicable, or elsewhere under the control of the operator, are dealt with through the regulatory process. [The State] shall ensure that [the regulatory body and response organizations] have the necessary resources and that they make preparations and arrangements to deal with any consequences of [a nuclear or radiological emergency] in the public domain, whether the [nuclear or radiological emergency] occurs within or beyond national [borders]. These preparations shall include the actions to be taken both in and* ***after*** *an emergency."*
(2)	**BASIS: GS-R-2 para. 4.97 states that:** *"The transition from the emergency phase to long term recovery operations and the resumption of normal social and economic activity shall be planned and made in an orderly manner and in accordance with international standards and guidance".*
S26	**Suggestion:** SNSA should initiate a work towards planning the transition between the emergency phase to long term recovery operations and the post-accident phase.
(1)	**BASIS: GS-R-2, para. 4.27 states that:** *"Arrangements shall be made for response organizations to have sufficient personnel available to perform their assigned initial response actions."*
(2)	**BASIS: GS-G-1.1, para. 3.25 states that:** *"[…] Adequate procedures should […] be prepared to obtain the requisite resources as necessary and to deploy them as appropriate."*
R4	**Recommendation:** SNSA should strengthen its arrangements to ensure that the minimum staffing requirements of its emergency centre continue to be met throughout any General Emergency.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GS-R-2, para. 5.12 states that:** *"Arrangements shall be made to ensure that all States within defined emergency zones are provided with appropriate information for developing their own preparedness to respond to an emergency and arrangements shall be made for appropriate trans-boundary co-ordination."*
S27	**Suggestion:** SNSA should work, alongside with the competent authorities, towards the harmonization of emergency preparedness and response arrangements with Croatia in case of an emergency occurring in Krško NPP.
(1)	**BASIS: GS-R-2, para. 5.33 states that:** *"Exercise programmes shall be conducted to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for facilities in threat category I, II or III and the national level programmes for threat category IV or V are tested at suitable intervals"*
R5	**Recommendation:** SNSA should, through the inter-ministerial committee, promote the organization of full scope field exercises more frequently, to test the coordination of all stakeholders.
(1)	**BASIS: GS-R-2, para. 5.14 states that:** *"Each response organization shall prepare a general plan or plans for coordinating and performing their assigned functions […]."*
(2)	**BASIS: GS-R-2, para. 5.21 states that:** *"The operating and response organizations shall develop the necessary procedures, analytical tools and computer programs in order to be able to perform the functions specified to meet the requirements for emergency response.[…]"*
R6	**Recommendation:** SNSA should encourage the responding organizations involved in the performance of functions mentioned in the national plan to have an emergency plan compliant with the requirements of the NERPNRA.

11. TRANSPORT OF RADIOACTIVE MATERIALS

The 29th of July 2011 the *Ionizing Radiation Protection and Nuclear Safety Act* (ZVISJV) articles 9 and 11 was amended so that transport of radioactive substances now is regulated and controlled as a practice requiring notification and licensing. This is a follow-up of action #27 - #29 in the Self-assessment action plan (Chapter 4 of the Self-Assessment Report, April 2010)

The IRRS team recognises the work still to be done by SNSA to fully integrate transport practices in their licensing and supervision processes but considers this to be a task proving little difficulties taken into account the high performance of their register for practices and support from the licensing process used for licensing of other practices.

The IAEA requirements for the safe transport of radioactive materials as found in TS-R-1 2009 Edition TS-R-1 is implemented in Slovenia through article 3 of the Transport of Dangerous Goods Act, which basically states that applicable international modal regulations shall apply.

These model regulations are internationally harmonized and give little room for "improvisation" on the side of requirements that the consignor, carrier and consignee must follow. However the TS-R-1 also set forth a number of tasks that the Competent Authority (CA) in each country are responsible for and should to be able to do.

Examples of such tasks are (TS-R-1 paragraph in parenthesis): (302) inspection of radiation protection programmes; (306) quality assurance programmes for manufacturing of packaging; (307) establish programmes for compliance assurance; (308) arrange for periodic assessments of the radiation doses to persons due to the transport of radioactive material; (309) be part of investigations in instances of non-compliance with the requirements on radiation and contamination levels; (310) approval of transport under special arrangement; (554) receive notification on first shipment of a package requiring CA approval; (555) receive notification for shipments of Type B(U) packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is the lower, Type B(M) packages, shipments under special arrangement; (576) approve radiation protection programmes for Slovenian flagged vessels; (579) be informed and give advice on undeliverable consignment; (802) approve certain types of package designs, (827) issue approval certificates; (834) validate certificates requiring multilateral approval.

The IRRS team found that some of these tasks, notably the requirement on periodic assessment of doses to persons and compliance assurance in general, are shared by other authorities like SRPA, the police and transport authorities. The IRRS team considers it a useful exercise for SNSA together with other concerned authorities to go through the list of CA tasks and clarify, when needed, which authority is responsible for what task, and to find means to communicate this to consignors, carriers and consignees, including updating the list of appointed competent authorities as given in annexes to the international modal regulations.

Being a small organisation with limited resources SNSA benefits from close contact and sharing of information with other CAs within e.g. the European Union and the IAEA. In doing so, the results from other IAEA assessments, like the TRANSAS, can be used for mutual identification of competence and as a reference to establish bilateral agreements which are beneficial for all parties for tasks that involve, e.g. more complex assessments of package designs that have to be validated in many countries. The IRRS team encourages SNSA to continue the cooperation undertaken so far in this area.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: TS-R-1 para. 207 states that** *"Competent authority shall mean any body or authority designated or otherwise recognized as such for any purpose in connection with these Regulations."*
S28	**Suggestion:** SNSA should take initiative, together with other concerned authorities, to go through the list of CA tasks and clarify, when needed, which authority is responsible for what task, and to find means to communicate this along with relevant contact information to consignors, carriers and consignees.

12. RADIOACTIVE WASTE MANAGEMENT AND DECOMMISSIONING, PUBLIC AND ENVIRONMENTAL EXPOSURE CONTROL

12.1. RADIOACTIVE WASTE MANAGEMENT

NATIONAL POLICY AND STRATEGY

Management of Radioactive Waste and Spent Fuel

The Resolution on the *2006-2015 National Programme for Managing Radioactive Waste and Spent Nuclear Fuel* was adopted by the Slovenian Parliament in February 2006. According to the programme, the NPP Krško as the major radioactive waste generator shall continue to operate until 2023 with an option of life extension. After termination of NPP Krško operation, the spent fuel will be transferred to dry storage for a period of about 35 years, when the spent fuel repository should be operable. The LILW waste repository shall be built in Slovenia. The design of the repository should be modular, with sufficient capacity to accommodate all future LILW waste arising in Slovenia. The spent fuel from the TRIGA Mark II research reactor will be returned to the country of origin. The waste stored at the Central Storage for Radioactive Waste in Brinje and the waste from small producers, meeting the waste acceptance criteria, shall be disposed of in the LILW repository. The remaining waste from the Central Storage for Radioactive Waste in Brinje shall be stored at the facilities of the repository if agreement on this issue is reached with the local community.

Loads at Spent Fuel Pools at Krško NPP have increased significantly due to re-racking. The possibilities of dry storage facility being built earlier or sending the spent fuel abroad for recycling are being under consideration. This issue will be addressed in next Periodic Safety Assessments. Preliminary discussions are being performed without any decision yet. If any of this option is chosen, the 2006 Parliament Resolution on the *National Programme for Managing Radioactive Waste and Spent Fuel* would have to be revised.

The current strategy of the TRIGA Mark II research reactor management is to operate the reactor beyond 2016, which means that Slovenia would have to handle the spent fuel at the national level. If that strategy persists the 2006 Parliament Resolution on the *National Programme for Managing Radioactive Waste and Spent Fuel* would have to be revised.

PREDISPOSAL

Central Interim Storage for Low and Intermediate Level Waste

This facility is situated at the IJS Reactor Infrastructure Centre, is intended for storage of low and intermediate level radioactive waste arising from medical, industrial and research applications. The construction of the facility started in 1984 and it was put into operation in 1986. In 1999, the responsibility for managing and operation of the interim storage was transferred from the IJS to the Agency for Radioactive Waste Management (ARAO). Following the refurbishment and two and a half years of trial operation, a new operating licence was issued in early 2008. During that refurbishment ventilation system was changed and air drying system was installed. Such modifications were done to reach compliance with current situations. The validity of this licence is up to 2018. It is under consideration to extend the life of the facility beyond 2018.

The remaining capacity of this storage is around 20 m^3 and annually 2 m^3 of RW are received so the operational time is limited to about ten more years, assuming normal incoming flux of waste. Most of the waste stored there could be sent to the LILW repository, once it exists.

Radioactive Waste management facilities at Krško NPP

The operational radioactive waste generated at Krško NPP is stored in several types of drums at Solid Radioactive Waste Storage Facility. This operational waste is mainly ash from incineration, spent resins, compressible waste, evaporator bottom, filters, super compacted waste, etc.

Due to volume reduction campaigns, various waste forms were produced by means of super-compactions, incineration and melting. By the end of 2010, 3,723 drums were stored there which represented a total volume of 2,210 m^3, net weight of 2,650 t and a total activity of 20 TBq.

The capacity of the Storage Facility for Solid Waste at Krško NPP is close to being reached and an extension of the storage capacity, although not technically challenging, would necessitate a revision of the NPP licence, including local communities' consultation. This is not foreseen as a preferred option by SNSA.

SNSA has concern for the integrity of older RW packages located at this facility. The first waste placed there were not conditioned/designed for long term storage**.**

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 para. 2.28 states that** *"Decommissioning of facilities and the safe management and disposal of radioactive waste shall constitute essential elements of the governmental policy and the corresponding strategy over the lifetime of facilities and the duration of activities. The strategy shall include appropriate interim targets and end states. Radioactive Waste generated in facilities and activities necessitates special consideration because of the various organizations concerned and the long timescales that may be involved. The government shall enforce continuity of responsibility between successive authorized parties"*
(2)	**BASIS: GSR Part 5 Requirement 11 states that** *"Waste shall be stored in such a manner that it can be inspected, monitored, retrieved and preserved in a condition suitable for its subsequent management. Due account shall be taken of the expected period of storage, and, to the extent possible, passive safety features shall be applied. For long term storage in particular, measures shall be taken to prevent degradation of the waste containment."*
R7	**Recommendation:** SNSA should require Krško NPP operators to include in the Periodic Safety Review the evaluation of the integrity of the RW packages stored for demonstrating that the safety conditions are kept.

At Krško NPP there is another facility for RWM, the Decontamination Building. This facility was constructed in 2000. Two old stream generators and approximately 55 other bulk items, such as heat exchangers, insulation valves, scrap iron, pipes, spent fuel pool racks, lead blankets, and other items are stored there. The total volume and mass are 1,120 m^3 and 830 t respectively.

Operators are studying the possibility of using the manipulation area of 200 m^3 of this facility to store radioactive solid waste if the situation of completeness of Solid Radioactive Waste Storage Facility is reached and the LILW repository is not available.

DISPOSAL

There are no final disposal facilities in operation for radioactive waste neither for spent fuels in Slovenia nowadays.

A project for the construction of a silo repository type for LILW was confirmed in 2009.

Flexibility of the repository concept was an input to the project to cover as many future developments in the programme as was reasonable to expect. It consists of a modular approach and an intermittent mode of operation. Each silo is an independent unit. The number of silos is expandable. The second silo will be constructed when the first one is filled up and the need for the second one arises. The repository can operate intermittently, being temporarily in standstill mode for longer or shorter periods of time. The repository also has the potential to accommodate all LILW from the Krško NPP if it is decided that this will be a joint LILW disposal of Slovenia and Croatia.

The site for the emplacement of the Low and Intermediate Level Waste Repository has been approved. It took about 20 years to conclude the siting process.

The site is located 500 m from the site where Krško NPP is emplaced. Next steps foreseen in the project are additional site qualification, the final design (this will take at least 3 years) and the production of the Environmental Impact Study and the Safety case. The construction is estimated to be finalized 3 years after the Licence for Construction is obtained. (see section 5.5. of this report).

SNSA considers that the storage capacity limitation for RW on the NPP site and on Central Interim Storage Facility at Brinje should be seen as a major justification for Slovenia to accelerate the LILW construction project.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 para. 2.28 states that** *"Decommissioning of facilities and the safe management and disposal of radioactive waste shall constitute essential elements of the governmental policy and the corresponding strategy over the lifetime of facilities and the duration of activities. The strategy shall include appropriate interim targets and end states. Radioactive Waste generated in facilities and activities necessitates special consideration because of the various organizations concerned and the long timescales that may be involved. The government shall enforce continuity of responsibility between successive authorized parties."*
R8	**Recommendation:** The Government should make the necessary provision for the LILW Repository to ensure radioactive waste can be disposed at the appropriate time.

Žirovski vrh Uranium Mine

The Žirovski vrh Uranium Mine was in operation from 1984 to 1990.

The design and the Safety Analysis Report on final remediation of the Jazbec mine waste pile were accomplished in the year 2004 and the design and the Safety Analysis Report on the Boršt mill tailings in the year 2005. The SNSA issued the consent to the proposed activities.

The remediation was completed at the Jazbec and Boršt disposal sites in 2008 and 2010 respectively. It is planned that additional measures will be implemented to stabilize the base rock sliding under the Boršt mill tailings pile in 2012, or in 2013 if the measures of groundwater drainage from the hinterland are not successful.

The accomplishment of remediation is complicated due to reactivation of landslide of the base of the tailing. The current rate of movement is approximately 10 cm per year. Expert group concluded that probability of collapse of the slope is negligible, and proposed investigation of the landslide by drill holes. It is planned that additional measures will be implemented to stabilize the base rock sliding under the Boršt mill tailings pile in the year 2012 or 2013.

Institutional monitoring of seepage water, ground water, ground water level, air, surface integrity and of stability will be needed in the future.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 para. 2.28 states that** *"Decommissioning of facilities and the safe management and disposal of radioactive waste shall constitute essential elements of the governmental policy and the corresponding strategy over the lifetime of facilities and the duration of activities. The strategy shall include appropriate interim targets and end states. Radioactive Waste generated in facilities and activities necessitates special consideration because of the various organizations concerned and the long timescales that may be involved. The government shall enforce continuity of responsibility between successive authorized parties."*
(2)	**BASIS: WS-R-3 para 7.6 states that** *"A mechanism shall be established for periodically reviewing the conditions in remediated areas and amending or removing any restrictions imposed. If surveillance and maintenance are required after remediation is completed, a surveillance and maintenance plan shall be prepared which shall be periodically reviewed. The plan shall be subject to the approval of the regulatory body."*
S29	**Suggestion:** SNSA should continue with the regulatory monitoring activities at Boršt for the time necessary to reach a stable situation. The plan for surveillance and monitoring should be periodically reviewed.

12.2. DECOMMISIONING

Krško NPP is owned by two countries Slovenia and Croatia. An agreement between the two countries exists on the *Regulation of the Status and Other Legal Relations Regarding the Investment, Exploitation and Decommissioning of the Krško NPP*. According to that Agreement:

- Decommissioning of the Krško Nuclear Power Plant and management of its radioactive waste and spent fuel are a joint responsibility of the contracting parties, and they should ensure efficient common solutions both from the economic and environmental protection standpoints.
- If the contracting parties do not reach agreement on a joint solution for RW and SF management during the lifetime of the Krško NPP, two years after that period they must finish removal of operational RW and SF from the location of the Krško NPP (one half by each party) and will individually bear the costs of their management (including subsequent division and removal of RW from decommissioning).
- The contracting parties shall in equal shares assure funds for the preparation of the decommissioning programme and its execution and the funds for the preparation of the programme for the disposal of radioactive waste and spent fuel. If the contracting parties agree on a joint solution for the disposal of radioactive waste and spent fuel they shall finance it in equal shares or they shall finance their shares of activities.
- The Republic of Slovenia and the Republic of Croatia shall jointly prepare and approve a new plan for decommissioning of the Krško NPP and disposal of LILW and high level waste (hereinafter the Decommissioning Plan).
- The Croatian party has, according to the Agreement, established its own fund for the management and collection of financial resources for its share of decommissioning and radioactive waste disposal costs.

The Revision of the Joint Slovenian-Croatian Program of NPP Krško Decommissioning and SF & LILW Disposal is delayed nowadays because of disagreement between Slovenia and Croatia on radioactive waste management strategy.

TRIGA Mark II Preliminary Decommissioning Plan was prepared in 2007. The periodicity for the review of that Plan is not prescribed. Nevertheless, a Periodical Safety Review that will start this year foresees the revision of that Plan.

No detailed Plan has been adopted so far for the decommissioning of the Central Interim Storage Facility for Radioactive Waste in Brinje. In the Safety Report for Central Interim Storage Facility there are addressed possible approaches to decommissioning of the facility.

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: GSR Part 1 para. 2.28 states that** *"Decommissioning of facilities and the safe management and disposal of radioactive waste shall constitute essential elements of the governmental policy and the corresponding strategy over the lifetime of facilities and the duration of activities. The strategy shall include appropriate interim targets and end states."*
R9	**Recommendation:** SNSA should require ARAO to prepare and present a Decommissioning Plan for the CISF at Brinje. That plan should be updated periodically.

12.3. CONTROL OF RADIOACTIVE DISCHARGES AND MATERIALS FOR CLEARANCE

Slovenia has adopted Clearance Levels through Decree UV1 for unconditional levels and also the criteria for conditional clearance.

The competent authority shall decide on the application of clearance of a radioactive substance in the cases where, within a period of one year from the clearance, such a radioactive substance cannot cause a collective dose exceeding 1 man-Sv and the effective dose sustained by any member of the public in a period of one year due to such radioactive substance cannot exceed 10 μSv.

A radioactive substance shall be deemed cleared without a specific decision by the competent authority in the case where the specific activity of such radioactive substance does not exceed the level set out in column two of Table 3 in the Annex to UV1.(Unconditional Clearance)

SNSA requires the applicant, requesting clearance, to hire a TSO for an independent measurement/assessment of the activity concentration of the waste deemed to be cleared. SNSA could audit the TSO if considered necessary.

The control of discharges is addressed in section 12.4. of this report.

12.4. ENVIRONMENTAL MONITORING FOR PUBLIC PROTECTION

Responsibilities for environmental monitoring in Slovenia are stated in Rule JV10 (see section 9.5. of this report).

Control of radioactive discharges into the environment from nuclear facilities has been carried out regularly by the operator. Effectively independent measurements have been provided by the technical support organizations. To a much smaller extent, clearly independent supervision is carried out by the SNSA as the regulatory authority.

The discharge limits for nuclear facilities were set by the SNSA in relation to the dose constraints in the licensing process.

Radioactive discharges from hospitals with nuclear medicine departments are monitored at times to verify if annual effective doses for reference individuals in the environment are below 10 μSv.

Monitoring of the global radioactive contamination due to atmospheric nuclear bomb tests and the Chernobyl accident has been carried out in Slovenia for almost five decades. This monitoring is performed by SNSA (National Monitoring Program)

During the last few years the SNSA established a comprehensive database on past discharges and environmental radioactivity measurements. The objective of this computerised database is to analyse and visualise the statuses and trends of historical records. All these data could be used as the input data for modelling radiation exposure of a representative person of the reference group(s).

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
(1)	**BASIS: RS-G-1.8 para 3.5 states that** *"In relation to the control of discharge practices, the regulatory body has the following general responsibilities:* *(a) Ensuring, by means of establishing and implementing appropriate regulations, that the public and the environment are protected;* *(b) Ensuring that the operator complies with the appropriate regulations and regulatory requirements, including those in respect of carrying out such source and environmental monitoring as may be necessary;*

RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES	
	(c) Providing assurance that judgements concerning the safety of the public are based upon valid information and sound methods."
GP7	**Good Practice:** SNSA is performing a comprehensive National Monitoring Program and control of Operational Monitoring as prescribed at JV10. Environmental data are regularly assessed and published in a transparent manner.

Central Interim Storage Facility at Brinje

The monitoring programme of environmental radioactivity of the Central Storage of Radioactive Waste at Brinje includes control measurements of radioactive atmospheric discharges (radon and its short-lived progeny from the storage resulting from the stored ^{226}Ra sources), radioactive waste water (from the newly built drainage collector) and direct external radiation on the outside parts of the storage.

During the reconstruction in 2005 the facility was equipped with a ventilation system for reducing radon concentration and air contamination in the storage facility. To obtain relatively low and constant humidity it was equipped with the air drying system. After this modification of the facility the radon releases to the environment gradually decreased from the annual average value of 75 Bq/s to 52 Bq/s in 2005, 35 Bq/s in 2006, 31 Bq/s in 2007, 24 Bq/s in 2008, and only 4 Bq/s in 2009 and 2010.

For the dose assessment of the most exposed members of the public, the inhalation of radon decay products and direct external radiation were taken into account. The most exposed members of the reference group are the employees of the reactor centre, who are potentially affected by radon releases from the storage. According to the model calculation, they received an estimated effective dose of 0.6 μSv in 2010.

POLICY ISSUE – WASTE MANAGEMENT

The policy issue discussion on Waste Management was opened by a presentation on "Radioactive waste management- Status and Challenges" by M. Pečnik, head of Division for Radiation Safety and Materials. During that presentation, an overview of the sources of production of radioactive waste in Slovenia, as well as the management and the associated issues was made available. Some of the challenges were then discussed between SNSA and the review IRRS team.

Management of spent fuel at the Krško NPP:

Spent fuel is stored in the reactor spent fuel pool, which has sufficient capacity for operation until the current planned end of operation (year 2023). Storage capacity in case of plant life extension is not seen as an issue, since spent fuel is planned to be put on dry storage after 2023, for about 35 years, before being disposed.

In light of the TEPCO-Fukushima Dai-ichi accident, there are on-going discussions, without any decision yet, for reducing the quantity of spent fuel in the pool by putting part of it on dry storage earlier than 2023, or by sending it to a recycling facility abroad. If any of this option is chosen, the 2006 Parliament resolution on the national programme for managing radioactive waste and spent fuel would have to be revised.

Management of spent fuel at the TRIGA Mark II research reactor:

In 1999, all spent fuel was sent back to the USA. Based on current US DoE decision the remaining fuel can be shipped back to the USA until 2019, which would mean that the reactor would stop operation by 2016 (to allow on-site cooling before transport). The current strategy of the research reactor management is to operate the reactor beyond 2016, which means that Slovenia would have to handle the spent fuel at the national level. SNSA has no influence on that decision, but does not foresee any additional challenge associated with that spent fuel management, having to deal with the spent fuel of the NPP. However, the 2006 Parliament resolution on the national programme for managing radioactive waste and spent fuel would have to be revised.

Long term management of spent fuel and high level radioactive waste:

The current strategy does not specify any particular long term management option for the spent fuel and high radioactive waste. A final repository site could be envisaged towards 2065. SNSA and more generally Slovenia are not having any specific action at the moment, apart for the survey of other States programmes.

Management of low and intermediate level waste produced at the NPP:

LILW generated by the NPP are stored in the solid radioactive waste storage facility, under the operating licence of the NPP. The storage capacity of this facility is almost reached. An extension of the storage capacity, although not technically challenging, would necessitate a revision of the NPP licence, including local communities' consultation. This is not foreseen as a preferred option by SNSA. On the other hand, the operation of the NPP should not be compromised by the issue of LILW storage. Transitional measures are being taken by the operator to reduce the volume of waste, but SNSA considers the only sustainable option to be the opening of the LILW repository. SNSA considers that this storage capacity limitation on the NPP site should be seen as a major justification for Slovenia to move ahead quickly with the LILW construction project.

Another challenge associated with the LILW generated by the NPP is the possible degradation of the old waste packages, packed 30 years ago. Following the discussions in the technical review and in the policy issue session, a suggestion is made by the review IRRS team that SNSA should request from the operator a periodic assessment of the integrity of the packages.

Management of all other low and intermediate level waste:

LILW generated in industry, medicine, and research, including at the research reactor, are stored at the central storage facility. The remaining capacity of this storage is also limited to about ten more years of operation, assuming normal incoming flux of waste. Most of the waste stored there could be sent to the LILW repository, once it exists. This is seen by SNSA as another strong justification for this LILW repository to be constructed in a near future.

Another challenge of this storage facility is the lack of dedicated waste treatment facility and the systematic use of the hot cell from the Jožef Stefan Institute.

Management of disused sources:

About 1000 sealed sources are in use in Slovenia, together with more than 30 000 smoke detectors. If no other route is available, disused sources can be stored at the central storage facility. SNSA believes that optimization of the use of radiation sources, and replacement by alternate technologies, when appropriate,

will contribute to reduce the production of waste from that sector. The experience of Sweden to limit the use and to promote the recycling of smoke detectors was presented during the discussion.

Management of uranium mining and milling residues at the Zirovski vrh mine:

Remediation of the site after the closure of the mine in 1990 is almost complete. SNSA will soon to statute on the end of remediation of the mine tailing and the mill tailing. A continuous monitoring will be needed, and possible additional remediation actions might be conducted, because of a landslide phenomenon.

Decommissioning policies and plans:

For the NPP, an agreement between Slovenia and Croatia established in 2003 requires preparation of a joint decommissioning plan. Its second revision is in progress, with a view to revise the cost estimates. According to the agreement, both States have established funds for decommissioning and will either work on a joint solution for managing the waste of decommissioning and the spent fuel or assume each the management and associated costs of 50 % of the waste generated. From discussions held at the Ministry of Energy, a joint solution will be proposed by Slovenia once the revision of the decommissioning plan is approved.

Notwithstanding the unknown date of its end of operation, the decommissioning of the research reactor should not raise significant issues. The decommissioning plan, established in 2007 will be reviewed during the next periodic safety review.

SNSA indicated that once the LILW repository is operational, there is no justification for maintaining the central waste storage facility. All activities related to the management of LILW should take place on the LILW repository site, either disposal in the repository of further storage for the waste not meeting the acceptance criteria. Decommissioning of the central waste storage facility is planned in the 2006 Parliamentary resolution on the national programme for managing radioactive waste and spent fuel.

For SNSA, the main issue regarding the national waste management strategy is the very slow speed of progress in the LILW repository facility project. It took about 20 years to conclude the siting process. Since the site approval by the Government in 2009, very little progress towards design and construction has been made, while local communities already receive compensation. The next steps are additional site qualifications, the design and production of the Environmental Impact Assessment and the safety analysis report. The opening of the LILW repository is not foreseen before 5 to 6 years from now. SNSA is expressing concerns on the increase risks of reaching maximum storage capacity both at the NPP storage facility and at the central storage facility associated to these delays.

13. REGULATORY IMPLICATIONS OF THE TEPCO FUKUSHIMA DAI-ICHI ACCIDENT

This module brings together the information accumulated by the IRRS team on TEPCO-Fukushima Dai-ichi accident implications, during the course of the mission and contains the views and conclusions of the IRRS team for each of the standard modules of the IRRS.

In particular, this module includes discussions on the policy issue on the Slovenian response to the TEPCO-Fukushima Dai-ichi accident, on the Progress Report on the Slovenian nuclear stress test, and on the former and immediate actions taken by the nuclear power plant.

13.1. ACTIONS TAKEN BY THE REGLATORY BODY IN THE AFTERMATH OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT

A. IMMEDIATE ACTIONS TAKEN BY THE REGULATORY BODY

Right after the TEPCO-Fukushima Dai-ichi accident the emergency preparedness team of SNSA has been activated. Its main duty was to analyze the situation and provide information for the general public and the media. Besides direct communication with the electronic and written media, SNSA has also used its home page for making known the conclusions and evaluations of the regulatory body.

The head of SNSA served as the main technical adviser and source of information of the Slovenian Government in the TEPCO-Fukushima Dai-ichi issue.

The emergency team of SNSA remained active in working hours for about two months and a 24 hours duty officer was also in service.

Concentration of airborne radioactivity was measured two weeks after the accident; the measured values barely exceeded the sensitivity of the measuring devices and were in accordance with other measurements across Europe.

B. TECHNICAL ISSUES CONSIDERED IN THE LIGHT OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT

It is to be mentioned that prior to the accident the regulatory body and the power plant have decided to take two important steps to increase the safety of the plant, which steps have bearing to the TEPCO-Fukushima Dai-ichi lessons learned. One is the installation of a third emergency diesel generator; the other is the height increase of the walls of the dikes along the Sava river by one meter. Realization of these steps is underway.

Shortly after the accident SNSA has requested the operator of the power plant to analyze the possible consequences of and lessons learned from the accident. This request was in line with the decision of the European Council on the compulsory targeted safety reevaluation of the European nuclear power plants, called stress test. The management of the Krško NPP has initiated a number of short term measures, part of which have required and obtained the authorization of SNSA. These measures were meant to establish alternative possibilities for decay heat removal (via the steam generators and with feed and bleed); for flooding the containment for external heating of the pressure vessel; for operating valves; and for heat removal from the spent fuel pool. The immediate steps, among others, included the installation of mobile diesel generators, of a mobile air compressor, of portable pumps, of new AC power supply connections to operate emergency equipment, and of auxiliary pipe connections for providing extra water supply for the feed water and the auxiliary feed water systems and for the containment flooding.

The Krško NPP has prepared its preliminary report on the results of the stress test. Based on that, SNSA

has prepared the preliminary national report to be submitted to the European Commission. According to this report the Krško NPP is sufficiently resistive to any earthquake of a return frequency of not smaller than once in 100.000 years. Its flood protection – taking also into account the ongoing dike construction works – is fully adequate against floods much beyond the design basis (minimum return frequency once in 1.000.000 years). The possibilities of loss of electrical power and the loss of ultimate heat sink have been analyzed. The report concludes that with the third emergency diesel generator and with the installed auxiliary devices and alternative solutions the power supply and cooling functions shall be available with sufficient certainty in case of the considered external events.

The report also states that the power plant is provided with all equipment and staff to manage a severe accident and to take the necessary emergency response steps in case of a severe accident. Nevertheless the IRRS review team noted that while on-site severe accident management and emergency response capabilities have been reviewed and actions taken, the review of the off-site response with a leading role of SNSA therein should be carried out and provisions for testing end exercising made.

At the same time SNSA should review its emergency preparedness and response system to ensure it has the capability and the infrastructure to manage its response to a severe accident.

C. OTHER ISSUES CONSIDERED IN THE LIGHT OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT

The accident has had an impact on not only the technical and safety aspects of the nuclear facilities but also on the future attitude of the stakeholders in the nuclear field. The accident has resulted in a marked decrease in the risk tolerance of the general public. Accordingly, on one hand, the actual meaning of the ALARA principle needs to be re-evaluated, on the other hand protection against less probable beyond basis accidents shall be needed and shall call forth further financial investments. Thirdly, the importance of safety culture in nuclear installations needs to be further emphasised and the management has to encourage further enhancement of safety culture and safety awareness. These implications have been also recognised by SNSA and by the management of Krško NPP.

The Slovenian regulatory system was able to duly react on the implications of the TEPCO-Fukushima Dai-ichi accident and no such shortcomings have been realized, which would imply the necessity of considerable changes in the structure or functioning of SNSA.

CONCLUSION [1]

The IRRS team considers that the immediate reactions of SNSA on the TEPCO-Fukushima Dai-ichi accident were adequate and commensurate with the risk posed. Later actions were well established and in line with the common activities of the European nuclear countries. The fast and coordinated activity of the regulatory body and the nuclear power plant is commendable. Revision and full scale exercising of the national off-site emergency preparedness capability is suggested.

13.2. PLANS FOR UP-COMING ACTIONS TO FURTHER ADDRESS THE REGULATORY IMPLICATIONS OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT

The Krško NPP is expected to submit the final version of the stress test report to SNSA in October 2011. SNSA then evaluates the report and prepares the final version of the Slovenian national report. This report is to be submitted to the European Commission by the end of 2011. SNSA does not expect substantial changes in the results as compared to those in the preliminary report.

In a recent decision SNSA has ordered further actions to be completed by the power plant. These include among others improvements to be introduced to the severe accident guidelines; inclusion of PSA results into the Safety Analysis Report; realization of alternative ultimate heat sink via cooling tower; providing additional power supply; establishing a backup control room; reassessment of the long term spent fuel storage options. Implementation of these supplementary actions shall take about 5 years.

CONCLUSION [2]

The IRRS team concludes that SNSA has considered the lessons learned from TEPCO-Fukushima Dai-ichi in its full complexity and perspectives and has taken decisions on the future tasks accordingly.

13.3. SIGNIFICANCE OF REGULATORY IMPLICATIONS OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT ACROSS REVIEWED AREAS

Note: ***The significance of TEPCO-Fukushima Dai-ichi accident implications was considered as part of the review of each IRRS module. The review conclusions below and the plans presented by Slovenia to further address TEPCO-Fukushima Dai-ichi accident issues in the coming years should be included in the scope of the follow-up IRRS mission to be invited by Slovenia.***

Module 1: Responsibilities and Functions of the Government

Lessons learned from the TEPCO-Fukushima Dai-ichi accident in the field of governmental responsibilities and functions relate in general mainly to two issues. The first is the independence of the regulatory body and its co-operation with other authorities having role in the safety of nuclear installations. The governmental background of emergency preparedness represents the other main issue.

In the first issue the IRRS team observed that responsibilities and roles of the authorized parties are clearly defined although SNSA's interfaces and co-operation with some of them might need further considerations as discussed in Chapter 1 of this report. It has also been noted that all aspects for the independence of the nuclear regulator are adequately considered and met thus the conditions of the functioning of a responsible and accountable nuclear safety regulatory body are granted.

The emergency preparedness aspects of governmental functions and responsibilities are discussed in the part related to Module 10 below.

CONCLUSION [3]

The IRRS team concludes that SNSA has reviewed the national responsibilities and did not reveal any issue stemming from the TEPCO-Fukushima Dai-ichi accident needing immediate action. It was also noted that SNSA is committed to address any relevant implications and lessons learned from the TEPCO-Fukushima Dai-ichi accident for further improvement of its regulatory process.

Module 2: Global Nuclear Safety Regime

Slovenia is a party in all important nuclear safety and emergency preparedness related international conventions and agreements. Provisions to implement these conventions are in place. Safety Standards of IAEA (enhanced also by the WENRA requirements) form the basis of the nuclear regulations and rules in Slovenia.

SNSA is an active partner of the international nuclear safety community and takes also part in the international co-operation of the regulatory bodies in the field of emergency preparedness. No EPREV mission has yet been invited.

CONCLUSION [4]
The IRRS team recognises that SNSA is actively involved in international activities, in some cases (e.g. ENSREG) also taking a leadership role. The IRRS team has concluded that there are no issues related to the TEPCO-Fukushima Dai-ichi accident requiring immediate action.

Module 3: Responsibilities and Functions of the Regulatory Body

The IRRS review team has obtained evidences that the activity of SNSA is clearly separated from those organisations and bodies that may have responsibilities in the operation of nuclear facilities or any role in the promotion of nuclear energy. It became clear that SNSA is able to exercise its authority and to take timely decisions in order to prevent any radiation or nuclear risk or in handling a nuclear emergency situation.

Emergency communication means between SNSA and the licensees seem to be adequate, nevertheless further exercising within the national emergency preparedness system is suggested in the main body of the report. Informing the public in general and in case of an emergency in specific is a practice of SNSA. Development of transparency is an on-going task in every member state and so is in Slovenia.

CONCLUSION [5]
The IRRS team concludes that SNSA has reviewed its regulatory responsibilities and functions and did not reveal any issue needing immediate action. The IRRS team also recognises SNSA is committed to making improvement of its regulatory process as a result of lessons learned from the TEPCO-Fukushima Dai-ichi accident.

Module 4: Management System of the Regulatory Body

After the TEPCO-Fukushima Dai-ichi accident SNSA has performed an extraordinary management review with the goals to identify any gaps and opportunities for further improvement. Currently no specific measures for improvement of the management system or organizational aspects have been identified.

The management system of SNSA will be subjected to continuous improvement programme making use of the current management processes in place such as self-assessment, independent assessment and management system review, conducted at regular intervals, with the aim to identify any non-conformances, the associated corrective actions and opportunities for improvement.

CONCLUSION [6]
The IRRS team concludes that SNSA has reviewed its management system and did not reveal any issue needing immediate action. It was also noted that SNSA is committed to address any relevant implications and lessons learned from the TEPCO-Fukushima Dai-ichi accident for further improvement of its management system.

Module 5: Authorization

In Slovenia, according to the current legal basis, the licensing process is regulated in such a manner that the regulatory body (SNSA) has a clear role to play and can influence the siting process in all its steps. The documents that need to be submitted for a site licensing are defined in the laws and rules, the exact content, analysis method and standards to be applied are instead fixed by SNSA on a project basis. In fact in preparation for a new build project, SNSA has drafted a practical guidance that gives more detailed instructions on the topic to be tackled in the application and makes reference to a series of (mainly) IAEA and USNRC standards and guides. The available regulation is hence not prescriptive, which makes it possible on a case by case basis to include the newest standards and methods.

The same applies to the reactor design authorization which for a new build would start with the construction licence. Not having laws and rules that are prescriptive has implicitly the advantage of more flexibility in the adoption of up to date results of science and technology on one side and of operating experience on the other. Furthermore SNSA is represented in most of the international groups (IAEA, WENRA; OECD/NEA, ENSREG) dealing with the definition and/or harmonization of safety reference levels for existing and new nuclear power plants.

SNSA plans to start with a more thorough check of regulations and guides once the lessons learned from the TEPCO-Fukushima Dai-ichi accident are more consolidated.

CONCLUSION [7]
The IRRS team concludes that no elements regarding the authorization process were identified, which would raise particular concern in the light of the TEPCO-Fukushima Dai-ichi accident. SNSA is aware of the added significance gained by the siting and design review processes. The lack of a strictly prescriptive regulation system allows for a flexible consideration of state-of-the-art standards and methods.

Module 6: Review and Assessment

After the TEPCO-Fukushima Dai-ichi accident the operator of Krško NPP has performed its first and quick review trying to identify possible short-term improvements. In June 2011, based on the Krško NPP application, the Slovenian Nuclear Safety Administration (SNSA) licenced a series of minor modifications in the plant which add alternate possibilities for electrical power supply and cooling of reactor and spent fuel pool in case of beyond design basis accidents.
In response to the TEPCO-Fukushima Dai-ichi accident, the SNSA issued a decision to the Krško NPP to perform a Special Safety Review. The program of this review is completely in line with the ENSREG specifications for European Stress Tests with the purpose to evaluate the robustness of the defence-in-depth approach, the adequacy of current accident management measures and to identify the potential for safety improvements, both technical and organisational. The technical scope of the stress tests has been defined considering the issues that have been highlighted by the events that occurred at TEPCO-Fukushima Dai-ichi site, including combination of initiating events and failures such as:

<u>Initiating events conceivable at the plant site:</u>

- Earthquake
- Flooding
- Other extreme natural events

<u>Consequential loss of safety functions</u>

- Loss of electrical power, including station black out (SBO)

- Loss of the ultimate heat sink (UHS)
- Combination of both

Severe accident management issues

- Means to protect from and to manage loss of core cooling function
- Means to protect from and to manage loss of cooling function in the spent fuel storage pool
- Means to protect from and to manage loss of containment integrity

Engineering judgement will be the prevailing reassessment methodology during the stress test analysis. Deterministic and probabilistic analysis and evaluations results, which have been prepared in the past, will be used as important elements during the reassessment. The scope of the reassessment is limited to the NPP.
The targeted reassessment of Krško NPP safety margin is currently on-going. The first interim report made by the plant has been submitted for review to SNSA in the middle of August, the final one being expected by the end of October. The national report summarizing the results of the targeted reassessment be posted on the SNSA website and thus will be publicly available. The main findings and conclusion will also be presented to the media.
A peer review of the stress tests and of the associated action plans has been decided by the EU countries, which should ensure that the safety will be appropriately demonstrated in the light of the TEPCO-Fukushima Dai-ichi accident in all EU countries with equal scrutiny.

CONCLUSION [8]
The IRRS team considers that the immediate assessment actions by SNSA and Krško NPP after the TEPCO-Fukushima Dai-ichi accident were adequate and commensurate with the risk posed. Subsequent actions taken by SNSA and Krško NPP for reassessment of design safety margins of the nuclear power plant were well established and in line with the common activities of the European nuclear countries aiming at ensuring enhanced safety provisions and robustness against extreme external events and accident scenarios in the light of the events which occurred at TEPCO-Fukushima Dai-ichi site.

Module 7: Inspection

Krško NPP performed a safety evaluation of the site immediately following the accident at the TEPCO-Fukushima Dai-ichi plant, to identify where improvements where necessary at the facility. The studies primary intent was to identify changes that would enable two different solutions for every required function. The scope of recommended modifications includes mechanical changes (independent, mobile equipment and accessories to enable connection) and electrical (independent additional electrical supplies and accessories to enable connections).

The modifications are currently on-going, with a measurable portion completed. The completed modifications to the plant are identified as the targeted changes to be inspected as part of the SNSA Annual Inspection Plan item “Modification Inspections” of which there are 4 planned for 2011. Additional inspections are added to the schedule as needed, therefore there is sufficient flexibility to accommodate more than 4 modification inspections should that become necessary. SNSA inspectors will continue to monitor changes in the field until all modifications are completed.

With regards to the scope of the SNSA Annual Inspection Plan, the IRRS team views the plan as adequately comprehensive to address the modifications in response to the lessons learned from the

TEPCO-Fukushima Dai-ichi accident. The IRRS team basis this on the information above as well as the fact that the Annual Inspection Plan is updated with information from the Nuclear Safety Division, who is monitoring the progress of the modifications. The inspection staff is experienced and familiar with modification inspections, therefore there is no special training required for the inspections specific to lessons from the TEPCO-Fukushima Dai-ichi accident.

CONCLUSION [9]
The IRRS team considers the approach by the regulatory inspection functions to be prompt, well defined and an effective way of evaluating the safety improvements post a significant event. Future inspection activities should look to focus on the improvements being implemented in a targeted and systematic manner.

Module 8: Enforcement

In case of the implementation of the TEPCO-Fukushima Dai-ichi accident lessons learned modifications, SNSA has legal mechanisms in the Inspection Act, Article 5 and Article 7 to inspect and to order that work be done. The Offenses Act enables a clear understanding of penal options available to the inspectors should that become necessary. However, SNSA's enforcement approach is cooperative in nature and the more stringent enforcement options are not often employed as the enforcement principle is one of cooperation. Therefore the inspectors will first work cooperatively with the utility to ensure it produces a mutually acceptable schedule. Should there be an issue of timeliness identified; the SNSA inspectors have within their authority the capability of setting timelines for corrective actions.

CONCLUSION [10]
The nature of the relationship between regulator and licensee is based on mutual cooperation and respect; this enables regulatory objectives to be achieved with the minimal amount of confrontation. However, the IRRS team concludes that improvement plans to address the implications of the TEPCO-Fukushima Dai-ichi accident can be adequately enforced by the regulatory body with the enforcement tools at its disposal if required.

Module 9: Regulations and Guides

Results of first quick screening of existing Slovenian regulations and guides do now show need for immediate action. The regulatory body has plans to include the TEPCO-Fukushima Dai-ichi accident lessons learned to upcoming reviews of regulations. Also new *Practical Guides* will include inputs from evaluation of this accident.

While conducting these reviews, SNSA will monitor what happens at the international level (evolution of IAEA safety standards, European stress tests results…).

CONCLUSION [11]
The IRRS team noted the commitment of SNSA to include lessons learned from the TEPCO-Fukushima Dai-ichi accident in next revision of Slovenian nuclear safety regulations. The IRRS team considers this response as adequate in the area of regulation and guides.

Module 10: Emergency Preparedness and Response

In response to the questionnaire on emergency preparedness issues in relation with the TEPCO-Fukushima Dai-ichi accident the IRRS team has reached the conclusions as below.

- Responsibilities for **immediate notification** are defined in the National emergency response plan. National Emergency Response Plan for Nuclear and Radiological Accidents (NERPNRA).
- Responsibilities to **make preparation and arrangements** are defined for competent authorities dealing with the consequences of accidents and for facilities that might affect the public and the environment, but the allocation of resources is not fully detailed in the plans.
- Clear responsibilities for **decision making** in an emergency are defined in the NERPNRA, but the effective mechanisms of coordination are not in place in all the fields (e.g. agricultural countermeasures). Besides, these mechanisms are not tested during exercises. There is a national plan covering the emergency phase but some operational documents are missing. In addition, the national plan does not cover the post-accident phase.
- The suitability of the nationwide emergency response system has to be assessed in the near future to check that it is able to remain effective in case of the **combination of a natural disaster and a nuclear emergency**. There are too few field exercises involving both natural disaster and an accident on the NPP to have a clear opinion.
- **Data transfer** from the NPP to the Emergency Off-site Facility (in Ljubljana) is achieved by optical fibres. No assessment was made to check that this system would resist in case of a severe accident combined with natural disaster. Besides, **communications** between responding organizations (at local and national level) often rely only on land-based systems (no satellite). The reliability of the liaisons and communication means has to be assessed.
- Regarding **providing information and instructions to the potentially affected population**: there are sirens around the NPP and the instructions are to listen to the radio / watch TV in case of an emergency but there is no agreement between the Government and radio- and TV-stations to deliver protection recommendations.

CONCLUSION [12]
The IRRS team concludes that the main elements of an emergency preparedness system capable of managing the national response to a nuclear emergency are available in Slovenia but a systematic assessment of its vulnerability to a large scale natural disaster (with special regards to the potential damage of the communication means and technologies) is to be carried out in the near future.

Topical Module: Radioactive Waste Management and Spent Fuel

Pit Integrity

Based on the feedback from local counterparts and issues addressed by the Krško NPP stress test (still to be reviewed and approved by the SNSA) the Team concludes as below.

The following measures which can be envisaged to increase robustness of the Spent Fuel Pit (SFP) have been taken: installation of fixed piping above the SFP with connections for portable fire pumps and an alternative system with skid mounted pump and heat exchanger to cool the SFP.

If water level in the SFP is decreasing in spite of makeup to the SFP is established, then operators are instructed to establish water spray over the spent fuel before the water drops below 3.05 m above the spent fuel elements. The priority of water sources is as follows: fire protection hydrant network, water pre-treatment tanks, carbonate mud pool, circulating water intake and a circulating water outlet pool. Source of water can be provided from different tanks located at the plant, potable water, well water or water from the River Sava or any other water. Demineralised water or clean water without impurities would be preferred.

With the portable or mobile pumps with engines independent from external power source water can be transported into the SFP. This could be done to the skimmer connection through vale or directly with the use of fire protection hoses into the SFP. Provided there is balance of filling with water and evaporation there is no chance to lose the capability to cool the fuel and to lose the integrity of the spent fuel.

As a consequence of the above, for earthquake levels up to, approximately, 0.9 g, it is considered that the SFP integrity would not be challenged. Alternative strategies from Emergency Operational Procedures and Severe Accident Management Guidelines are credited to provide the makeup water for the SFP inventory and, thus, prevent the fuel assemblies from overheating in the case of small leakages or loss of inventory by evaporation.

Accordingly, for earthquakes in the range of Peak Ground Acceleration (PGA) exceeding 0.9 g, gross structural failures of SFP cannot be excluded. For earthquakes of such intensity, fuel uncovers in the SFP are considered likely to occur. However, it needs to be pointed out that seismic events with PGA in the range of 0.8 g to 0.9 g (or higher), at which reactor core damage is considered likely, were estimated to be very rare at the Krško site. Based on the plant specific studies, the return period for such an event is of the order of 100 000 years or larger.

Loads at SFP have increased significantly due to re-racking. The possibility of Dry Storage Facility having been built earlier is under consideration. This issue will be addressed in the next Periodic Safety Assessments. Preliminary discussions are being performed.

CONCLUSION [13]
The IRRS team noted that the Spent Fuel Pit integrity had been evaluated for beyond design basis earthquakes by the licensee. SNSA is in the process of reviewing this submission.

IRRS REVIEW TEAM

APPENDIX I – LIST OF PARTICIPANTS

INTERNATIONAL EXPERTS:		
PATCHETT Colin	Health & Safety Executive (HSE)	Colin.Patchett@hse.gsi.gov.uk
ALLAIN Olivier	Autorité de Sûreté Nucléaire (ASN)	Oliver.Allain@asn.fr
CIUREA-ERCAU Cantemir Marian	National Commission for Nuclear Activities Control (CNCAN)	Cantemir.Ciurea@cncan.ro
GUILLAUD Pascal	Autorité de Sûreté Nucléaire (ASN)	Pascal.Guillaud@asn.fr
KRS Petr	State Office for Nuclear Safety (SÚJB)	Petr.Krs@sujb.cz
MEDICI Marcela Alejandra	Nuclear Regulatory Authority	Mmedici@arn.gob.ar
O'DONOHUE Kathleen	U.S. Nuclear Regulatory Commission (NRC)	Kathleen.ODonohue@nrc.gov
SARDELLA Rosa	Eidgenoessisches Nuklearsicherheitsinspektorat (ENSI)	Rosa.Sardella@ensi.ch
VEGVARI Istvan Janos	Hungarian Atomic Energy Agency (HAEA)	Vegvari@haea.gov.hu
WELLEMAN Erik	Swedish Radiation Safety Authority (SSM)	Erik.Welleman@ssm.se
IAEA STAFF MEMBERS		
1. Adriana **NICIC**	Division of Nuclear Installation Safety	A.Nicic@iaea.org
2. Ivan **LUX**	Division of Nuclear Installation Safety	I.Lux@iaea.org
3. Hilaire **MANSOUX**	Division of Nuclear Safety and Radiation Waste	H.Mansoux@iaea.org
4. Peter **ZOMBORI**	Incident Emergency Centre	P.Zombori@iaea.org
5. Martyn O. **UBANI**	Division of Nuclear Installation Safety	M.Ubani@iaea.org
LIAISON OFFICER		
1. Igor **GRLICAREV**	Slovenian Nuclear Safety Administration (SNSA)	Igor.Grlicarev@gov.si

APPENDIX II – MISSION PROGRAMME

IRRS MISSION PROGRAMME		
Sunday, 25 September 2011		
IRRS Opening IRRS Review Team Meeting		
15:30 - 19:00	- Opening Remarks by the IRRS Team Leader (Mr Patchett) - Introduction of Liaison officer - Logistical arrangements - IRRS Team Members – Self introduction - Presentation on the IRRS Methodology and Reporting (Ms Nicic & Mr Mansoux) - Review of mission schedule/conduct/review (Mr Patchett) - First Impression from experts arising from the Advanced Reference Material (ARMS) - Preparation for daily interviews - Closing remarks/questions	IRRS Team SNSA counterpart
Monday, 26 September 2011		
IRRS Entrance Meeting		
09:30 - 12:00	- Entrance meeting - Opening remarks (Mr Stritar) – Slovenian officials and IRRS Team Leader - Introduction of the IRRS review team - Presentation of the IRRS Process and Objectives (Mr Patchett) - Overview of the Slovenian Regulatory Approach – Introduction of the 12 IRRS Modules - SNSA	IRRS Team SNSA counterparts
13:00 - 17:00	Interviews and discussions with counterparts (Parallel discussion of group 1 to 5)	IRRS Team SNSA counterparts
17:00 - 18:00	Daily IRRS Team debrief and SNSA status meeting	IRRS Team SNSA counterpart

Tuesday, 27 September 2011		
Daily Discussions / Interviews (Site visits)		
08:30 - 10:30	Meeting with ARAO	Group 3+4
09:00 - 17:30	Interviews and Discussions with counterparts (Parallel discussions of groups 1 to 5)	IRRS Team SNSA counterparts
09:00 - 12:00	Parallel Activity: - Visit to the Civil Protection and Disaster Relief Administration (CPDRA) - Visit to the Krško NPP Emergency Off-Site Facility (NEK EOF)	Group 5 SNSA counterparts CPDRA reps. NEK EOF reps.
11:00 - 13:00	Meeting with SRPA and with State Secretary of the MoH	Group 1,3 +4 SNSA counterparts SRPA reps.
13:00 - 16:00	Site visit to the Research Reactor in Podgorica	Parts of Group 2 SNSA counterparts
14:00 - 15:00	Meeting with the Minister for Environment and Spatial Planning	Group 1 SNSA counterparts
16:00 - 17:30	Policy Issue Discussion – Session I: TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT	IRRS Team SNSA counterparts
17:30 - 18:30	Daily IRRS Team debrief and SNSA status meeting	IRRS Team SNSA counterpart
19:00 -	Report writing	IRRS Team
Wednesday, 28 September 2011		
Daily Discussions / Interviews (Site visits)		
07:30 - 17:00	Site visit to NPP Krško to witness an inspection exercise and meet Krško NPP Management	Parts of Group 2 SNSA counterparts
09:00 - 17:00	Interviews and discussions with counterparts (Parallel discussion of group 1 to 5)	IRRS Team SNSA counterparts
09:00 - 10:30	Meeting with the Director General for Energy at the Ministry of Economy	Group 1 + 4 SNSA counterparts
09:00 - 12:00	Site visit to a radiation practice in Ljubljana area (source owner)	Group 3 SNSA counterparts

10:30 - 12:30	Activation of the SNSA emergency response – emergency drill	Group 5 SNSA counterpart
16:00 - 17:30	Policy Issue Discussion – Session II: LONG TERM OPERATION	IRRS Team SNSA counterparts
17:30 - 18:30	Daily IRRS Team debrief and SNSA status meeting	IRRS Team SNSA counterpart
19:00 -	Report writing	IRRS Team
Thursday, 29 September 2011		
Daily Discussions / Interviews (Site visit)		
09:00 - 12:00	Site visit to waste management facility CSRO Podgorica	Group 4 SNSA counterparts
09:00 - 12:00	Interviews and discussions with counterparts (Parallel discussion of group 1 to 5)	IRRS Team SNSA counterparts
13:00 - 14:30	Policy Issue Discussion – Session III: RADIOACTIVE WASTE	IRRS Team SNSA counterparts
14:30 - 17:30	Interviews and discussions with counterparts (if required) Report writing	IRRS Team SNSA counterparts
17:30 - 18:30	Daily IRRS Team debrief and SNSA status meeting	IRRS Team SNSA counterpart
19:00 -	Report writing	IRRS Team
Friday, 30 September 2011		
Daily Discussions / Interviews		
09:00 - 12:00	Interviews and discussions with counterparts (if required)	IRRS Team SNSA counterparts
13:00 - 17:00	Report writing	IRRS Team
17:30 - 18:30	Daily IRRS Team debrief and SNSA status meeting	IRRS Team SNSA counterpart
17:30 - 18:30	Daily IRRS Team debrief and SNSA status meeting	IRRS Team SNSA counterpart
19:00 -	Report writing	IRRS Team

Saturday, 1 October 2011		
Report Writing		
09:00 - 12:00	Report writing	IRRS Team
12:00	Delivery of group drafts to Admin Assistant for compilation	IRRS Team
16:00 - 18:00	Team discussion of draft	IRRS Team
20:00	Draft mission report handover to SNSA	IRRS Team
Sunday, 2 October 2011		
Social Event		
09:00 - 18:00	Social Event	IRRS Team SNSA counterparts
Monday, 3 October 2011		
Daily Discussions		
09:00 - 12:00	SNSA review and comments on draft mission report	SNSA counterparts
13:00 - 18:00	- Discussion of SNSA comments followed by discussion with SNSA - Preparation of Press Release	IRRS Team SNSA counterparts
19:00 -	Handover of revised draft mission report to SNSA	IRRS Team
Tuesday, 4 October 2011		
EXIT MEETING and PRESS CONFERENCE		
10:00 - 12:00	IRRS Exit Meeting followed by Press Release	IRRS Team IAEA Director of Nuclear Installation Safety SNSA counterparts

APPENDIX III – SITE VISITS

SITE VISITS	
1.	Site Visit to Civil Protection and Disaster Relief Administration (CPDRA)
2.	Site Visit to Krško NPP Emergency Off-Site facility (NEK EOF)
3.	Site Visit to RR in Podgorica
4.	Site Visit to Krško NPP for inspection exercise
5.	Site Visit to Radiation Practice near Ljubljana
6.	Site Visit to Waste Management Facility CSRAO near Ljubljana

APPENDIX IV – LIST OF COUNTERPARTS

	IRRS EXPERTS	SNSA Lead Counterpart	SNSA Support Staff
1.	**RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT**		
	C. Patchett O. Allain	A. Škraban	I. Sirc
2.	**GLOBAL NUCLEAR SAFETY REGIME**		
	C. Patchett O. Allain	I. Grlicarev	A. Škraban I. Sirc
3.	**RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY**		
	C. Patchett O. Allain	A. Škraban	I. Sirc
4.	**MANAGEMENT SYSTEM OF THE REGULATORY BODY**		
	C. Patchett O. Allain C. Ciurea-Ercau	D. Slokan-Dušič	A. Stritar
5.	**AUTHORIZATION**		
	R. Sardella E. Welleman M. Medici I. Vegvari	A. Peršič	I. Osojnik M. Podjavoršek J. Češarek
6.	**REVIEW AND ASSESSMENT**		
	R. Sardella C. Ciurea-Ercau E. Welleman M. Medici I. Vegvari	D. Vojnovič	T. Nemec
7.	**INSPECTION**		

	IRRS EXPERTS	SNSA Lead Counterpart	SNSA Support Staff
	K. O'Donohue E. Welleman I. Vegvari I. Lux	A. Janežič	M. Pristavec S. Šavli
8.	**ENFORCEMENT**		
	K. O'Donohue M. Medici I. Vegvari	A. Janežič	M. Pristavec S. Šavli
9.	**REGULATIONS AND GUIDES**		
	C. Patchett O. Allain P. Krs E. Welleman M. Medici I. Vegvari	I. Sirc	M. Podjavoršek D. Vojnovič
10.	**EMERGENCY PREPAREDNESS AND RESPONSE**		
	P. Guillaud P. Zombori	M. Tkavc	I. Grlicarev
11.	**TRANSPORT OF RADIOACTIVE MATERIALS**		
	E. Welleman	M. Pečnik	I. Osojnik P. Tavčar
12.	**RADIOACTIVE WASTE MANAGEMENT AND DECOMMISSIONING, PUBLIC AND ENVIRONMENTAL EXPOSURE CONTROL**		
	M. Medici I. Vegvari	M. Pečnik	P. Tavčar B. Vokal-Nemec
13.	**REGULATORY IMPLICATIONS OF THE TEPCO DAI-ICHI ACCIDENT**		
	I. Lux	A. Stritar	I. Sirc D. Vojnovič A. Peršič M. Tkavc

POLICY ISSUE DISCUSSIONS		
PI 1 – TEPCO-Fukushima Dai-ichi Regulatory Issues		
I. Lux	A. Stritar	**IRRS Team**
PI 2 – Long Term Operation		
C. Ciurea-Ercau	A. Stritar	**IRRS Team**
PI 3 – Waste Management		
M. Medici I. Vegvari	M. Pečnik	**IRRS Team**

APPENDIX V – RECOMMENDATIONS, SUGGESTIONS AND GOOD PRACTICES

AREA	R: Recommendation S: Suggestion GP: Good Practice	Recommendation/Suggestion/Good Practice
1. RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT	R1	**Recommendation:** The Government should produce a document that sets out the national policy and strategy for safety. This document would then be supported by a national co-ordinated plan to ensure the appropriate national infrastructure is in place to secure its delivery.
	S1	**Suggestion:** SNSA should draft a National Policy and Strategy for Safety and promote its adoption.
	S2	**Suggestion:** The Government should consider alternative methods of financing SNSA to provide it with the flexibility to meet its regulatory obligations whilst also ensuring it operates effectively. This should include provision for research and development.
	S3	**Suggestion:** SNSA should consider establishing a joint coordinated and effective inspection programme with other regulatory bodies such as SRPA and the Administration for Civil Protection and Disaster Relief.
	R2	**Recommendation:** SNSA should develop and implement a process for carrying out a systematic review of its organisational structure, competencies and resource needed to effectively discharge its current and future responsibilities.
	S4	**Suggestion:** SNSA should develop a strategy for research and development and establish an annual programme of work which it considers necessary to meet its regulatory responsibilities.
2. GLOBAL NUCLEAR SAFETY REGIME	S5	**Suggestion:** SNSA should expand its number of staff trained in using root cause analysis techniques to ensure its regulatory effectiveness is not compromised.

AREA	R: Recommendation S: Suggestion GP: Good Practice	Recommendation/Suggestion/Good Practice
	S6	**Suggestion:** SNSA should review the current licensees' event reporting threshold to ensure the data used in for evaluating and analysing the effectiveness of the licensees' operating experience programme is appropriate.
3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY	**S7**	**Suggestion:** SNSA should establish a process for directly obtaining and financing technical or other expert professional advice or services in support of its regulatory functions (e.g. inspections), in order to ensure impartiality of advice and avoid conflict of interest.
	S8	**Suggestion:** SNSA should consider the establishment of a systematic training programme to develop and maintain the competence and skills of its entire staff.
	S9	**Suggestion:** SNSA should initiate the modification of Article 58 of the Nuclear Act in order to better define the term "Specific Issues related to Radiation and Nuclear Safety".
	GP1	**Good Practice:** SNSA has designed and use a register for licenced practices and sources which not only fulfil the IAEA requirements but also incorporates functions and tools that enables SNSA to be proactive in its licensing and supervisory roles.
	S10	**Suggestion:** SNSA should finalize the revision of regulations to include regulatory requirements for keeping records related to safety of nuclear facilities, including requirements for retention period, disposal of records and notification to the regulatory body.
	S11	**Suggestion:** SNSA should provide interested parties and the public with reasons and justification for its decisions, using a graded approach.
4. MANAGEMENT SYSTEM OF THE REGULATORY BODY	**GP2**	**Good practice:** The resources allocated to the development and implementation of the management system, as well as the considerable effort

AREA	R: Recommendation S: Suggestion GP: Good Practice	Recommendation/Suggestion/Good Practice
		deployed to align it with GS-R-3 requirements and ISO 9001, are considered as proof of the commitment of the SNSA management to the continual improvement of the effectiveness of the organization.
	S12	**Suggestion:** SNSA should establish a process to routinely assess the competence and independence of its authorized experts.
	S13	**Suggestion:** SNSA should take measures to better define and formalize the graded approach of its management system requirements and to ensure that the graded approach is consistently applied for all the management system processes.
	S14	**Suggestion:** SNSA should establish a specific procedure for implementing the process for management of organizational changes.
	S15	**Suggestion:** SNSA should specify in the Management Manual that the causes of non-conformances have to be systematically analysed.
5. AUTHORIZATION	**S16**	**Suggestion:** SNSA should consider defining a prioritized structure of which requirements and acceptance criteria apply, indicating the order of applicability of referenced international standards and other regulatory bodies' guides.
6. REVIEW AND ASSESSMENT	**S17**	**Suggestion:** SNSA should take measures to address more systematically the regulatory review and assessment aspects related to the licensees' management system.
	S18	**Suggestion:** SNSA should consider expanding and further developing its own set of internal technical review guidelines and provide the necessary training in their application for regulatory review and assessment, in order to cover all areas important to safety (such as for the regulatory review of PSA, SAR, PSR, Safety Analyses, radioactive waste management applications, etc.)

AREA	R: Recommendation S: Suggestion GP: Good Practice	Recommendation/Suggestion/Good Practice
7. INSPECTION	**S19**	**Suggestion:** SNSA should consider taking steps in order to relieve the limitations on the personnel who may perform inspections.
	S20	**Suggestion:** To better increase the transparency and predictability of the inspection, SNSA should further develop the internal guidance material with methods on how to inspect different areas and practices and how to evaluate and act upon findings against requirements.
	S21	**Suggestion:** SNSA should perform more unannounced inspections and in a broader scope than in its current practice for nuclear facilities as appropriate.
	GP3	**Good Practice:** At the end of each NPP outage, SNSA prepares a report with the summary, analysis and action plan based on the inspection findings.
	GP4	**Good Practice:** SNSA has developed, maintains and uses an integrated database (INFOURSJV) that contains all information important for the activity of the regulatory body and what is available for the entire regulatory staff.
8. ENFORCEMENT	**-**	-
9. REGULATIONS AND GUIDES	**S22**	**Suggestion:** SNSA should perform systematic periodic screening/review of nuclear safety legislation, to ensure keeping regulatory safety requirements complete and up-to-date.
	S23	**Suggestion:** SNSA should establish a long term legislative plan to improve the use of its limited resources and enhance awareness of applicants/licence holders of possible changes in regulatory requirements.
	R3	**Recommendation:** SNSA should develop long term plan for development of *Practical Guidance* in order to complete the framework of principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based. The plan should be periodically

AREA	R: Recommendation S: Suggestion GP: Good Practice	Recommendation/Suggestion/Good Practice
		tested with plans for legislative actions of the SNSA.
	S24	**Suggestion:** Where possible, SNSA should consider use of external support for development of *Practical Guides*.
10. EMERGENCY PREPAREDNESS AND RESPONSE	**GP5**	**Good practice:** Coordination principles between all stakeholders at the national level are set in the *National Emergency Response Plan for Nuclear and Radiological Accidents*, and an efficient mechanism for this coordination is provided through the establishment and operation of an inter-ministerial committee chaired by SNSA.
	GP6	**Good practice:** The SNSA has developed a *Communication System During an Emergency* (MKSID), which is a web tool for communication between emergency response organizations, at the national level (14 organizations).
	S25	**Suggestion:** SNSA should require the operator of Krško NPP to assess the reliability of the means of communication in order to verify that data transfer between the NPP and the NPP Emergency Off-Site Facility in Ljubljana would still be ensured in case of both natural disaster and nuclear accident (lessons from the TEPCO-Fukushima Dai-ichi accident)
	S26	**Suggestion:** SNSA should initiate a work towards planning the transition between the emergency phase to long term recovery operations and the post-accident phase.
	R4	**Recommendation:** SNSA should strengthen its arrangements to ensure that the minimum staffing requirements of its emergency centre continue to be met throughout any General Emergency.
	S27	**Suggestion:** SNSA should work, alongside with the competent authorities, towards the harmonization of emergency preparedness and response arrangements with Croatia in case of an emergency occurring in Krško NPP.

AREA	R: Recommendation S: Suggestion GP: Good Practice	Recommendation/Suggestion/Good Practice
	R5	**Recommendation:** SNSA should, through the inter-ministerial committee, promote the organization of full scope field exercises more frequently, to test the coordination of all stakeholders.
	R6	**Recommendation:** SNSA should encourage the responding organizations involved in the performance of functions mentioned in the national plan to have an emergency plan compliant with the requirements of the NERPNRA.
11. TRANSPORT OF RADIOACTIVE MATERIALS	**S28**	**Suggestion:** SNSA should take initiative, together with other concerned authorities, to go through the list of CA tasks and clarify, when needed, which authority is responsible for what task, and to find means to communicate this along with relevant contact information to consignors, carriers and consignees.
12. RADIOACTIVE WASTE MANAGEMENT AND DECOMMISSIONING, PUBLIC AND ENVIRONMENTAL EXPOSURE CONTROL	**R7**	**Recommendation**: SNSA should require Krško NPP operators to include in the Periodic Safety Review the evaluation of the integrity of the RW packages stored for demonstrating that the safety conditions are kept.
	R8	**Recommendation:** The Government should make the necessary provision for the LILW Repository to ensure radioactive waste can be disposed at the appropriate time.
	S29	**Suggestion:** SNSA should continue with the regulatory monitoring activities at Boršt for the time necessary to reach a stable situation. The plan for surveillance and monitoring should be periodically reviewed.
	R9	**Recommendation:** SNSA should require ARAO to prepare and present a Decommissioning Plan for the CISF at Brinje. That plan should be updated periodically.
	GP7	**Good Practice:** SNSA is performing a comprehensive National Monitoring Program and control of Operational Monitoring as prescribed at JV10. Environmental data are regularly assessed and published in a transparent

AREA	R: Recommendation S: Suggestion GP: Good Practice	Recommendation/Suggestion/Good Practice
		manner.
13. REGULATORY IMPLICATIONS OF THE TEPCO FUKUSHIMA DAI-ICHI ACCIDENT	-	-

APPENDIX VI – CONCLUSIONS ON THE REGULATORY IMPLICATIONS OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT

AREA	NO.	CONCLUSION
ACTIONS TAKEN BY THE REGLATORY BODY IN THE AFTERMATH OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT	**C1**	The IRRS team considers that the immediate reactions of SNSA on the TEPCO-Fukushima Dai-ichi accident were adequate and commensurate with the risk posed. Later actions were well established and in line with the common activities of the European nuclear countries. The fast and coordinated activity of the regulatory body and the nuclear power plant is commendable. Revision and full scale exercising of the national off-site emergency preparedness capability is suggested.
PLANS FOR UP-COMING ACTIONS TO FURTHER ADDRESS THE REGULATORY IMPLICATIONS OF THE TEPCO-FUKUSHIMA DAI-ICHI ACCIDENT	**C2**	The IRRS team concludes that SNSA has considered the lessons learned from TEPCO-Fukushima Dai-ichi in its full complexity and perspectives and has taken decisions on the future tasks accordingly.
1. RESPONSIBILITIES AND FUNCTIONS OF THE GOVERNMENT	**C3**	The IRRS team concludes that SNSA has reviewed the national responsibilities and did not reveal any issue stemming from the TEPCO-Fukushima Dai-ichi accident needing immediate action. It was also noted that SNSA is committed to address any relevant implications and lessons learned from the TEPCO-Fukushima Dai-ichi accident for further improvement of its regulatory process.
2. GLOBAL NUCLEAR SAFETY REGIME	**C4**	The IRRS team recognises that SNSA is actively involved in international activities, in some cases (e.g. ENSREG) also taking a leadership role. The IRRS team has concluded that there are no issues related to the TEPCO-Fukushima Dai-ichi accident requiring immediate action.

AREA	NO.	CONCLUSION
3. RESPONSIBILITIES AND FUNCTIONS OF THE REGULATORY BODY	**C5**	The IRRS team concludes that SNSA has reviewed its regulatory responsibilities and functions and did not reveal any issue needing immediate action. The IRRS team also recognises SNSA is committed to making improvement of its regulatory process as a result of lessons learned from the TEPCO-Fukushima Dai-ichi accident.
4. MANAGEMENT SYSTEM OF THE REGULATORY BODY	**C6**	The IRRS team concludes that SNSA has reviewed its management system and did not reveal any issue needing immediate action. It was also noted that SNSA is committed to address any relevant implications and lessons learned from the TEPCO-Fukushima Dai-ichi accident for further improvement of its management system.
5. AUTHORIZATION	**C7**	The IRRS team concludes that no elements regarding the authorization process were identified, which would raise particular concern in the light of the TEPCO-Fukushima Dai-ichi accident. SNSA is aware of the added significance gained by the siting and design review processes. The lack of a strictly prescriptive regulation system allows for a flexible consideration of state-of-the-art standards and methods.
6. REVIEW AND ASSESSMENT	**C8**	The IRRS team considers that the immediate assessment actions by SNSA and Krško NPP after the TEPCO-Fukushima Dai-ichi accident were adequate and commensurate with the risk posed. Subsequent actions taken by SNSA and Krško NPP for reassessment of design safety margins of the nuclear power plant were well established and in line with the common activities of the European nuclear countries aiming at ensuring enhanced safety provisions and robustness against extreme external events and accident scenarios in the light of the events which occurred at TEPCO-Fukushima Dai-ichi site.
7. INSPECTION	**C9**	The IRRS team considers the approach by the regulatory inspection functions to be prompt, well defined and an effective way of evaluating the safety improvements post a significant event. Future inspection activities should look to focus on the improvements being implemented in a targeted and systematic manner.

AREA	NO.	CONCLUSION
8. ENFORCEMENT	**C10**	The nature of the relationship between regulator and licensee is based on mutual cooperation and respect; this enables regulatory objectives to be achieved with the minimal amount of confrontation. However, the IRRS team concludes that improvement plans to address the implications of the TEPCO-Fukushima Dai-ichi accident can be adequately enforced by the regulatory body with the enforcement tools at its disposal if required.
9. REGULATIONS AND GUIDES	**C11**	The IRRS team noted the commitment of SNSA to include lessons learned from the TEPCO-Fukushima Dai-ichi accident in next revision of Slovenian nuclear safety regulations. The IRRS team considers this response as adequate in the area of regulation and guides.
10. EMERGENCY PREPAREDNESS AND RESPONSE	**C12**	The IRRS team concludes that the main elements of an emergency preparedness system capable of managing the national response to a nuclear emergency are available in Slovenia but a systematic assessment of its vulnerability to a large scale natural disaster (with special regards to the potential damage of the communication means and technologies) is to be carried out in the near future.
TOPICAL MODULE		
RADIOACTIVE WASTE MANAGEMENT AND SPENT FUEL PIT INTEGRITY	**C13**	The IRRS team noted that the Spent Fuel Pit integrity had been evaluated for beyond design basis earthquakes by the licensee. SNSA is in the process of reviewing this submission.

APPENDIX VII – SNSA REFERENCE MATERIAL USED FOR THE REVIEW

[1] IRRS Questions and Answers:

- *Module 1: Responsibilities and Functions of the Government*
- *Module 2: Global Nuclear Safety Regime*
- *Module 3: Responsibilities and functions of the Regulatory Body*
- *Module 4: Management System of the Regulatory Body*
- *Module 5: Authorization*
- *Module 6: Review and Assessment*
- *Module 7: Inspection*
- *Module 8: Enforcement*
- *Module 9: Regulations and Guides*
- *Module 10: Emergency Preparedness and Response*
- *Module 11a: Periodic Safety Review*
- *Module 11b: Feedback of Operating Experience*

[2] Legislation

Acts

1. *Ionising Radiation Protection and Nuclear Safety Act*
2. *Act amending the Ionising Radiation Protection and Nuclear Safety Act*
3. *Act Amending the Ionising Radiation Protection and Nuclear Safety Act*
4. *Ionising Radiation Protection and Nuclear Safety Act - last official consolidated text*
5. *Act Amending the Ionising Radiation Protection and Nuclear Safety Act*

Governmental Decrees

UV1:

1. *Decree on activities involving radiation*
2. *Decree amending the Decree on activities involving radiation*
3. *Exemption levels for radionuclides Ba-133, Y-88 and Po-209*

UV2:

4. D*ecree on dose limits, radioactive contamination and intervention levels*

UV3:

5. *Decree on the areas of limited use of space due to a nuclear facility and the conditions of facility construction in these areas*
6. *Decree amending the Decree on the areas of limited use of space due to a nuclear facility and the conditions of facility construction in these areas*

UV6:

7. *Decree on safeguarding of nuclear materials*

UV8:

8. *Decree on the criteria for setting compensation level payable for limited use of space within the area of a nuclear facility*
9. *Decree amending the Decree on the criteria for setting compensation level payable for limited use of space within the area of a nuclear facility*

UV11:

10. *Decree on checking the radioactivity of shipments of scrap metal*
11. *Decree on the implementation of Council Regulations (EC) and Commission Regulations (EC) on the radioactive contamination of foodstuffs and feedstuffs*

12. Decree amending the Decree on the implementation of Council Regulations (EC) and Commission Regulations (EC) on the radioactive contamination of foodstuffs and feedstuffs

Rules/Regulations of the Minister of the Environment and Spatial Planning

JV1:

1. *Rules on the specialist council on radiation and nuclear safety*

JV2/SV2:

2. *Rules on the use of radiation sources and on activities involving radiation*

JV3:

3. *Rules on authorised experts on radiation and nuclear safety*

JV4:

4. *NEW! Rules on providing qualification for workers in radiation and nuclear facilities*
5. *Rules on conditions to be fulfilled by workers performing safety-significant tasks at nuclear or radiation facilities - valid until 14.5.2011*

JV5:

6. *Rules on radiation and nuclear safety factors*
7. *Correction of Rules on radiation and nuclear safety factors*

JV7:

8. *Rules on radioactive waste and spent fuel management*

JV9:

9. *Rules on operational safety of radiation or nuclear facilities*
10. *Correction of Rules on operational safety of radiation or nuclear facilities*
11. *!! NEW!! Rules amending the rules on operational safety of radiation or nuclear facilities*

JV10:

12. *Rules on radioactivity monitoring*
13. *Rules amending the rules on radioactivity monitoring*

JV11:

14. *Rules on trans-boundary shipments of radioactive waste and spent fuel*

JV12:

15. *Rules on the trans-boundary shipment of nuclear and radioactive substances*

Rules/Regulations of the Minister of Health

SV1:

1. *Rules on functioning of the Expert Council for the issues of ionizing radiation protection, radiological activities, and the use of radiation sources in human and veterinary medicine*

SV2/JV2:

2. *Rules on the use of radiation sources and on activities involving radiation*

SV3:

3. *Rules on the requirements of using ionising radiation sources in healthcare*

SV4:

4. *Rules on the method of keeping records of personal doses due to exposure to ionizing radiation*

SV5:

5. *Rules on the requirements and methodology of dose assessment for the radiation protection of the*

population and exposed workers

SV6:

6. *Rules on health surveillance of exposed workers*

SV7:

7. *Rules on approving of experts performing professional tasks in the field of ionising radiation*

SV8:

8. *Rules on the obligations of the person carrying out a radiation practice and person possessing a ionizing radiation source*

SV9:

9. *Rules on the use of potassium iodide*

SV10:

10. *Rules on the conditions to be met by primary health care centres for breast*

Rules/Regulations of the Minister of the Interior

FV1:

1. *Rules on physical protection of nuclear materials, nuclear facilities and radiation facilities*

FV2:

2. *Rules on the conditions for workers who carry out physical protection of nuclear materials, nuclear facilities or radiation facilities and on the conditions for workers who have access to nuclear materials as well as on other conditions with respect to physical protection*
3. *Correction of Rules on the conditions for workers who carry out physical protection of nuclear materials, nuclear facilities or radiation facilities and on the conditions for workers who have access to nuclear materials as well as on other conditions with respect to physical protection*

Z9:

4. *Regulation on maximum permitted levels of radioactive contamination of human environment and on decontamination (the provisions of Articles 1 - 15 ceased to apply)*

Third Party Liability for Nuclear Damage

1. *Act on Liability for Nuclear Damage*
2. *Ordinance on determining the persons to whom the conclusion of the insurance of liability for nuclear damage is not obligatory*
3. *Third Party Liability for Nuclear Damage Act*
4. *Insurance of Liability for Nuclear Damage Act*
5. *Decree on establishment of the amount of limited operator's liability for nuclear damage and on establishment of the amount of insurance for liability for nuclear damage*

Other Legislation

1. *Act Regulating the Exports of Dual-Use Goods*
2. *Regulation on procedures for issuing authorisations and certificates and on competence of the Commission for the control of exports of dual use items*
3. *Decree on restrictive measures against Iran and on implementation of Council Regulation (EU) No 961/2010*
4. *Transport of Dangerous Goods Act*
5. *Maritime Code of the Republic of Slovenia*
6. *Decree on establishment of a Public Agency for Radioactive Waste Management*
7. *Decree on the method and subject of and conditions for performing a public utility service of radioactive*

waste management

8. *Price list of public service of radioactive waste management*
9. *Fund for Financing Decommissioning of the Krško Nuclear Power Plant Krško and Disposal of Radioactive Waste from the Krško NPP Act*
10. *Instruction on the method of charging and payment to the Fund for Financing Decommissioning of the Krško Nuclear Power Plant Krško and Disposal of Radioactive Waste from the Krško NPP*
11. *Order on application of measuring units other than those accepted for use in the Nuclear Power Plant Krško*
12. *Mining Act*
13. *Act on Permanent Closeout of Uranium Ore Exploitation and Prevention of Mining Consequences in the Žirovski vrh Uranium Mine*
14. *Decree determining the area and of the compensatory amount due to the limited use of the environment in the area of Žirovski vrh Uranium Mine*
15. *Rules on technical requirements for researching, extraction of and preparation of nuclear mineral raw materials*
16. *Rules amending the Rules on technical requirements for researching, extraction of and preparation of nuclear mineral raw materials*
17. *Criminal Code - Criminal offences related to nuclear substances and facilities and ionizing radiation sources are defined in Articles 108, 314, 316, 332, 334, 335 in 357*
18. *Decree on obligatory setting-up of security service*
19. *National Emergency Response Plan for Nuclear and Radiological Accidents, version 3.0*

[3] International Agreements - Bilateral

Early Notification in the Event of a Radiological Emergency

1. *Agreement Between the Republic of Slovenia and the Republic of Croatia for the Early Exchange of Information in the Event of a Radiological Emergency*
2. *Agreement between the Republic of Slovenia and the Republic of Austria on the Early Exchange of Information in the Event of Radiological Emergency and on Common Interests in the Field of Nuclear Safety and Radiation Protection*
3. *Agreement between the Government of the Republic of Slovenia and the Government of the Republic of Hungary on the Early Exchange of Information in the Event of Radiological Emergency*
4. *Arrangement between the Nuclear Safety Administration (SNSA) of the Republic of Slovenia and the Institute for Environmental Protection and Research (ISPRA) of the Republic of Italy for the early exchange of information in the event of a radiological emergency and co-operation in nuclear safety matters*

Co-operation and Exchange of Information

1. *Arrangement between the Nuclear Safety Administration of the Republic of Slovenia and the Federal Ministry of Agriculture and Forestry, Environment and Water Management of the Republic of Austria regarding Co-operation in the Field of Radiation Protection and Strengthening of the mutual Exchange of Data of the Aerosol Monitoring Systems*
2. *Arrangement between the Slovenian Nuclear Safety Administration (S.N.S.A.) and the United States Nuclear Regulatory Commission (U.S.N.R.C.) for the Exchange of Technical Information and Cooperation in Nuclear Safety Matters*
3. *Arrangement between the Slovenian Nuclear Safety Administration and the Directorate for Nuclear Safety of the French Republic on the Exchange of Information and Cooperation in the Field of Nuclear Safety*
4. *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*

5. *Arrangement between the Nuclear Safety Administration of the Republic of Slovenia nad the Council for Nuclear Safety of South Africa for the exchange of technical information and co-operation in the regulation of Nuclear Safety*
6. *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*
7. *Administrative Arrangement between the Slovenian Nuclear Safety Administration and Atomic Energy Control Board of Canada pursuant to the Agreement between the Government of the Republic of Slovenia and the Government of Canada for co-operation in the peaceful uses of nuclear energy*
8. *Agreement between the Government of the Republic of Slovenia and the Government of Canada for co-operation in the peaceful uses of nuclear energy*
9. *Agreement between the Federal Commission for Nuclear Energy and Italian National Commitee for Nuclear Energy for co-operation in the peaceful uses of nuclear energy*

Other Agreements

1. *Revised Supplementary Agreement between the International Atomic Energy Agency and the Government of the Republic of Slovenia concerning the Provision of Technical Assistance by the International Atomic Energy Agency to the Government of the Republic of Slovenia*
2. *Treaty between the Government of the Republic of Slovenia and the government of the Republic of Croatia on the regulation of the status and other legal relations regarding investment, exploitation and decommissioning of the Krško Nuclear Plant and Joint Declaration at the time of signature of the Treaty between the Government of the Republic of Slovenia and the government of the Republic of Croatia on the regulation of the status and other legal relations regarding investment, exploitation and decommissioning of the Krško Nuclear Plant*

International acts which are not international treaties

1. *Memorandum of Understanding between the Slovenian Nuclear Safety Administration and the State Office for Nuclear Safety of the Czech Republic on the Exchange of Information on Nuclear and Radiation Safety Matters*
2. *Memorandum of Understanding between the Slovenian Nuclear Safety Administration and the Macedonian Radiation Safety Directorate on the Exchange of Information on Nuclear and Radiation Safety Matters*
3. *Memorandum of Understanding between the European Nuclear Safety Regulators Group and the International Atomic Energy Agency for International Peer Review Missions to the EU Member States*
4. *Memorandum of Understanding between the Slovenian Nuclear Safety Administration and the State Regulatory Agency for Radiation and Nuclear Safety of Bosnia and Herzegovina on the Exchange of Information on Nuclear and Radiation Safety Matters*

[4] International Agreements – Multilateral

International Agreements for which implementation the Slovenian Nuclear Safety Administration is responsible

1. *Agreement between the kingdom of Belgium, the kingdom of Denmark, the federal Republic of Germany, Ireland, the Italian Republic, the Grand Duchy of Luxembourg, the kingdom of Netherlands, the European Atomic Energy Community and the International Atomic Energy Agency in implementation of Article III (1) and (4) of the Treaty on the non-proliferation of nuclear weapons*
2. *Additional Protocol to the Agreement between the Kingdom of Belgium, the Kingdom of Denmark, the Federal Republic of Germany, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands, the European Atomic Energy Community and the International Atomic Energy Agency in implementation of Article III (1) and (4) of the Treaty on the non-proliferation of nuclear weapons*
3. *Convention of 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*

4. *Protocol to Amend the Convention of 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*
5. *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*
6. *Protocol to Amend the 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*
7. *An amendment of article VI and Article XIV of the Statute of the International Atomic Energy Agency*
8. *Comprehensive Nuclear-Test-Ban Treaty*
9. *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*
10. *Convention on Nuclear Safety*
11. *Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention*
12. *Amendment to the Convention on the Physical Protection of Nuclear Material*

Succession

1. *Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency*
2. *Convention on Early Notification of a Nuclear Accident*
3. *The IAEA Incident Reporting System (IAEA-IRS)*
4. *Convention on the Physical Protection of Nuclear Material*
5. *Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction in the Sea-Bed and the Ocean Floor*
6. *Treaty on the Non-proliferation of Nuclear Weapons*
7. *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water*
8. *Statute of the International Atomic Energy Agency*

[5] CNS Reports, Joint Convention Reports and Annual Reports

Annual Reports

1. *Annual Reports (1991-1998)*
2. *Annual Reports (2000-2010)*

National Reports

1. *National reports – Convention on Nuclear Safety (1998/2001/2005/2008/2011)*
2. *National reports – Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (2003/2005/2008)*

Reports of EU and Expert missions

EU:

1. *WENRA report [html]*
2. *Report on Nuclear Safety in the Context of Enlargement, May 2001*
3. *Report on Nuclear Safety in the Context of Enlargement, June 2002*

Expert missions:

1. *OSART mission report (october 2003)*
2. *ORPASS mission report (june 2001*
3. *INSARR mission report at research reactor TRIGA*
4. *RAMP report (december 2001)*
5. *IRRT report (december 1999)*

[6] SNSA Management Manual, Rev. 6

APPENDIX VIII – IAEA REFERENCE MATERIAL USED FOR THE REVIEW

1.	**IAEA SAFETY STANDARDS SERIES No. SF-1** - Fundamental Safety Principles
2.	**IAEA SAFETY STANDARDS SERIES No. GSR PART 1** - Governmental, Legal and Regulatory Framework for Safety
3.	**IAEA SAFETY STANDARDS SERIES No. GS-R-2 -** Preparedness and Response for a Nuclear or Radiological Emergency
4.	**IAEA SAFETY STANDARDS SERIES No. GS-R-3 -** The Management System for Facilities and Activities
5.	**IAEA SAFETY STANDARDS SERIES No. NS-R-1 –** Safety of Nuclear Power Plants: Design
6.	**IAEA SAFETY STANDARDS SERIES No. NS-R-2 –** Safety of Nuclear Power Plants: Operation
7.	**IAEA SAFETY STANDARDS SERIES No. NS-R-4 -** Safety of Research Reactors
8.	**IAEA SAFETY STANDARDS SERIES No. GS-G-1.1 -** Organization and Staffing of the Regulatory Body for Nuclear Facilities
9.	**IAEA SAFETY STANDARDS SERIES No. GS-G-1.2 -** Review and Assessment of Nuclear Facilities by the Regulatory Body
10.	**IAEA SAFETY STANDARDS SERIES No. GS-G-1.3 -** Regulatory Inspection of Nuclear Facilities and Enforcement by the Regulatory Body
11.	**IAEA SAFETY STANDARDS SERIES No. GS-G-1.4 -** Documentation for Use in Regulatory Nuclear Facilities
12.	**IAEA SAFETY STANDARDS SERIES No. GS-G-2.1 -** Arrangements for Preparedness for a Nuclear or Radiological Emergency
13.	**IAEA SAFETY STANDARDS SERIES No. GS-G-3.1 -** Application of the Management System for Facilities and Activities
14.	**IAEA SAFETY STANDARDS SERIES No. GS-G-3.2 -** The Management System for Technical Services in Radiation Safety
15.	**IAEA SAFETY STANDARDS SERIES No. RS-G-1.3 -** Assessment of Occupational Exposure Due to External Sources of Radiation
16.	**IAEA SAFETY STANDARDS SERIES No. RS-G-1.4 -** Building Competence in Radiation Protection and the Safe Use of Radiation Sources
17.	**IAEA SAFETY STANDARDS SERIES No. NS-G-2.10 -** Periodic Safety Review of Nuclear Power Plants Safety Guide
18.	**IAEA SAFETY STANDARDS SERIES No. NS-G-211 -** A System for the Feedback of Experience from Events in Nuclear Installations Safety Guide

19. **INTERNATIONAL ATOMIC ENERGY AGENCY** - Convention on Early Notification of a Nuclear Accident (1986) and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (1987), Legal Series No. 14, Vienna (1987).

20. **INTERNATIONAL ATOMIC ENERGY AGENCY** - Generic Assessment Procedures for Determining Protective Actions during a Reactor Accident, IAEA-TECDOC-955, IAEA, Vienna (1997).

APPENDIX IX – SNSA ORGANIZATIONAL CHART