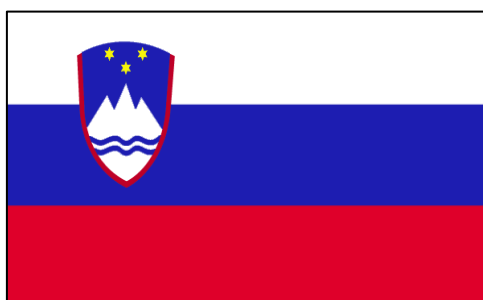




Emergency  
Preparedness  
Review

EPREV

# **PEER APPRAISAL OF ARRANGEMENTS IN THE REPUBLIC OF SLOVENIA FOR PREPAREDNESS AND RESPONSE FOR A NUCLEAR OR RADIOLOGICAL EMERGENCY**



2017-11-05 to 2017-11-16

International Atomic Energy Agency



## **FOREWORD**

Within the United Nations system, the International Atomic Energy Agency (IAEA) has the statutory functions of establishing standards of safety for the protection of health against exposure to ionizing radiation, and of providing for the application of these standards. In addition, under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention) the IAEA has a function, if requested, to assist Member States in preparing emergency arrangements for responding to nuclear accidents and radiological emergencies.

In response to a request from the Government of Slovenia and in accordance with Article III of the IAEA Statute, the IAEA fielded an Emergency Preparedness Review (EPREV) mission to conduct a peer review of Slovenia's radiation emergency preparedness and response arrangements vis-à-vis the relevant IAEA standards.

The number of recommendations, suggestions and good practices is in no way a measure of the status of the emergency preparedness and response system. Comparisons of such numbers between EPREV reports from different countries should not be attempted.

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## **Executive Summary**

This report provides the results of the Emergency Preparedness Review (EPREV) mission to Slovenia, 4–16 November 2017. The mission was undertaken by the International Atomic Energy Agency (IAEA) based on a request from the Government of Slovenia through the Slovenian Nuclear Safety Administration (SNSA). EPREV missions are designed to provide a peer review of emergency preparedness and response (EPR) arrangements in a country based on the IAEA Safety Standards. The team for the EPREV mission consisted of international EPR experts from IAEA Member States as well as a team coordinator and deputy team coordinator from the IAEA Secretariat.

This report includes recommendations and suggestions for improvements based on the IAEA Safety Standards as well as good practices that are considered as models for other Member States. In some cases, improvements in line with the detailed findings are already being undertaken. In other cases, the Government of Slovenia should adopt an action plan to implement the recommendations and suggestions.

The Government of Slovenia is to be commended for dedicating significant resources for EPR across all levels of government. The majority of response organizations have developed comprehensive arrangements to fulfil their assigned roles and responsibilities. In many cases, arrangements have been tested through sustained drill and exercise programmes, especially for emergencies at the nuclear power plant.

The EPREV team noted some areas where improvements could be made. In particular, the coordinating mechanism at the national level could be strengthened to cover all required areas and topics, set the frequency of formal meetings, define membership at a consistent level across all organizations, and address the interface between safety organizations and security/law enforcement organizations.

The first task of the national coordinating mechanism should be to continue the revision of the National Emergency Response Plan for Nuclear and Radiological Accidents. The National Plan should be updated to fully reflect the international safety standards, in particular for the development of a protection strategy for taking protective actions and other response actions during an emergency. Additional focus should also be given to describing the concept of operations for a nuclear or radiological emergency, using the set of protective actions described in the National Plan. The concept of operations should serve as a common reference point for all organizations developing their own plans and procedures to ensure compatibility of arrangements.

The National Plan should also be updated to include additional details and arrangements for the later phases of an emergency response, particularly the lifting of protective actions, and the termination of an emergency, which is currently not addressed.

There is a significant need for Slovenia to further develop a comprehensive monitoring strategy as part of the overall protection strategy, to ensure data and information is available to support public protective action decisions in a timely manner. This is particularly important given the various public and private organizations in the country which have monitoring, sampling, and assessment capabilities.

While there have been many exercises related to emergencies at the nuclear power plant, the EPREV team notes that Slovenia would benefit from a defined national exercise programme

reflecting periodic drills and exercises of all postulated emergencies in the national hazard assessment.

The team also noted a number of specific good practices relating to communication between response organizations during an emergency, GIS systems, and the quality management programme at the national level.

The EPREV team noted the excellent cooperation between all the stakeholders and response organizations during the mission and during detailed discussions regarding the EPR arrangements in the country.

This report serves as the final record of the EPREV mission. The IAEA will continue to work with Slovenia through existing projects to continue to improve EPR arrangements. It is expected that Slovenia will develop an Action Plan to implement the recommendations and suggestions in the report, and will invite the IAEA for an EPREV Follow-Up Mission to review the implementation.

## **1. INTRODUCTION**

### **1.1. Objective and scope**

The purpose of this EPREV mission was to conduct a review of Slovenia's emergency preparedness and response arrangements and capabilities. The EPREV focused on emergency preparedness categories I, II, III, and IV. The review was carried out by comparing existing arrangements against the IAEA Safety Standards.

It is expected that the EPREV mission will facilitate improvements in Slovenia's emergency preparedness and response arrangements, and those of other Member States, based on the knowledge gained and experiences shared between Slovenia and the EPREV team, and through the evaluation of the effectiveness of the country's arrangements, its capabilities and its good practices.

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

- Providing Slovenia with an opportunity for self-assessment of its activities against IAEA Safety Standards;
- Providing Slovenia with a review of its emergency preparedness and response arrangements;
- Providing Slovenia with an objective evaluation of its emergency preparedness and response arrangements with respect to IAEA Safety Standards and guidelines;
- Contributing to the harmonization of emergency preparedness and response 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 EPR;
- Providing key staff with an opportunity to discuss their practices with reviewers who have experience with different practices in the same field;
- Providing Slovenia with recommendations and suggestions for improvement; and
- Providing other States with information regarding good practices identified in the course of the review.

### **1.2. Preparatory work and review team**

At the request of the Government of Slovenia, a preparatory meeting for EPREV was conducted from 4–5 April 2017. The preparatory meeting was carried out by the appointed Team Leader, Mr David Nodwell, the Deputy Team Leader, Ms Hannele Aaltonen, the Team Coordinator, Mr Mark Breiting, and counterparts from Slovenia.

The EPREV team had discussions regarding EPR (and policy issues) with the Liaison Officers, Mr Marjan Tkavc and Mr Igor Sirc, as well as other key organizations in the host country. The discussions resulted in agreement on the scope of the EPREV mission.

Mr Sirc and representatives of other organizations made presentations on the national context, the current status of EPR in Slovenia, and the self-assessment results to date.

IAEA staff presented the EPREV principles, process and methodology. This was followed by



a discussion on the tentative work plan for the implementation of the EPREV Mission in November 2017.

The proposed EPREV Review team composition — experts from Member States to be involved in the review — was discussed, and the size of the EPREV Review team was tentatively confirmed. Logistics including meetings and work spaces, identification of counterparts and a Liaison Officer, proposed site visits, lodging and transportation arrangements, were also addressed. All relevant aspects were included in the agreed Terms of Reference (TOR).

Mr Sirc provided the IAEA and the review team with the advance reference material for the review, including the self-assessment results.

### **1.3 References for the review**

The primary reference for the review is IAEA Safety Standards Series, General Safety Requirements, No. GSR Part 7, *Preparedness and Response for a Nuclear or Radiological Emergency* [1].

In addition, Safety Guides GSG-2, *Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency* [2], and GS-G-2.1, *Arrangements for Preparedness for a Nuclear or Radiological Emergency* [3], were used as review criteria.

The terms used in this report are consistent with those found in the IAEA Standards referred to in the above paragraphs.

## **2. DETAILED FINDINGS ON GENERAL REQUIREMENTS**

### **2.1. Emergency management system**

The all-hazards emergency management system in Slovenia is comprehensive and addresses, with varying effectiveness, all phases of emergency management. The system is defined in legislation through the Act on Protection against Natural and other Disasters (Disaster Act) and other decrees.

The Administration for Civil Protection and Disaster Relief (ACPDR) is the competent national authority for the all-hazards disaster management system in Slovenia. ACPDR is organized into regional and national levels. Emergencies are handled at the lowest level possible, only activating additional resources when necessary. There are Civil Protection (CP) commanders in designated commercial companies, and at the local, regional, and national level who assume command for disaster response when activated, in accordance with the emergency response plans. CP Commanders at the local level are designated by the mayor and at the regional and national levels are designated by the national government. Depending on the nature, scale and consequences of the emergency, the Civil Protection Headquarters, composed of representatives of all key relevant organizations, is activated to support the CP Commander. On the scene, the incident commander (i.e., firefighter in case of fires) coordinates the activities with other organizations (e.g., police, emergency medical services). The Civil Protection Commanders at the regional and national levels are supported by ACPDR.

The country conducted a risk assessment to analyse the potential likelihood and consequences of different disasters. Based on the results, the country developed specific plans for some types of disasters, including nuclear or radiological emergencies. For the selected disasters, response plans have been developed at national, regional, local and facility levels.

Emergency preparedness and response for nuclear or radiological emergencies is further defined in the Ionizing Radiation Protection and Nuclear Safety Act (Radiation Protection and Nuclear Safety Act). It assigns regulatory oversight and response roles to the Slovenian Nuclear Safety Administration (SNSA) and the Slovenian Radiation Protection Administration (SRPA).

The government, with primary input from ACPDR and SNSA, has drafted the National Emergency Response Plan for Nuclear and Radiological Accidents (National Plan). The National Plan is designed for nuclear or radiological emergencies which results in a release of radioactive substances into the environment or the irradiation of the public, both within Slovenia or abroad, and is consistent with the all-hazards emergency management system in the country. The National Plan is currently under revision. This mission considered the published National Plan as the basis for the review while also noting the content of the draft National Plan as it currently stands.

The emergency management system is in line with international standards and compatibility of arrangements has been tested through conventional emergencies, drills, and exercises.

### **2.2. Roles and responsibilities**

The roles and responsibilities of organizations are defined in the Protection against Natural and Other Disasters Act and the Radiation Protection and Nuclear Safety Act, and are specified in more detail in the National Plan.

The country has established a number of standing commissions and groups which have some responsibility for preparedness for nuclear or radiological emergencies. Most notable is the Inter-ministerial Commission for the Monitoring of the Implementation of the National Emergency Plan for Nuclear and Radiological Accidents (referred to as the Commission), chaired by the Director of SNSA. The Commission members are representatives of national level organizations with significant responsibilities for preparedness and response for nuclear or radiological emergencies. The Commission meets several times per year based on needs, not a set periodicity. The Commission relies on the authority of its members; lacking a charter or mandate, it has an advisory role and no executive authority.

There are also other groups established for specific purposes relating to some aspects of preparedness and response for nuclear or radiological emergencies, including:

- Inter-ministerial Operational Group for the Implementation of Tasks Defined in the National Emergency and Rescue Plan in Case of Use of Weapons or Materials of Mass Destruction for Terrorist Purposes or Terrorist Attacks with Conventional Means;
- Commission for Physical Protection of Nuclear Facilities and Nuclear and Radioactive Material;
- Inter-ministerial Working Group for Counter-terrorism; and
- National Computer Security at Nuclear Facilities Working Group.

These groups all have some responsibility for aspects related to nuclear or radiological emergencies or their initiating events.

<b>Suggestion 1.</b>
<b>Observation:</b> Activities during the preparedness stage are spread amongst various commissions and groups with no clear mechanism for overall coordination.
<p><b>Basis for suggestion:</b> GSR Part 7 paragraph 4.10 states: “The government shall establish a national coordinating mechanism to be functional at the preparedness stage, consistent with its emergency management system, with the following functions:</p> <ul style="list-style-type: none"> <li>(a) To ensure that roles and responsibilities are clearly specified and are understood ...;</li> <li>(b) To coordinate the hazard assessment within the State ...;</li> <li>(c) To coordinate and ensure consistency between the emergency arrangements of the various response organizations, operating organizations and the regulatory body ...;</li> <li>(d) To ensure consistency among requirements for emergency arrangements, contingency plans and security plans of operating organizations ...;</li> <li>(e) To ensure that appropriate emergency arrangements are in place, both on the site and off the site ...;</li> <li>(f) To coordinate arrangements made for enforcing compliance with the national requirements for emergency preparedness and response as established by legislation and regulations ...;</li> <li>(g) To coordinate a subsequent analysis of an emergency, including analysis of the emergency response ...;</li> </ul>

<b>Suggestion 1.</b>
<p>(h) To ensure that appropriate and coordinated programmes of training and exercises are in place and implemented, and that training and exercises are systematically evaluated;</p> <p>(i) To coordinate effective communication with the public in preparedness for a nuclear or radiological emergency.”</p>
<p><b>Suggestion:</b> The Government should consider strengthening the national coordinating mechanism to ensure all activities during the preparedness stage are undertaken in an effective manner.</p>

There are some roles and responsibilities which are not clearly assigned. Neither the Radiation Protection and Nuclear Safety Act nor the National Plan allocates responsibility for dose assessment resulting from an intake of radioactive material and for dose reconstruction for members of the public following a nuclear or radiological emergency, as defined in GSR Part 7 paragraph 5.83. Additionally, there are no clear responsibilities for issuing recommendations on the restriction of non-public food chain products during the urgent and early response phase.

The Radiation Protection and Nuclear Safety Act requires dose assessment arrangements to be in place for routine operations. There are technical capabilities in place which provide annual dose assessment for routine operations and on a case-by-case basis for small events. There are no legal requirements or arrangements in place for larger emergencies.

<b>Recommendation 1.</b>
<p><b>Observation:</b> There are no arrangements to undertake dose assessment or dose reconstruction for members of the public or for issuing recommendations on the restriction of non-public food chain products following a nuclear or radiological emergency.</p>
<p><b>Basis for recommendation:</b> GSR Part 7 paragraph 4.7 states: “The government shall ensure that all roles and responsibilities for preparedness and response for a nuclear or radiological emergency are clearly allocated in advance among operating organizations, the regulatory body and response organizations.”</p>
<p><b>Recommendation:</b> The Government should assign roles and responsibilities for dose assessment, dose reconstruction, and recommendations on the restriction of non-public food chain products as part of the preparedness for a nuclear or radiological emergency.</p>

SNSA and SRPA are responsible for the regulatory aspects of emergency preparedness and response for Krško NPP and other facilities and activities associated with use of radiation sources. The Decree on Dose Limits, Radiation Contamination and Intervention Levels (UV2) establishes principles and criteria for emergency preparedness and response to be used by the operating and response organizations.

SNSA, SRPA, and the Inspectorate for Protection Against Natural and Other Disasters are responsible for inspections of emergency preparedness and response arrangements of the licensees. However, inspections of licensee emergency preparedness and response arrangements are infrequent and only address arrangements at a high level.

The regulatory body provides the operating organizations with the authority to promptly take protective actions, including mitigatory actions on the site, in response to a nuclear or radiological emergency.

There arrangements cover a broad range of public and private organizations to fulfil roles and responsibilities for emergency preparedness and response. In the case of private organizations, contracts contain slightly differing provisions, for example on drills and exercises. The contracts are not systematically analysed to ensure all organizations have financial or human resources to fulfil their assigned roles and responsibilities.

<b>Recommendation 2.</b>
<b>Observation:</b> There arrangements for emergency response are reliant upon many contracts between government, operating organizations, and private companies. The provisions of the contracts are not standardized. The contracts are not systematically analysed to ensure all organizations have financial or human resources to fulfil their assigned roles and responsibilities.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 4.8 states: “The government shall ensure that response organizations, operating organizations and the regulatory body have the necessary human, financial and other resources, in view of their expected roles and responsibilities and the assessed hazards, to prepare for and to deal with both radiological and non-radiological consequences of a nuclear or radiological emergency, whether the emergency occurs within or beyond national borders.”
<b>Recommendation:</b> The Government should ensure that all roles and responsibilities are analysed to ensure that organizations have appropriate financial and human resources to complete the assigned expected tasks during emergency preparedness and response.

### 2.3. Hazard assessment

The most recent hazard assessment, Edition 6, was completed by SNSA in August 2017, updating previous hazard assessments. The hazard assessment takes into account the existing nuclear facilities, the uses of radioactive materials, criminal acts, uncontrolled radiation sources, the transport of radioactive and nuclear materials, the re-entry of a satellite carrying radioactive material, nuclear accidents abroad, and the damage to the tailings repository at the former uranium mine in Žirovski Vrh.

The hazard assessment identified the following emergency preparedness categories in the country:

- Emergency Preparedness Category I:
  - Krško NPP
- Emergency Preparedness Category II:
  - Visiting nuclear powered vessels (although this has occurred in the past, it is noted that this has not occurred within the past 15 years)
- Emergency Preparedness Category III:
  - TRIGA Mark II research reactor at Podgorica
  - Brinje central storage for radioactive waste

<b>Suggestion 2.</b>
<b>Observation:</b> The hazard assessment has identified the visit of nuclear powered vessels in Slovenian territorial waters but no assessment of impacts and consequences has been performed.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 4.18 states: “Hazards shall be identified and potential consequences of an emergency shall be assessed to provide a basis for

<b>Suggestion 2.</b>
establishing arrangements for preparedness and response for a nuclear or radiological emergency. These arrangements shall be commensurate with the hazards identified and the potential consequences of an emergency.”
<b>Suggestion:</b> SNSA should consider updating the hazard assessment to include potential impacts and consequences of emergencies during the visit of a nuclear powered vessel.

Although the term “emergency preparedness category IV” is not explicitly mentioned in the hazard assessment, there are many licensed activities with radioactive sources within Slovenia. The hazard assessment identifies the 19 dangerous sources based on the classification of the Decree on Practices Involving Radiation (UV1).

Most of the facilities and activities have been analysed, including: the sources of hazards; the possible cause of emergencies; the probability of occurrence; the type, form and level of hazard; the course and possible scope of emergencies; the people, animals, property and cultural heritage at risk; the probable consequence of accidents; the likelihood of chain reaction accidents; the predictability of accidents; the planning of protective measures. Additionally, the combination of nuclear and other emergencies was analysed for the nuclear power plant.

Although the hazard assessment considers criminal acts in general terms, there is no direct link to the nuclear security threat assessment or other related law enforcement information. It also focuses on criminal acts at existing facilities or impacting authorized activities with relatively little focus on radioactive materials out of regulatory control. There are existing arrangements for detection of radioactive material at scrap metal processing facilities. The draft law under development expands these considerations and includes requirements for additional facilities including postal facilities, waste (non-radioactive) landfills and ports of entry (e.g. airport and seaports).

#### **2.4. Protection strategy for an emergency**

The Radiation Protection and Nuclear Safety Act requires that the Government establishes intervention levels for nuclear or radiological emergencies, expressed as avertable dose. The published National Plan fulfils this and includes operational intervention levels (OILs) for supporting public protective action decisions.

In line with the revised IAEA Safety Standards and the EU Basic Safety Standards directive, the basis for a national protection strategy has been introduced in a draft decree on dose limits, reference levels and radioactive contamination. The basis includes a reference level of 100 mSv for emergency exposure situations, generic criteria, and OILs for urgent and early protective actions in accordance with international standards.

Although the decree is still in draft form, the reference level, generic criteria and OILs for supporting public protective actions and other response actions have been included in SNSA response procedures and were applied during a recent emergency exercise. The basis for the protection strategy included in the draft decree has not been included in plans and procedures by other response organizations or operating organizations. This varying implementation creates possible differences in response procedures for nuclear or radiological emergencies.

Operating organizations including the Krško NPP, TRIGA research reactor and the Central Radioactive Waste Storage Facility (CSRAO) have developed emergency action levels (EALs) in their emergency classification system and will update their procedures, including EALs, based on the national protection strategy, once it is published. Other operating organizations do not include observables, EALs, or OILs in their plans or procedures.

<b>Recommendation 3.</b>
<b>Observation:</b> A protection strategy for taking effective protective actions and other response actions in a nuclear or radiological emergency has not been formalized and consistently implemented by all organizations.
<b>Basis for recommendation:</b> GSR Part 7 Requirement 5 states: “The government shall ensure that protection strategies are developed, justified and optimized at the preparedness stage for taking protective actions and other response actions effectively in a nuclear or radiological emergency.”
<b>Recommendation:</b> The Government should ensure that the protection strategy is formalized, and that all emergency plans and procedures are updated by the relevant response organizations to include pre-established operational criteria.

### **3. DETAILED FINDINGS ON FUNCTIONAL REQUIREMENTS**

#### **3.1. Managing emergency response operations**

CP Commanders are designated at elected commercial companies as well as at the local, regional and national levels and are responsible for command, coordination and decision making in large scale emergencies, including the response to nuclear or radiological emergencies. Other ministries and response organizations report to the CP Commanders through the respective CP Headquarters, and provide necessary technical or operational information to support the response.

For an emergency at the Krško NPP, the Posavje regional CP commander is responsible for managing and coordinating the operation of protection and rescue forces in the Posavje region and the overall off-site response. The draft National Plan includes provisions for NPP personnel to support the regional CP Headquarters to provide technical expertise and knowledge of the on-site activities, and also to supplement staffing at the ACPDR emergency centres, in order to fulfil the ACPDR responsibilities. There is a tested and demonstrated ability to coordinate the on-site and local off-site response during an emergency at the NPP.

During other nuclear or radiological emergencies requiring immediate action, including those at facilities in emergency preparedness category III and activities in emergency preparedness category IV, the emergency response is managed by the first responders and then the local or regional CP commanders when activated. In these cases, technical expertise is provided by the SNSA officer on duty. The SNSA officer on duty advises the head of emergency response remotely.

However, there is some doubt about the ability of the ACPDR, in particular, to gather the required information about all the resources needed in an emergency response, to inform resource allocation decision making. In this regard, it was noted that some ACPDR counterparts were unfamiliar with the monitoring capabilities of the Ministry of Defence. Similarly, there was uncertainty about the integration of private entities into the overall response organization.

It should be noted that while Slovenia has high-level bilateral agreements and strong notification procedures with neighbouring countries, the ability and mechanisms to coordinate a response with those countries, especially Croatia, have not been fully tested for the range of postulated emergencies.

#### **3.2. Identifying, notifying and activating**

The ability of operating organizations throughout the country to recognize emergency conditions and initiate an emergency response varies. The Krško NPP has equipment and procedures which are regularly tested to initiate an emergency response on the site and notify off-site officials. However, other facilities, such as the CSRAO, do not have continuous radiation monitoring and may not be able to promptly identify a nuclear or radiological emergency and initiate protective actions. Some first responders were equipped with alarming radiation dosimeters and radiation detectors, but indicated that they only use them when there are indications that radioactive material is present, such as labels, placards, or markings. This could limit their ability to identify the presence of radioactive material out of regulatory control and initiate an emergency response.



<b>Suggestion 3.</b>
<b>Observation:</b> The CSRAO does not have any fixed radiation monitoring capabilities.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 5.17 states: “For facilities and activities in categories I, II and III, and for category IV, arrangements shall be made: (1) to promptly recognize and classify a nuclear or radiological emergency; ...”
<b>Suggestion:</b> The CSRAO should consider installing continuous radiation monitors in the waste storage area.

Emergency notification centres are available throughout Slovenia using the standard EU 112 emergency notification phone number. These emergency notification centres are continuously available and have procedures in place to activate the appropriate response organizations if they are notified of a possible nuclear or radiological emergency. These centres can also receive notifications from authorized facilities or activities and activate an emergency response. The regional emergency notification centres have a GIS system that includes the location of all High Activity Sealed Sources in the country; they receive automated notifications when a call is received from one of these locations.

<b>Good Practice 1.</b>
<b>Observation:</b> Regional emergency notification centres have immediate access to the locations and details of all High Activity Sealed Sources in their GIS system. This provides for a rapid assessment of the hazard and appropriate emergency response.
<b>Basis for Good Practice:</b> GSR Part 7 paragraph 5.11 states: “The notification point(s) shall be maintained in a state of continuous availability to receive any notification or request for support and to respond promptly, or to initiate a preplanned and coordinated off-site emergency response appropriate to the emergency class or the level of emergency response.”
<b>Good Practice:</b> Regional emergency notification centres have the GIS coordinates and details of all high activity sealed sources in Slovenia.

For nuclear or radiological emergencies, the notification procedures will continue to the national level, including ACPDR headquarters and SNSA. SNSA maintains an officer on duty 24 hours per day. This officer’s responsibilities include notification procedures such as calling the Director, other key positions, and then subsequent positions. The first individual arriving at the SNSA emergency centre sends a group SMS message to all SNSA staff and other users of MKSID. Depending on availability, phone notifications to identify the full team can take up to 2 hours, not counting the time needed to provide advice to response organizations at the emergency if needed. The system currently relies on individual phone calls and could be enhanced with the use of automated notification systems or software, and updated procedures, to ensure redundancy.

<b>Suggestion 4.</b>
<b>Observation:</b> The activation of the SNSA emergency response centre could be delayed due to extensive notification procedures, limiting the ability of SNSA to provide timely advice and recommendations during the initial response to some emergencies.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 5.17 states: “... and (4) upon notification, to initiate a coordinated and preplanned off-site response, as appropriate, in accordance with the protection strategy.”
<b>Suggestion:</b> SNSA should consider further improving its internal notification

<b>Suggestion 4.</b>
procedures to streamline notification and activation.

The NPP has an emergency classification system with 4 levels, each with distinct emergency response actions and notification procedures. The TRIGA research reactor and CSRAO have separate classification systems using the same terminology, but with fewer levels and different definitions. Other operating organizations do not have emergency classification procedures in place.

<b>Suggestion 5.</b>
<b>Observation:</b> Not all operating organizations, particularly those in emergency preparedness category III, have an emergency classification system.
<p><b>Basis for suggestion:</b> GSR Part 7 paragraph 5.14 states: “The operating organization of a facility or activity in category I, II, III or IV shall make arrangements for promptly classifying, on the basis of the hazard assessment, a nuclear or radiological emergency warranting protective actions and other response actions to protect workers, emergency workers, members of the public and, as relevant, patients and helpers in an emergency, in accordance with the protection strategy (see Requirement 5). This shall include a system for classifying all types of nuclear or radiological emergency as follows:</p> <p>(a) General emergency at facilities in category I or II for an emergency that warrants taking precautionary urgent protective actions, urgent protective actions ...”</p>
<b>Suggestion:</b> SNSA and SRPA should consider enforcing that all operating organizations, especially those facilities in emergency preparedness category III with radioactive sources, have appropriate classification system(s).

Emergencies at the Krško NPP could affect territory in Croatia. There are direct notification channels and procedures which have been tested, both from the operating organization and from SNSA. The Croatian regulatory body has direct access to a communication system, MKSID, used by Slovenian response organizations at the local, regional, and national level. ACPDR regional offices with national borders have procedures to notify regions in neighbouring countries directly.

### 3.3. Taking mitigatory actions

In accordance with the Radiation Protection and Nuclear Safety Act, a person carrying out a radiation practice using the radiation source or managing the facility which has caused an emergency must mitigate the consequences of the emergency. The operating organization has the sole responsibility to implement the necessary mitigatory actions at facilities, although support from off-site resources is planned for some facilities.

At the Krško NPP, the Technical Support Centre manages the on-site response and makes decisions on mitigatory actions. These decisions are communicated to the Operations Support Centre, which is organized and equipped to carry-out the actions. The NPP has contracts with off-site organizations which may be required to support the on-site response, such as fire and emergency medical services. Training on the plant layout, on-site equipment and radiation protection aspects is provided to off-site organizations by the operator.

The TRIGA Research Reactor and CSRAO facilities have emergency procedures in place, including mitigatory actions. The procedures describe the activation, training and access of off-site response organizations to the site.

The Fire Fighting Brigade of Ljubljana and 35 volunteer fire fighting stations receive regular training regarding basic instructions on how to mitigate the potential consequences of a radiological emergency, where there is a significant likelihood of encountering a dangerous source that is not under control. Training is conducted at ACPDR training centres as part of overall hazardous material (HAZMAT) training.

During an emergency not at a designated facility, the operating organization or first responders may contact SNSA to receive advice on mitigatory actions if they are not already described in their emergency procedures. Technical Support Organizations including the mobile response teams from the Institute of Occupational Safety and the ELME may be activated for additional advice, or to deploy to the site.

### **3.4. Taking urgent protective actions and other response actions**

The published National Plan includes defined emergency planning zones and distances, as well as actions to be taken during an urgent phase of an emergency. The emergency planning zones of the Krško NPP are:

- The Precautionary Action Zone (PAZ): within a 3 km radius of the NPP;
- The Urgent Protective Action Planning Zone (UPZ): within a 10 km radius of the NPP;
- The Long-Term Protective Action Planning Zone (LPZ); within a 25 km radius of the NPP.

In addition, there is an Area of General Preparedness which covers the entire territory of Slovenia.

The concept of operations for urgent protective actions is based on the existing protection strategy described previously, and is designed based on the concept of avertable dose. The PAZ will be evacuated when a Level 3 (General Emergency) is declared at the NPP. Evacuation in the UPZ is carried out on the basis of model and measurement results. The draft National Plan is removing the reliance on models and measurements within a 10 km radius, and includes provisions to issue evacuation orders based on plant conditions immediately after the conclusion of the evacuation from the PAZ. Protective measures in the LPZ are implemented on the basis of modelling and monitoring results. When evacuation cannot be implemented in a timely manner before radioactive release into the environment, the public will be advised to shelter indoors: for example, in case of an anticipated rapid deterioration of the on-site situation or other reasons, e.g. weather conditions.

The decision making authority for public protective actions rests with the national CP commander once activated, with input from the operating organization and SNSA (including SRPA officials at the SNSA emergency centre). If there are any delays in activation, communication system outages, or a rapid progression of the emergency, local and regional CP commanders in the region of the NPP are empowered to initiate public protective actions based on direct communication with the NPP. The Police are responsible for establishing access control points for areas with evacuation orders or indoor sheltering orders, directing the implementation of protective actions, and maintaining public safety during the evacuation. The Posavje regional CP commander provides transport for those who are unable to evacuate themselves in case of nuclear emergency, while for radiological emergencies this is the responsibility of Krško municipality, although the municipality indicated that it would also

expect to provide some buses during a nuclear emergency. The Krško Health Centre assists in evacuation of vulnerable populations.

Evacuation routes are pre-planned and leaflets highlighting the evacuation routes and reception centres are distributed to the public. There are 4 pre-planned reception centres, all outside the LPZ. The draft National Plan updates the location of the reception centres and identifies locations which are all greater than 40 km away from the NPP. The operation of reception centres and temporary accommodation for the public is outlined in municipal and regional plans. Municipalities shall be able to operate the centres for a minimum of 7 days.

Iodine Thyroid Blocking (ITB) tablets are available to all citizens under 40 years of age residing within 10 km, free of charge. They are also available free of charge to non-residents through institutions such as schools, kindergartens, health care centres, nursing homes, other institutions, companies and other organizations. The ITB tablets are available for pickup during normal operating hours at pharmacies within the area and at hospitals and other healthcare facilities outside the area. To date, approximately 23% of the eligible population has collected ITB tablets.

Based on a study performed in 2008, it is estimated that the evacuation of the 11 000 inhabitants of the PAZ would take about 3 hours. In the same study, it was estimated that the evacuation of the UPZ, almost 29 000 inhabitants, would take approximately 7.5 hours. There are recent and planned changes to the infrastructure in the region which could affect these estimates.

<b>Suggestion 6.</b>
<b>Observation:</b> The last study and analysis regarding the evacuation times for the PAZ and UPZ date from 2008. Taking into account the evolution of the available means and municipal infrastructures, these estimates could be updated to better develop procedures for urgent protective actions.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 5.17 states: "... and (4) upon notification, to initiate a coordinated and preplanned off-site response, as appropriate, in accordance with the protection strategy."
<b>Suggestion:</b> The government and municipalities should consider reviewing the evacuation time estimates for the PAZ and UPZ around the Krško NPP using updated data and methodologies.

The full set of urgent protective actions and other response actions should be included in a detailed Concept of Operations for ensuring that all response organizations involved in the development of emergency plans and arrangements share a joint understanding (see section 4.4).

During a nuclear or radiological emergency not at the NPP, urgent protective actions are planned only for the site area. They are implemented by the licensee. At the TRIGA research reactor, urgent protective actions are based either on predefined EALs or measured OILs. On-site personnel are alerted by sirens and evacuated. There are EALs at CSRAO for the alarming dosimeters, fire alarms and security events.

During emergencies not at a facility, police and firefighters are trained to establish a cordoned-off area and evacuate the public. The size of the cordoned-off area is dependent on the nature, scale and consequences of the event.

There are general provisions for the possible administration of ITB and implementing urgent protective actions in the Area of General Preparedness based on a large nuclear emergency abroad, but procedures are not developed and it has never been tested.

### **3.5. Providing instructions, warnings and relevant information to the public**

The population within 10 km of the Krško NPP receives information about the potential for emergencies on a regular basis through public communications and leaflets which are distributed to all households. The leaflets contain information on the NPP, possible hazards, the warning system, evacuation routes, and reception centre locations.

The surrounding population at the Jožef Stefan Institute in Ljubljana is frequently informed about the kind of facility and its hazards and potential effects on the environment. The facility hosts annual public open houses including the ability to visit the Institute and learn more about its activities. The Krško NPP conducts open houses for the public once every three years. Tours of the NPP are available regularly and include information on EPR.

There is a national network of warning sirens which provide audible alarms and are used for all emergencies, including conventional emergencies and nuclear or radiological emergencies. The public is instructed that when the alarm sounds, they should check the radio or TV for more detailed instructions. The instructions are issued only in Slovenian: it is assumed that hotels and other responsible organizations would be able to communicate with transient populations. The sirens can be activated nationally or within specific regions. Slovenia is currently upgrading the sirens to provide direct verbal instructions through the siren network to streamline instructions and warnings to the public.

The municipalities provide additional information to the potentially-affected population in the area of the emergency using a special telephone number which is later transferred to the information centre established by the ACPDR. In case of a level 2 or 3 emergency at Krško NPP, ACPDR establishes an information centre to provide additional information for the population of the LPZ.

The Slovenian Ministry of Foreign Affairs informs foreign diplomatic and consular missions in Slovenia about the situation, potential or actual consequences, and the living conditions of foreign nationals in Slovenia.

### **3.6. Protecting emergency workers and helpers in an emergency**

The Radiation Protection and Nuclear Safety Act established requirements for the dose limits of exposed emergency workers, measurements of emergency exposures, recording of results and reporting, and medical surveillance of exposed workers and the population.

SRPA is responsible for establishing dosimetry requirements and regulating organizations that provide the services. Authorized dosimetry services ensure that the results of dose measurements are made available promptly to the relevant competent authorities and authorized medical practitioner if dose limits have been exceeded. The Jožef Stefan Institute, Institute of Occupational Safety, Krško NPP and the Slovenian Army operate dosimetry services. The Slovenian Army dosimetry service is not regulated by SRPA and the records are kept separately.

In the case of a nuclear and radiological emergency, the SRPA ensures that radiation exposures exceeding the dose limits for individuals are approved in exceptional cases by the CP Commander, with the consent of an occupational physician. The individual must be healthy, volunteering to perform the task, trained, and aware of the risks involved. A consent form and notification of the risk of exceeding the dose limits is included in SRPA procedure P-204.

During a nuclear or radiological emergency the references levels (i.e. guidance values) for emergency workers in the Decree on Dose Limits, Radioactive Contamination and Intervention Levels (UV2), are applied. Reference levels to protect emergency workers based on a protection strategy have been included in the draft revised Decree previously described, but are based on EU directives.

In general, all workers in Slovenia are subject to health and safety regulations, including requirements for periodic assessment of their work conditions and medical surveillance, depending on the identified job hazards. These regulations are enforced by the Labour Inspectorate. The operating and response organizations for nuclear or radiological emergencies are responsible for ensuring compliance with the Ministry of Health Rule on health surveillance of radiation exposed workers (OJ RS, No.2/04). SRPA is responsible for ensuring the health surveillance of emergency workers for the purpose of assessing their initial fitness, and continuing fitness, for their intended duties.

During the implementation of protective actions following a large scale nuclear emergency, persons not designated in advance as emergency workers will be integrated into operations as directed by the CP Commander. There are no arrangements in place to ensure that non-designated emergency workers receive training prior to deployment for the implementation of protective actions.

<b>Recommendation 4.</b>
<b>Observation:</b> There are no provisions to provide just-in-time training to non-designated emergency workers.
<p><b>Basis for recommendation:</b> GSR Part 7 paragraph 5.52 states: “The operating organization and response organizations shall ensure that arrangements are in place for the protection of emergency workers and protection of helpers in an emergency for the range of anticipated hazardous conditions in which they might have to perform response functions. These arrangements, as a minimum, shall include:</p> <p>...</p> <p>(b) Providing emergency workers not designated in advance and helpers in an emergency immediately before the conduct of their specified duties with instructions on how to perform the duties under emergency conditions (‘just in time’ training); ...”</p>
<b>Recommendation:</b> The Government should ensure that arrangements are established to provide non-designated emergency workers with just-in-time training, immediately before deployment, on how to perform duties under emergency conditions.

Emergency workers at operating organizations and responders to nuclear and radiological emergencies are equipped with the appropriate personal protection equipment, iodine thyroid blocking and personal dosimetry. Health care services, however, do not have personal dosimetry arrangements.

<b>Recommendation 5.</b>
<b>Observation:</b> Not all emergency workers have access to personal dosimetry.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 5.52 states: “The operating organization and response organizations shall ensure that arrangements are in place for the protection of emergency workers and protection of helpers in an emergency for the range of anticipated hazardous conditions in which they might have to perform response functions. These arrangements, as a minimum, shall include: ... (c) Managing, controlling and recording the doses received; (d) Provision of appropriate specialized protective equipment and monitoring equipment; ...”
<b>Recommendation:</b> The Government should ensure that arrangements are established to manage, control, and record the doses of all emergency workers.

### 3.7. Medical response

The capabilities for treatment of contaminated patients or radiation injuries are focused on a small number of institutions in the country. Emergency medical services are not consistently trained to recognize possible signs of radiation emergencies beyond their general hazard awareness training. Only the units near the NPP and in Ljubljana receive specialized training at regular intervals.

There is draft guidance from the Ministry of Health on the transport and treatment of contaminated patients or patients with radiation injuries; this is expected to be published by the end of 2017.

There are specific arrangements in place for the Krško NPP. The Krško community health centre offers regular training on initial treatment of radiation injuries. The NPP has a contract with the Rebro Clinical Medical Centre in Zagreb, Croatia, and patients would be transported there. The NPP and medical transport services conduct annual exercises to practise transporting patients, which must cross a national border with checkpoints. These exercises have identified some restrictions which have been communicated to government officials from both countries.

For nuclear or radiological emergencies occurring elsewhere than the NPP, the University Medical Centre Ljubljana is the national referral hospital and maintains a nuclear medicine department with medical physicists and radiation protection officers. The Medical Centre has no formal arrangements for leveraging expertise from multiple departments during a nuclear or radiological emergency. They also have no procedures for receiving and treating contaminated patients. There are no guidelines for treatment, or for the designation of medical personnel to treat radiation injuries.

<b>Recommendation 6.</b>
<b>Observation:</b> Most general practitioners are trained in recognizing clinical symptoms of radiation exposure during their studies, but there is no periodic refresher training programme in place.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 5.63 states: “Arrangements shall be made for medical personnel, both general practitioners and emergency medical staff, to be made aware of the clinical symptoms of radiation exposure, and of the appropriate



<b>Recommendation 6.</b>
notification procedures and other emergency response actions to be taken if a nuclear or radiological emergency arises or is suspected.”
<b>Recommendation:</b> The Ministry of Health should develop arrangements for general practitioners and emergency medical services to be trained to recognize the symptoms of radiation exposure and national response procedures.

<b>Recommendation 7.</b>
<b>Observation:</b> Not all relevant healthcare organizations have guidelines for practitioners or healthcare facilities on the transport and treatment of contaminated patients or the treatment of radiation injuries.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 5.64 states: “Arrangements shall be made so that, in a nuclear or radiological emergency, individuals with possible contamination can promptly be given appropriate medical attention. These arrangements shall include ensuring that transport services are provided where needed and providing instructions to medical personnel on the precautions to take.”
<b>Recommendation:</b> The Ministry of Health should issue guidelines on the initial treatment and transport of contaminated patients.

There are no arrangements between the medical providers, the Ministry of Health, or SRPA for the identification and longer term medical actions of patients at risk of increased rates of cancer. The current system relies on the existing network of general physicians and paediatricians, but there are no overall procedures for standardizing guidance across the country.

<b>Recommendation 8.</b>
<b>Observation:</b> There are no plans or procedures for identifying populations at risk of increased incidences of cancer and longer-term medical actions.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 5.68 states: “Arrangements shall be made for the identification of individuals who are in those population groups that are at risk of sustaining increases in the incidence of cancers as a result of radiation exposure in a nuclear or radiological emergency. Arrangements shall be made to take longer term medical actions to detect radiation induced health effects among such population groups in time to allow for their effective treatment. These arrangements shall include the use of pre-established operational criteria in accordance with the protection strategy.”
<b>Recommendation:</b> The Government should develop arrangements for the identification and longer-term medical actions of at-risk populations following a nuclear or radiological emergency.

### **3.8. Communicating with the public throughout an emergency**

The current National Plan specifies some arrangements for communicating with the public during a nuclear or radiological emergency.

For emergencies at the Krško NPP, SNSA is assigned the responsibility of providing an initial press release within 30 minutes of a Level 2 or 3 emergency. This initial press release is based on pre-developed templates. Further press releases will be published by national CP headquarters or the Ministry of Defence, upon approval by the national CP Commander. The CP Commander requires input from SNSA; this input is coordinated with the Public Relations



Office of the Ministry of Environment and Spatial Planning, for all further press releases. The Krško NPP can issue its own press releases in Slovenian, English, and Croatian. There are procedures at SNSA and the NPP to coordinate draft press releases. The procedures specify that press releases are to be issued every 3 hours in the event of little or no change in the emergency, or every 30 minutes following any major change.

For other nuclear or radiological emergencies, operating organizations can issue their own press releases. The procedures for coordination of draft press releases are less specific than the procedures for an emergency at the NPP, and have not been tested for the TRIGA Research Reactor or CSRAO.

The procedures specify that press releases are to be issued every 3 hours in the event of little or no change, or every 30 minutes following any major change.

If necessary, the Communication Office of the Government of the Republic of Slovenia (GOC) is also included in public information activities. The GOC has primary responsibility for foreign communications, including press releases aimed at international audiences.

The respective press offices described above have arrangements in place with television, radio, and other press agencies within the country.

<b>Recommendation 9.</b>
<p><b>Observation:</b> The arrangements for communicating with the public are focused on procedures for issuing press releases and for providing factual information. There are no arrangements in place to ensure that public information puts the health hazards into perspective and to address public concern regarding possible health effects.</p>
<p><b>Basis for recommendation:</b> GSR Part 7 paragraph 5.72 states: “The government shall ensure that a system for putting radiological health hazards in perspective in a nuclear or radiological emergency is developed and implemented with the following aim:</p> <ul style="list-style-type: none"> <li>• To support informed decision making concerning protective actions and other response actions to be taken;</li> <li>• To help in ensuring that actions taken do more good than harm;</li> <li>• To address public concerns regarding potential health effects.</li> </ul> <p>In the development of such a system, due consideration shall be given to pregnant women and children as the individuals who are most vulnerable with regard to radiation exposure.”</p>
<p><b>Recommendation:</b> The Government should further develop its public communications arrangements to provide additional information on the health hazards and health effects, and to address the most vulnerable members of the public.</p>

The Krško NPP has procedures in place for monitoring the traditional media and providing any necessary corrections and clarifications, but this does not include arrangements for monitoring social media. Other organizations do not have such arrangements.

<b>Recommendation 10.</b>
<p><b>Observation:</b> The arrangements for public communication of the off-site organizations do not address the issue of media and social media monitoring to identify rumours or incorrect information.</p>
<p><b>Basis for recommendation:</b> GSR Part 7 paragraph 5.74 states: “Arrangements shall be made to identify and address, to the extent practicable, misconceptions, rumours and incorrect and misleading information that might be circulating widely in a nuclear or</p>

<b>Recommendation 10.</b>
radiological emergency, in particular those that might result in actions being taken beyond those emergency response actions that are warranted (see Requirement 16).”
<b>Recommendation:</b> The Government should ensure that effective media and social media monitoring is in place to identify incorrect information reaching the public, and in those cases to respond to it as soon as possible.

### 3.9. Taking early protective actions

The National Plan includes early protective actions and other response actions to be taken, in addition to urgent protective actions in the Precautionary Action Zone and the Urgent Protective Action Zone, to reduce radiation consequences and to maintain security in the areas where protective actions have been necessary. The measures include:

- Establishment of access control to areas where protective actions of the public have been implemented. The Police control the access and exit points of those areas, but there are no arrangements for returnees to enter areas temporarily.
- The measurement of goods from within the contaminated area, to minimize the spread of radioactive material at control points established outside of areas where protective actions are needed. The organizations involved in the actions are fire-fighting units with the competency to respond to accidents involving dangerous substances, a CBRN Civil Protection unit for decontamination, and, if necessary, CBRN decontamination assets of the Slovenian Armed Forces.
- Restrictions on agriculture, banning contaminated food, animal food stuffs, wild berries and game meat, and protection of the water supply. These actions are implemented by the public (including farmers), by the respective authorities, and by food and foodstuff manufacturers.
- Long-term evacuation (relocation or permanent resettlement).

<b>Suggestion 7.</b>
<b>Observation:</b> There are no arrangements to manage returns to a restricted area during a nuclear or radiological emergency.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 5.79 states: “Returns to these areas for short periods of time shall be permitted if justified (e.g. to feed animals left behind) and provided that those individuals entering the area are: (a) Subject to controls and to dose assessment while in the area; (b) Instructed on how to protect themselves; (c) Briefed on the associated health hazards.”
<b>Suggestion:</b> The government and municipalities should consider developing arrangements for response organizations to manage returns to a restricted area, including allowable justifications for returns, controls, and instructions.

The early protective actions are to be implemented in the LPZ based on radioactivity measurements complemented by modelling, and, if necessary, in areas outside the LPZ.

The draft National Plan also includes actions to prevent inadvertent ingestion of radioactive material. Actions may include instructions to reduce how many members of the public are

working in gardens or fields, the number of children playing on the ground, and other outdoor activities such as recreation.

The Ministry of Agriculture, Forestry and Food has overall responsibility for the public food chain, but does not have detailed emergency procedures to implement its responsibilities, or criteria to use for decision making during an emergency response. There are no specific responsibilities assigned for providing recommendations for non-public food chain products (e.g., hunting, fishing).

Neither the current nor draft National Plan include decontamination or cleanup in the list of early protective actions, which can be particularly important for the timely resumption of normal social and economic activities in populated areas. Detailed planning and criteria are required to execute decontamination in an efficient way, allowing the restart of society's essential services and the return of evacuated inhabitants. At the same time, the need to minimize the amount of waste generated during cleaning processes needs to be taken into account. These issues should all be addressed in the Protection Strategy.

Radiation monitoring in Slovenia includes stationary gamma dose rate meters in a network of approximately 70 stations. The monitoring results from these stations are available in real time. During an emergency, this network is complemented by arrangements concerning field monitoring. There are two national specialized mobile laboratories and 13 regional mobile CBRN units with limited measuring capabilities. Additionally, there are 43 fire brigades in the country that are designated and equipped as specialized HAZMAT teams, with radiation detection and identification equipment.

In addition, the Slovenian Army has monitoring capabilities which could support the emergency response if requested. There are a total of 10 Cobra units that can be sent to highly contaminated areas for monitoring and taking environmental samples. The Army also has a team for monitoring and collecting samples which can be measured in a mobile laboratory. Monitoring capabilities include alpha, beta, gamma and neutron analysis. Although no specific arrangements are in place to ensure compatibility, the Army is prepared to send measurement data to ACPDR and SNSA.

Krško NPP maintains two mobile teams. In addition, the NPP has contracted the Institute of Occupational Safety (ZVD) and the Ecological Laboratory with Mobile Unit (ELME) at the Jožef Stefan Institute (JSI), for off-site measurements of external dose rate, deposition, airborne monitoring, and for taking samples. These sample can be analysed either in the mobile laboratory or in the laboratory at JSI and ZVD premises. The contract stipulates an activation time of 72 hours, although this could be quicker in a large emergency.

There are multiple laboratories in Slovenia that could analyse samples during an emergency. The laboratory at the Jožef Stefan Institute has ten gamma spectrometry measuring devices and one portable device. The resources are available under a contract with the Ministry of Defence for nuclear or radiological emergencies. The ZVD laboratory has five gamma spectrometry detectors, but the ZVD assets are used for Civil Protection purposes in radiological incidents only. The ACPDR has a contract with the same ZVD laboratory for the specific case of a nuclear or radiological emergency initiated by a nuclear security event, e.g. a dirty bomb.

The mobile laboratories are not trained on the operational criteria, OILs, or sample analysis to be used during emergency response as a basis for decision making.

There is no overall strategy for the activities of the multiple organizations with capabilities for monitoring, or to prioritize sample collection and analysis to support early protective action decision. SNSA has internal procedures to direct some monitoring and sampling activities from its dose assessment group. In some cases, private organizations have multiple contracts with the government which could result in fewer than expected capabilities actually being available.

While there are no specific time limits for public organizations or limitations in the contracts for private organizations, multiple organizations expressed doubt that there are sufficient resources to conduct extended operations for monitoring and sampling during a large nuclear or radiological emergency.

<b>Recommendation 11.</b>
<b>Observation:</b> There is no joint plan for measurements during all phases of a nuclear or radiological emergency. Nor is there prioritization of radiation measurements in order to meet the needs for initiating new protective actions, or lifting those already implemented. The existing procedures could be expanded to ensure effective use of all resources in an optimal manner.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 5.82 states: “Monitoring in response to a nuclear or radiological emergency shall be carried out on the basis of a strategy to be developed at the preparedness stage as part of the protection strategy. Arrangements shall be made to adjust the monitoring in the emergency response on the basis of prevailing conditions.”
<b>Recommendation:</b> The Government should further develop a comprehensive national monitoring strategy, as part of the protection strategy, for supporting timely decision making of protective actions and other needs of society. The strategy should take into account all resources and capabilities in Slovenia and possibilities to receive international assistance.

### 3.10. Managing radioactive waste in an emergency

The Radioactive Waste Management Agency (ARAO) is responsible for storing radioactive waste, including that which is generated in case of an emergency. The radioactive waste would be stored in the CSRAO at Brinje, managed by ARAO, which has a total capacity of 120 m<sup>3</sup> and presently has 27 m<sup>3</sup> available.

For the purpose of storing radioactive waste generated in case of an emergency, about 7.5 m<sup>3</sup> of space is reserved in CSRAO, ready to accept such waste. In an exceptional case, up to 30 m<sup>3</sup> of waste could be stored there.

The radioactive waste produced at Krško NPP is stored on-site until a disposal facility is available. This also includes the radioactive waste arising from minor radiological accidents on site.

ARAO has staff and capabilities for collecting, transporting and processing radioactive waste, including the necessary certification for the road transport of Class 7 dangerous goods.

There are no plans in place to manage larger volumes of radioactive waste, such as those that might be produced during an emergency involving the dispersal of radioactive materials.

ARAO does not have the capabilities to characterize the radioactive waste, including that arising from an emergency, and relies upon the producers and other organizations.

The management of contaminated human remains and animal remains has not been considered.

<b>Recommendation 12.</b>
<b>Observation:</b> There are no arrangements for the management of large volumes of radioactive waste generated during a nuclear or radiological emergency, including its identification, characterization, categorization, transport and storage. No planning exists also for the management of contaminated human remains and animal remains.
<b>Basis for recommendation:</b> GSR Part 7 Requirement 15 states: “The government shall ensure that radioactive waste is managed safely and effectively in a nuclear or radiological emergency.”
<b>Recommendation:</b> The Government should establish arrangements to manage radioactive waste for the emergencies postulated in the hazard assessment.

### 3.11. Mitigating non-radiological consequences

There are no arrangements in place specifically to address the non-radiological consequences of a nuclear or radiological emergency. ACDPR has a unit which is able to provide support to response organizations, but it is not intended to provide support to the public. However, there is experience within the country of addressing the consequences of conventional emergencies not directly related to the hazard. There has been experience providing ad hoc services, including psychological and social support, to evacuees and other victims of large conventional emergencies: for example, following the drowning event in 2008 in the Sava River. The Ministry of Labour, Family and Social Affairs, and the Ministry of Interior, have expertise and resources in this area that are not reflected in the National Plan. As a result, none of these arrangements have been formalized, either for conventional or nuclear or radiological emergencies.

<b>Recommendation 13.</b>
<b>Observation:</b> The Government does not have any arrangements to mitigate the non-radiological consequences of a nuclear or radiological emergency.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 5.90 states: “Arrangements shall be made for mitigating the non-radiological consequences of an emergency and those of an emergency response and for responding to public concern in a nuclear or radiological emergency. These arrangements shall include arrangements for providing the people affected with: (a) Information on any associated health hazards and clear instructions on any actions to be taken (see Requirement 10 and Requirement 13); (b) Medical and psychological counselling, as appropriate; (c) Adequate social support, as appropriate.”
<b>Recommendation:</b> The Government should develop arrangements to address the non-radiological consequences of a nuclear or radiological emergency and the emergency response.

### 3.12. Requesting, providing and receiving international assistance

Slovenia has ratified the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency and registered national assistance capabilities in the Response and Assistance Network (RANET). The capabilities include: radiation surveys; environmental sampling and analysis; source search and recovery; radiological assessment and advice; medical support; dose assessment; decontamination; nuclear installation assessment and advice.

The Slovenian Competent Authority, SNSA, has since 2012 participated annually in Convention Exercises (ConvEx) under the Assistance Convention, offering and receiving international assistance in the role of both assisting state and requesting state.

Slovenia also has experience requesting and providing international assistance through the European Union Civil Protection Mechanism — specifically the Emergency Response Coordination Centre (ERCC) — established for natural and man-made disasters, including environmental disasters, marine pollution and acute health emergencies as well as preparedness and response actions related to civil protection in case of a nuclear or radiological emergency. This mechanism has been utilized in the country during conventional emergencies such as extreme weather events, but never the CBRN component.

Slovenia also has bilateral agreements on assistance with its neighbours: Austria, Croatia, Hungary, and Italy. The Krško NPP has its own arrangements with the Clinical Medical Centre Rebro in Zagreb, Croatia, for the treatment of workers exposed at the NPP. These arrangements are exercised regularly.

The National Plan assigns coordination responsibilities for international assistance to the ACPDR and the SNSA. The approval for requesting and providing assistance is made by the Government on the recommendation of the national CP Commander. The existing procedures for providing assistance could be updated to include procedures if assistance will be requested through RANET, and how the decision will be made for a relatively small emergency when the CP Commander is not activated (such as a single overexposed patient not from the NPP).

<b>Suggestion 8.</b>
<p><b>Observation:</b> There are at least two assistance arrangements utilized in Slovenia in requesting assistance from other States: the IAEA RANET and EU ERCC. However, there is incomplete knowledge of which assistance systems and decision making mechanisms are to be used when determining whether to request international assistance.</p>
<p><b>Basis for suggestion:</b> GSR Part 7 paragraph 5.94 states: “Arrangements shall be put in place and maintained for requesting and obtaining international assistance from States or international organizations ... in preparedness and response to a nuclear or radiological emergency... These arrangements shall take due account of compatibility arrangements for the capabilities to be obtained from ... different States so as to ensure the usefulness of these capabilities.”</p>
<p><b>Suggestion:</b> SNSA and ACPDR should consider developing procedures for requesting and receiving assistance to ensure timely decision making and high compatibility of arrangements for assistance received through different mechanisms in case of a nuclear or radiological emergency.</p>

### 3.13. Terminating an emergency

The current National Plan does not provide information on the transition phase of the emergency and emergency termination. Although it identifies that the CP Commander is responsible for issuing the formal order of emergency termination, it does not reflect other crucial aspects, such as: the transfer of responsibilities during the transition phase and over the longer term, the decision to transition to a planned or existing exposure situation, the criteria to enable the termination, and the involvement of interested parties. SNSA is mentioned only in the context of an organization that comes with the proposal to adjust protective actions and other actions.

SNSA developed a plan on post-disaster measures after the nuclear or radiological emergency that will provide some discussions and recommendations regarding the transition and recovery phases. The plan is an annex of the current National Plan (annex D – 212) but does not address prerequisites for termination of an emergency.

<b>Recommendation 14.</b>
<b>Observation:</b> There are no arrangements in place for terminating a nuclear or radiological emergency in the National Plan.
<b>Basis for suggestion:</b> GSR Part 7 Requirement 18 states: “The government shall ensure that arrangements are in place and are implemented for the termination of a nuclear or radiological emergency, with account taken of the need for the resumption of social and economic activity.”
<b>Recommendation:</b> The Government should establish arrangements for the termination of a nuclear or radiological emergency in accordance with the protection strategy and ensure that supporting procedures are updated by all response organizations.

### 3.14. Analysing the emergency and emergency response

The operating organizations at the Krško NPP and the TRIGA research reactor have procedures to conduct analysis of every event, including those without radiological consequences. The TRIGA research reactor improved its emergency plan after a fire at the facility in 2010.

The Disaster Act includes requirements for response organizations to analyse the emergency and emergency response for all emergencies, including nuclear or radiological emergencies. There are no procedures in the National Plan to ensure that this is conducted for nuclear or radiological emergencies in a systematic way in collaboration with all relevant organizations.



## 4. DETAILED FINDINGS ON REQUIREMENTS FOR INFRASTRUCTURE

### 4.1. Authorities for emergency preparedness and response

The National Plan has defined roles and responsibilities of organizations during nuclear or radiological emergencies. Emergency response organizations are directed to develop plans for nuclear and radiological emergencies at all levels of organizations which comply with the National Plan.

The authority to make decisions is clearly allocated to respective organizations on the site and off the site. On-site emergency arrangements with necessary authority are in place for notifying relevant organizations and taking prompt actions on the site.

In response arrangements, attention has been paid to the mechanisms and systems for coordination and communication among all relevant responding organizations.

Although security-related emergencies are excluded in the National Plan, there are arrangements in place for transfer of command from police to civil protection in case of an emergency requiring simultaneously protective actions. These arrangements shall be tested next year in a large scale safety/security related exercise.

### 4.2. Organization and staffing for emergency preparedness and response

Only some of the larger response organizations have done an analysis of their assigned responsibilities and ensured the positions are filled to fulfil their assigned responsibilities. The Krško NPP, ACPDR, and SNSA all have well-defined emergency response organizations and duty rosters to ensure continuous availability of personnel. Other organizations rely on the staff that happen to be available at the time of an emergency, and on an undocumented understanding of individual expertise that is required by the organization.

Many organizations expressed a concern about their ability to maintain staffing to fulfil their assigned responsibilities for an extended response to a large emergency. This was particularly true at the local and regional levels, at healthcare organizations, and at JSI ELME. The challenge is particularly acute at SRPA, which is only staffed with a total of 5 employees, and has responsibilities to staff the dose assessment group at the SNSA emergency centre, while also maintaining its statutory responsibilities for oversight of dosimetry services, radiation protection services, and the use of sources in medicine. The local communities in the region of Krško NPP and regional CP Headquarters Posavje are coordinating to receive supplemental staff from the NPP, to support their activities during an emergency at the NPP.

The Krško NPP maintains contracts with off-site organizations which may be needed during an emergency, including the Community Health Centre Krško, the local fire brigade, JSI ELME, and ZVD. The contracts are limited to two years in duration and the staff of these organizations have stated that this presents challenges in recruiting and retaining qualified staff, especially considering the specialized knowledge required, such as the layout of the NPP. Some of these organizations also have contracts with other government organizations. Their roles and responsibilities during an emergency should be carefully considered in the context of their overall staffing.

<b>Suggestion 9.</b>
<b>Observation:</b> While many organizations expressed concern about their staffing



<b>Suggestion 9.</b>
levels, few have conducted a detailed analysis of the staffing requirements to fulfil their assigned responsibilities.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 6.10 states: “Appropriate numbers of suitably qualified personnel shall be available at all times (including during 24 hour a day operations) so that appropriate positions can be promptly staffed as necessary following the declaration and notification of a nuclear or radiological emergency. Appropriate numbers of suitably qualified personnel shall be available for the long term to staff the various positions necessary to take mitigatory actions, protective actions and other response actions.”
<b>Suggestion:</b> The Government, through the national coordinating mechanism, should consider an analysis of staffing levels of response organizations to determine whether there are sufficient qualified personnel for the required positions during an emergency.

### 4.3. Coordination of emergency preparedness and response

The coordination of many of the response organizations is documented in the National Plan, but not all operational interfaces are documented. The national CP Commander has overall command whenever the National Plan is activated. Whenever regional or national Headquarters are activated, response organizations send a representative to be present in those facilities, including the police, emergency medical services, and others as needed.

There are bilateral agreements in place with neighbouring states and the GOC has overall responsibility for communicating with foreign partners during an emergency. Most notably, there is coordination with Croatia during preparedness and response. The regulatory bodies meet multiple times per year and Croatia has direct access to the Slovenia communication system, MKSID, used during a nuclear or radiological emergency.

### 4.4. Plans and procedures for emergency response

The published National Plan identifies tasks that shall be carried out during an emergency response, and identifies responsible organizations. The published National Plan is based on the IAEA GS-R-2 requirements, does not reflect recent and upcoming changes to legislation (e.g. Radiation Protection and Nuclear Safety Act) and is not based on the latest national hazard assessment. The draft National Plan is intended to better align with the revised international safety standards, specifically on the topics of protection strategy, roles and responsibilities, termination, analysing the emergency and emergency response, decision making authorities during emergency response.

<b>Recommendation 15.</b>
<b>Observation:</b> The current National Plan does not fully address the latest international requirements, is not based on the latest national hazard assessment, and does not fully reflect the latest draft version of the Radiation Protection and Nuclear Safety Act.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 6.17 states: Each response organization shall prepare an emergency plan or plans for coordinating and performing their assigned functions as specified in Section 5 and in accordance with the hazard assessment and the protection strategy. An emergency plan shall be developed at the national level that integrates all relevant plans for emergency response in a coordinated manner and consistently with an all-hazards approach. Emergency

<b>Recommendation 15.</b>
plans shall specify how responsibilities for managing operations in an emergency response are to be discharged on the site, off the site and across national borders, as appropriate...”
<b>Recommendation:</b> The Government should ensure that the revision of the National Plan addresses all aspects of the international safety standards.

The ACPDR is responsible for the implementation and review of the National Plan, with substantial input from SNSA. The National Plan is required to be updated every 3 years, but the current National Plan dates from 2010.

Within the Ministry of Defence, the Inspectorate of the Republic of Slovenia for Protection Against Natural and Other Disasters reports directly to the Minister, and annually to the Government. It has the responsibility to review all response organization plans, including at the local, regional, and national levels.

The SNSA and SRPA have internal emergency procedures which describe the responsibilities of the authority and which are coordinated with other response organizations. The comprehensive SNSA emergency preparedness and response procedures are part of its Management System.

The operating organizations at the Krško NPP, the TRIGA research reactor, and the CSRAO coordinate with other bodies and organizations to ensure compatibility of procedures. The on-site emergency plans are submitted to the regulatory body for approval during the licensing process. The visit of nuclear-powered vessels to Slovenian territorial waters is identified in the hazard assessment. The operator of the Port of Koper has not included the visit of a nuclear-powered vessel in the facility risk assessment. As such, an emergency plan to deal with nuclear and radiological emergencies has not been established for the Port of Koper or territorial waters.

For other operating organizations, emergency plans are not established or approved, and there are apparent gaps in expectations regarding capabilities and resources between on-site and off-site response organizations. The documentation of emergency plans and procedures for other response organizations varies widely.

<b>Recommendation 16.</b>
<b>Observation:</b> Emergency plans and procedures are not established at all response organizations.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 6.17 states: “Each response organization shall prepare an emergency plan or plans for coordinating and performing their assigned functions as specified in Section 5 and in accordance with the hazard assessment and the protection strategy. An emergency plan shall be developed at the national level that integrates all relevant plans for emergency response in a coordinated manner and consistently with an all-hazards approach. Emergency plans shall specify how responsibilities for managing operations in an emergency response are to be discharged on the site, off the site and across national borders, as appropriate. The emergency plans shall be coordinated with other plans and procedures that may be implemented in a nuclear or radiological emergency, to ensure that the simultaneous implementation of the plans would not reduce their effectiveness or cause conflicts...”
<b>Recommendation:</b> ACPDR and municipalities should ensure that plans are established at all response organizations and that on- and off-site plans are coordinated in case of a

<b>Recommendation 16.</b>
nuclear or radiological emergency.

SNSA and the Krško NPP both have procedures for the use of analytical tools during a nuclear and radiological emergency. Arrangements to compare the results from analytical tools have been developed and tested.

<b>Recommendation 17.</b>
<b>Observation:</b> There are no plans or procedures that address the response to emergencies initiated by nuclear security events or that address the safety/security interface.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 6.17 states: “Each response organization shall prepare an emergency plan or plans for coordinating and performing their assigned functions as specified in Section 5 and in accordance with the hazard assessment and the protection strategy. An emergency plan shall be developed at the national level that integrates all relevant plans for emergency response in a coordinated manner and consistently with an all-hazards approach. Emergency plans shall specify how responsibilities for managing operations in an emergency response are to be discharged on the site, off the site and across national borders, as appropriate. The emergency plans shall be coordinated with other plans and procedures that may be implemented in a nuclear or radiological emergency, to ensure that the simultaneous implementation of the plans would not reduce their effectiveness or cause conflicts. Such other plans and procedures include: (a) Emergency plans for facilities in category I and for areas in category V; (b) Security plans and contingency plans ...; (c) Procedures for the investigation of a nuclear security event, including identification, collection, packaging and transport of evidence contaminated with radionuclides, nuclear forensics and related activities ...; (d) Evacuation plans; (e) Plans for firefighting.”
<b>Recommendation:</b> The government should establish arrangements for preparedness and response for a nuclear or radiological emergency initiated by a nuclear security event.

The National Plan includes a summary of protective actions and response actions but there is no description of the overall concept of operations. This concept of operations provides an overview and timelines associated with a response to a postulated scenario that would include a typical range of nuclear or radiological accident progressions. This concept of operations ensures a common understanding among all responding organizations of how an emergency response would ideally unfold, and is particularly important for organizations to be able to develop compatible procedures.

<b>Recommendation 18.</b>
<b>Observation:</b> The National Plan does not include a concept of operations to serve as a basis for the development of response organization plans and procedures.
<b>Basis for recommendation:</b> GSR Part 7 paragraph 6.18 states: The appropriate responsible authorities shall ensure that: (a) A ‘concept of operations’ for emergency response is developed at the beginning of the preparedness stage ...”
<b>Recommendation:</b> The Government should develop a concept of operations.

#### 4.5. Logistical support and facilities

The SNSA Emergency Response Centre (ERC) has a dedicated facility within its headquarters that is equipped and maintained with communication tools and analysis software. External real-time monitoring data is available from fixed monitoring stations. SNSA has access to plant parameters from Krško NPP. RODOS is used for dispersion modelling. SNSA has developed a tool, MKSID, for communicating during a radiological or nuclear emergency.

Recently there have been efforts to obtain real-time monitoring data from mobile units: that is, the NPP, ELME, the Institute for Occupational Health, the Army, and the ACPDR regional CBRN units. The new system for tracking and transmitting monitoring data is in progress, but is not yet tested by all units. Currently all units report data over the phone.

The Krško NPP has constructed and updated facilities on the site, including dedicated storage space for emergency equipment and an expansion of its Technical Support Centre to accommodate a larger emergency response organization.

In case of evacuation of the PAZ, Krško Municipality has an alternative location, just outside the UPZ, where it is possible to manage the provision of basic municipal services during the emergency.

There are 4 reception centres for evacuees in case of an emergency at the Krško NPP, all located outside the LPZ: in Otočec, in Radeče, in Šentjernej and in Podčetrtek. In these centres the evacuees will be decontaminated if needed, registered and forwarded to the receiving municipalities. The evacuation routes and destination of the evacuees are pre-established.

Communication and coordination of the response during a nuclear or radiological emergency is achieved through a dedicated system which is not common to conventional emergencies. The system, called MKSID, is specifically designed for nuclear or radiological emergencies while attempting to maximize commonality for conventional emergencies and emergency centre functions. MKSID shows the on-site situation, as well as monitoring results and recommended protective actions on a map. In addition, important reports and a logbook are available in the platform. Access to MKSID has been given to 32 organizations that have a role in response to nuclear or radiological emergencies. Additionally, authorities in Croatia have access to MKSID, considerably improving cross border co-operation in response to an emergency at the Krško NPP.

Good Practice 2.
<b>Observation:</b> The MKSID system allows rapid communication and coordination by emergency response organizations.
<b>Basis for Good Practice:</b> GSR Part 7 paragraph 6.22 states: “Adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation (such as documentation of procedures, checklists, manuals, telephone numbers and email addresses) shall be provided for performing the functions specified in Section 5.”
<b>Good Practice:</b> The MKSID system allows rapid sharing of technical and operational information across a wide range of national and international response organizations.

There are potential improvements being considered for MKSID which could further improve its use during an emergency. First is that it tracks public protective action recommendations and has the technical capability to track the implementation status, but there are no procedures to gather the data necessary to provide input to track the implementation status. Second, the information in MKSID could be readily formatted and filtered to provide templated input to decision makers for press conferences, press releases, and communicating with the public.

The University Medical Centre Hospital in Ljubljana recently opened a new decontamination facility adjacent to its emergency department to better prepare for receiving contaminated patients.

ACDPR has a contract with the Slovenian Radio Amateur Association to provide backup radio communications in case the ACPDR designated protection and rescue network (ZARE) is disabled.

#### 4.6. Training, drills and exercises

As previously discussed, not all organizations have a complete staffing analysis. Thus, some organizations rely on existing expertise and general awareness emergency training. ACPDR, SNSA, the Krško NPP, the TRIGA research reactor and the CSRAO have internal annual emergency training programmes. Other response organizations do not have emergency preparedness and response training programmes.

Recommendation 19.
<p><b>Observation:</b> Not all the specific functions that need to be performed in an emergency have a consistent and appropriate schedule for training, refresher training and exercises. For nuclear emergencies, training is available and drills and exercises are regularly performed, but not for radiological emergencies, particularly those involving dangerous sources.</p>
<p><b>Basis for recommendation:</b> GSR Part 7 paragraph 6.28 states: “The operating organization and response organizations shall make arrangements for the selection of personnel and for training to ensure that the personnel selected have the requisite knowledge, skills and abilities to perform their assigned response functions. The arrangements shall include arrangements for continuing refresher training on an appropriate schedule and arrangements for ensuring that personnel assigned to positions with responsibilities in an emergency response undergo the specified training.”</p>
<p><b>Recommendation:</b> The Government and municipalities should identify the needs for training and exercises at all levels of responsibility and competences and establish adequate training programmes and exercises involving all response organizations.</p>

Emergency response training at the Krško NPP is part of the overall employee training programme planned within the Annual Emergency Response Training Plan for the emergency response organization. It involves NPP employees and contractor employees.

ACPDR has a dedicated Training Centre for education and training of its personnel, responding organizations, non-governmental organizations, companies and lecturers/instructors. The Training Centre has central facilities in Ig and three sub-centres in Sežana, Pekre and Logatec (the latter is currently not providing training); it has been providing CBRN training since 1995. Specific nuclear and radiological training has also been in place since 2015. The training programmes are defined and prepared in accordance with

the training needs identified by the ACPDR and other response organizations. The training programme is approved by the Minister of Defence.

National level nuclear or radiological emergency exercises are held every three years with varying scenarios (e.g. NPP, research reactor). The Krško NPP conducts two on-site exercises per year. The exercises comprise a process of evaluation and analysis followed by a report. The recommendations identified in the report are considered in the revision of plans and procedures. The organizations contracted by the NPP do not have provisions in the contract that require participation in periodic exercises.

The TRIGA Research Reactor has a procedure to conduct an annual emergency exercise with external evaluators, but this is not always conducted annually. When it is conducted, the report is sent to SNSA.

JSI ELME performs a regular field drill with respect to the contract with the Krško NPP, and one internal field drill annually with respect to the contract with the Ministry of Defence.

ZVD performs internal exercises and CSRAO participate occasionally in exercises with the local fire brigade. But neither of these organizations have participated in national exercises.

The organizations from the Ministry of Agriculture, Forestry and Food, and the Department of Nuclear Medicine at University Medical Centre, Ljubljana, do not perform internal exercises, nor do they participate in national exercises.

The Inspectorate of the Republic of Slovenia for Protection Against Natural and Other Disasters, under the Ministry of Defence, is responsible for coordinating the evaluation of the exercises conducted at the national and regional levels. This evaluation pertains to all response organizations under the Act on the Protection against Natural and Other Disasters. Although the Inspectorate of the Republic of Slovenia for Protection against Natural and Other Disasters can be considered as a part of the national coordinating mechanism, it does not coordinate the evaluation of trainings for all the licensees.

Senior personnel, including the National Civil Protection Commander and Director of SNSA, participate regularly in the above mentioned activities.

The Slovenian Armed Forces have an independent training and exercise programme.

<b>Suggestion 10.</b>
<b>Observation:</b> The SNSA does not regularly exercise its responsibility to provide advice and assessment to licensees and first responders during a radiological emergency.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 6.31 states: “The personnel responsible for critical response functions shall participate in drills and exercises on a regular basis so as to ensure their ability to take their actions effectively.”
<b>Suggestion:</b> SNSA should consider conducting exercises to test the capability of the officer on duty to provide advice remotely during initial response to a radiological emergency.

<b>Suggestion 11.</b>
<b>Observation:</b> The national and organizational exercise programmes in place do not



<b>Suggestion 11.</b>
fully cover all postulated emergencies and do not include the participation of all response organizations.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 6.30 states: “Exercise programmes shall be developed and implemented to ensure that all specified functions required to be performed for emergency response, all organizational interfaces for facilities in category I, II or III, and the national level programmes for category IV or V are tested at suitable intervals.”
<b>Suggestion:</b> ACPDR should consider developing an exercise programme that tests and evaluates all response organizations periodically, and considers the response to a variety of postulated nuclear and radiological emergencies, including those initiated by nuclear security events.

#### 4.7. Quality management

Quality management programmes, as part of the overall emergency management system and management system, are not systematically implemented across all response organizations. As part of its management system, Krško NPP has established a strong quality management programme. There are external independent appraisals (e.g. OSART and follow-up missions) that took place almost annually. ARAO maintains ISO 9001 certification. SNSA was previously certified to ISO 9001 but does not maintain the certification today. ZVD and Jožef Stefan Institute are certified to ISO 17025 and ISO 9001. Some detection equipment at various mobile units which was demonstrated during the mission was out of calibration. There are 13 regional mobile CBRN units which were established and equipped more than 20 years ago; there is no programme for periodic reassessment of needs and equipment recapitalization.

<b>Suggestion 12.</b>
<b>Observation:</b> There are inconsistent quality management programmes in place to ensure the availability of emergency response organizations, equipment, and resources.
<b>Basis for suggestion:</b> GSR Part 7 paragraph 6.34 states: “The operating organization, as part of its management system, and response organizations, as part of their emergency management system, shall establish a programme to ensure the availability and reliability of all supplies, equipment, communication systems and facilities, plans, procedures and other arrangements necessary to perform functions in a nuclear or radiological emergency ...”
<b>Suggestion:</b> The Government should ensure that response organizations implement a quality management programme.

Prior to the EPREV mission, the ACPDR and SNSA representatives on the Inter-Ministerial Commission committed resources to conducting a simulated EPREV mission (sEPREV). The sEPREV used some national experts who had previously conducted EPREV missions in other countries to conduct a full, two-week sEPREV following the processes in the EPREV Guidelines. The findings of the sEPREV provided a basis for an Action Plan for the improvement of the emergency preparedness and response in Slovenia issued by the Inter-Ministerial Commission and approved by the Government.

<b>Good Practice 3.</b>
<b>Observation:</b> The Simulated EPREV provided a good basis for improving EPR arrangements in the country and updating the national self-assessment.

<b>Good Practice 3.</b>	
<b>Basis for Good Practice:</b>	GSR Part 7 paragraph 6.36 states: “Arrangements shall be made to maintain, review and update emergency plans, procedures and other arrangements and to incorporate lessons from research, operating experience (such as in the response to emergencies) and emergency exercises.”
<b>Good Practice:</b>	Slovenia conducted a Simulated EPREV to assess its national arrangements and improve its preparedness for nuclear or radiological emergencies.



## APPENDIX I: EPREV TEAM COMPOSITION

No.	Name and LAST NAME	Position	Organization
1.	Mr David Nodwell	Team Leader	Province of Ontario, Canada
2.	Ms Hannele Aaltonen	Deputy Team Leader	Radiation and Nuclear Safety Authority (STUK), Finland
3.	Mr Mark Breitingner	Team Coordinator	IAEA IEC
4.	Ms Katerina Kouts	Deputy Team Coordinator	IAEA IEC
5.	Mr Peter van Beek	Reviewer	Safety region Zeeland, Netherlands
6.	Mr Alan Muller	Reviewer	National Nuclear Regulator, South Africa
7.	Mr Luis Portugal	Reviewer	Portuguese Environment Agency, Ministry of Environment, Portugal

## APPENDIX II: MISSION SCHEDULE

### IAEA EPREV MISSION TO SLOVENIA 4–16 November 2017 PROGRAMME

Day		Team A	Team B
Sunday		<ul style="list-style-type: none"> <li>EPREV team meeting at hotel with host country Liaison Officer(s)</li> </ul>	
Monday	a.m.	Entrance Meeting, 09:00 – 12:00 at hotel <ul style="list-style-type: none"> <li>Introductions.</li> <li>Presentation by Host Country: Overall national framework for EPR.</li> <li>Presentation by Host Country of self-assessment.</li> <li>Presentation by IAEA of EPREV objectives and process.</li> </ul>	
	p.m.	Meeting on National Arrangements, 13:00 – 16:00 <ul style="list-style-type: none"> <li>EPREV Team and ACPDR, SNSA etc., at hotel</li> </ul>	
Tuesday	a.m.	Site Visits, 08:30 – 12:00 <ul style="list-style-type: none"> <li>SNSA (2 hours)</li> <li>Interview SRPA at SNSA (1 hour)</li> </ul>	Site Visits, 08:30 – 16:00 <ul style="list-style-type: none"> <li>ACPDR ** (3 hours)</li> <li>Interview: Training Centre ** (1 hour)</li> <li>Interview: Rapid Response Unit (30 minutes)</li> <li>CORS ** (30 minutes)</li> <li>Inspectorate for Protection Against Natural and Other Disasters ** (1 hour)</li> <li>NPP Off-site Emergency Centre (30 minutes)</li> </ul>
	p.m.	Site Visits, 13:00 – 16:00 <ul style="list-style-type: none"> <li>Ministry of Interior (1 hour)</li> <li>Ministry of Health ** (1.5 hours)</li> </ul>	
Wednesday	a.m.	Site Visits, 08:30 – 12:00  <i>Depart LJ @ 07:00</i> <ul style="list-style-type: none"> <li>Krosko NPP (3.5 hours)</li> </ul>	Site Visits, 08:30 – 12:00  <i>Depart LJ @ 07:00, return @ 13:00</i> <ul style="list-style-type: none"> <li>Port of Koper (1.5 hours)</li> <li>ACPDR Branch Koper ** (1 hour)</li> <li>Regional Notification Centre — ReCO ** (30 minutes)</li> </ul>

Day		Team A	Team B
	p.m.	Site Visits, 13:00 – 16:00 <ul style="list-style-type: none"> <li>Krško Professional Firefighting Unit **</li> <li>Community Health Centre, Krško **</li> </ul>	Site Visits, 14:00 – 15:00 <ul style="list-style-type: none"> <li>Firefighting Brigade Ljubljana (1 hour)</li> </ul>
Thursday	a.m.	Site Visits, 08:30 – 12:00 <ul style="list-style-type: none"> <li>Interview: J. Stefan Institute</li> <li>TRIGA Research Reactor</li> <li>Hot Cell</li> <li>Interview: Mobile Laboratory Monitoring &amp; Sampling Unit (ELME)</li> <li>Central Radioactive Waste Storage Facility (30 minutes)</li> </ul>	Site Visits, 08:30 – 12:00 <i>Depart LJ @ 07:30</i> <ul style="list-style-type: none"> <li>ACPDR Branch Brezice ** (1.5 hours)</li> <li>Regional Notification Centre — ReCO ** (30 minutes)</li> <li>Civil Protection Mobile Unit ** (30 minutes)</li> <li>Police Station, Krško ** (30 minutes)</li> <li>Interview: Police Directorate, Novo Mesto, at Krško Police Station ** (30 minutes)</li> </ul>
	p.m.	Site Visits, 13:00 – 16:00 <ul style="list-style-type: none"> <li>Paramedics LJ Field Unit ** (30 minutes)</li> <li>Paramedics LJ Dispatch Centre ** (30 minutes)</li> <li>University Medical Centre, Emergency Department and Department of Nuclear Medicine (1.5 hours)</li> </ul>	Site Visits, 13:00 – 15:00 <ul style="list-style-type: none"> <li>Krško Local Community ** (2 hours)</li> </ul>
Friday	a.m.	Interviews, 09:00 – 11:30 <ul style="list-style-type: none"> <li>Ministry of Agriculture, Forestry and Food ** (1 hour)</li> <li>Radwaste – ARAO (1 hour)</li> </ul>	Site Visits, 08:30 – 12:00 <ul style="list-style-type: none"> <li>Slovenian Army CBRN Unit, Mobile Laboratory, Kranj (1 hour)</li> <li>General Police Directorate Operative — Communications Centre (30 minutes)</li> <li>Institute for Occupational Safety — Licensee, TSO,</li> </ul>

Day	Team A	Team B
		Mobile Lab (1 hour)
	p.m.	Report writing by EPREV team.
Saturday		Report writing by EPREV team.
Sunday		Report writing. Draft findings submitted to Counterpart at 16:00.
Monday	a.m.	Clarification meetings and interviews as needed.
	p.m.	Report editing by EPREV team. Team drafts executive summary and presentation for the exit meeting. Team sends draft report to National EPREV Coordinator.
Tuesday		Host country organizations review report and submit comments to National EPREV Coordinator.
Wednesday		Host country and EPREV team meetings and discussions.
Thursday	a.m.	Exit meeting. Press conference.

**APPENDIX III: LIST OF ATTENDEES AT EPREV MISSION MEETINGS**

<b>No.</b>	<b>Name</b>	<b>Organization</b>
1.	Andrej Stritar	SNSA
2.	Samo Tomažič	SNSA
3.	Michel Cindro	SNSA
4.	Metka Tomažič	SNSA
5.	Anja Grabner	SNSA
6.	Igor Grlicarev	SNSA
7.	Igor Osojnik	SNSA
8.	Igor Sirc	SNSA
9.	Tomaž Šutej	SRPA
10.	Nina Jug	SRPA
11.	Damijan Škrk	SRPA
12.	Mateja Škufca Sterle	University Medical Centre Ljubljana, Paramedics Ljubljana
13.	Martin Čeh	University Medical Centre Ljubljana, Paramedics Ljubljana
14.	Denis Gorjup	University Medical Centre Ljubljana, Paramedics Ljubljana
15.	Gregor Omahen	ZVD
16.	Miran Stanko	Municipality of Krško
17.	Melita Čopar	Municipality of Krško
18.	Aleš Benje	Municipality of Krško
19.	Aleš Stopar	Krško Professional Firefighting Unit
20.	Joško Žvar	Krško Professional Firefighting Unit

No.	Name	Organization
21.	Tanja Mate	Ministry of Health
22.	Maja Rupnik Potokar	Ministry of Health
23.	Dragana Dujić	Ministry of Health
24.	Klemen Vintar	Ministry of Health
25.	Metka Kralj	ARAO
26.	Sandi Viršek	ARAO
27.	Irena Utroša	Ministry of Interior, Security Planning Division
28.	Branko Sojer	General Police Directorate, Uniformed Police Directorate
29.	Benjamin Franca	General Police Directorate, Criminal Police Directorate
30.	Goran Maršič	General Police Directorate, Special Forces
31.	Marjan Vukšič	General Police Directorate, Operation and Communication Centre
32.	Boris Baranja	Ministry of Interior, Security Planning Division
33.	Dušan Valant	Ministry of Interior, Occupational Health and Safety Service
34.	Branko Rantaša	Ljubljana Police Directorate
35.	Igor Juršič	Internal Affairs Inspectorate
36.	Peter Molan	Police station, Krško
37.	Robert Perc	Police Directorate, Novo Mesto
38.	Tomislav Iskra	General Police Directorate, Operation and Communication Centre
39.	Predrag Širola	NPP, Krško
40.	Bruno Glaser	NPP, Krško
41.	Milan Kostrevc	NPP, Krško

No.	Name	Organization
42.	Aleš Zeme	NPP, Krško
43.	Mirko Bevc	NPP, Krško
44.	Jože Valenčak	NPP, Krško
45.	Robert Hočevan	CP Headquarters of Posavje region
46.	Dušan Kolman	Regional mobile CBRN unit
47.	Alojz Kržan	Regional mobile CBRN unit
48.	Zdenka Močnik	ACPDR Branch Office, Brežice
49.	Aleš Šetinc	ACPDR Branch Office, Brežice
50.	Sergeja Bizjak	ACPDR Branch Office, Brežice
51.	Jože Kranjec	ACPDR Branch Office, Brežice
52.	Marko Tomazin	Firefighting Brigade, Ljubljana
53.	Robert Okorn	Firefighting Brigade, Ljubljana
54.	Branko Dervodel	ACPDR
55.	Jernej Hudohmet	ACPDR
56.	Olga Andrejek	ACPDR
57.	Mojca Zupan	ACPDR
58.	Milena Dobnik Jeraj	ACPDR
59.	Stanislav Lotrič	ACPDR
60.	Franja Turk Stojanovič	ACPDR
61.	Jože Pogačar	ACPDR
62.	Zvone Čadež	ACPDR

No.	Name	Organization
63.	Romana Lah	Inspectorate of the Republic of Slovenia for Protection against Natural and Other Disasters
64.	Stanislav Kranjc	Inspectorate of the Republic of Slovenia for Protection against Natural and Other Disasters
65.	Borut Smodiš	Jožef Stefan Institute, RIC
66.	Anže Jazbec	Jožef Stefan Institute, RIC
67.	Matjaž Stepišnik	Jožef Stefan Institute, SVPIS
68.	Tinkara Bučar	Jožef Stefan Institute, SVPIS
69.	Matej Lipoglavšek	Jožef Stefan Institute, ELME
70.	Boris Marzi	Port of Koper
71.	Boštjan Pavlič	Port of Koper
72.	Jure Barovič	Port of Koper
73.	Zvezdan Božič	ACPDR Branch Office, Koper
74.	Rok Kamenšek	ACPDR Branch Office, Koper
75.	Andrej Drnovšek	Slovenian Army CBRN Unit
76.	Primož Čuček	Slovenian Army CBRN Unit
77.	Jaka Jeraj	Slovenian Army CBRN Unit
78.	Edvard Pirnat	University Medical Centre Ljubljana, Department of Nuclear Medicine
79.	Marko Grmek	University Medical Centre Ljubljana, Department of Nuclear Medicine
80.	Luka Ležič	University Medical Centre Ljubljana, Department of Nuclear Medicine
81.	Aljaž Sočan	University Medical Centre Ljubljana, Department of Nuclear Medicine
82.	Luka Jensterle	University Medical Centre Ljubljana, Department of Nuclear Medicine
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<b>87.</b>	Jernej Drofenik	Ministry of Agriculture, Forestry and Food — The Administration of the Republic of Slovenia for Food Safety
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**ACRONYMS**  
(Alphabetical order)

<b>Name</b>	<b>Full Name</b>
<b>ACPDR</b>	Administration for Civil Protection and Disaster Relief
<b>ARAO</b>	Radioactive Waste Management Agency
<b>ConvEx</b>	Convention Exercise (of the IAEA)
<b>CP</b>	Civil Protection
<b>CSRAO</b>	Central Radioactive Waste Storage Facility
<b>EAL</b>	Emergency Action Level
<b>ELME</b>	Mobile unit/mobile laboratory of Jožef Stefan Institute
<b>EPR</b>	Emergency Preparedness and Response
<b>EPREV</b>	Emergency Preparedness Review
<b>ERC</b>	Emergency Response Centre (of SNSA)
<b>ERCC</b>	Emergency Response Coordination Centre (of the EU)
<b>EU</b>	European Union
<b>GIS</b>	Global Information System
<b>GOC</b>	Communication Office of the Government of the Republic of Slovenia
<b>GSR</b>	General Safety Requirements (of the IAEA)
<b>HAZMAT</b>	Hazardous Materials
<b>IAEA</b>	International Atomic Energy Agency
<b>ITB</b>	Iodine Thyroid Blocking
<b>LPZ</b>	Long-Term Protective Action Planning Zone

<b>Name</b>	<b>Full Name</b>
<b>NPP</b>	Nuclear Power Plant
<b>OIL</b>	Operational Intervention Level
<b>OSART</b>	Operational Safety Review Team (Peer Review Service of the IAEA)
<b>PAZ</b>	Precautionary Action Zone
<b>RANET</b>	Response and Assistance Network (of the IAEA)
<b>sEPREV</b>	Simulated EPREV
<b>SNSA</b>	Slovenia Nuclear Safety Administration
<b>SRPA</b>	Slovenian Radiation Protection Administration
<b>UPZ</b>	Urgent Protective Action Planning Zone
<b>ZVD</b>	Institute of Occupational Health