REPORT

PEER APPRAISAL OF THE ARRANGEMENTS IN THE REPUBLIC OF MONTENEGRO REGARDING PREPAREDNESS FOR RESPONDING TO A RADIATION EMERGENCY

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FOREWORD

Within the United Nations system, the International Atomic Energy Agency (IAEA) has the statutory functions of establishing standards of safety for 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) [1] the IAEA has a function, if requested, to assist Member States in preparing emergency arrangements for responding to nuclear and radiological emergencies.

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

This mission was conducted as a full-scope IAEA service Emergency Preparedness Review (EPREV), i.e., a complete and thorough appraisal of the country's emergency preparedness and response capability. Montenegro is a country with a relatively low risk profile regarding radiation emergencies; therefore, the actual scope of its emergency preparedness is rather limited. In discussions with counterparts, the team also gathered information about general radiation protection issues related to the preparedness and response to radiation emergencies (i.e., licensing, environmental radiation monitoring, the meteorological service, radioactive waste management, etc.).

Montenegro is a relatively new independent state, having declared its independence from Serbia and Montenegro in 2006. Since 2006, Montenegro is also a member of the IAEA, and the country is now successfully building its capabilities and arrangements in the area of preparedness for and response to a radiation emergency.

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1. INTRODUCTION

1.1. Background

Article III.A.6 of the IAEA Statute specifies two main functions the IAEA is authorized to perform in relation to safety:

- to "establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property"; and
- to "provide for the application of these standards" through, *inter alia*, the rendering of safety review services, including an appraisal of compliance.

The obligations, responsibilities and requirements regarding preparedness and response to radiation emergencies are set out in the Safety Standards, in particular the 2002 Requirements "Preparedness and Response for a Nuclear or Radiological Emergency" [2]. The IAEA General Conference, in resolution GC(46)/RES/9, encouraged Member States to "implement the Safety Requirements for Preparedness and Response to a Nuclear or Radiological Emergency."

In 2003, the IAEA published the document "Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency" [3] (EPR-METHOD) with the aim of fulfilling in part the IAEA's function under Article 5 of the Assistance Convention [1] to provide a compendium of best practices for planners aiming to comply with IAEA Requirements [2].

The Montenegrin authorities requested the IAEA to organize an EPREV mission, which was conducted as a peer review *vis-à-vis* the relevant international standards.

The overall objectives of this mission were:

- to provide an assessment of Montenegro's capability to respond to nuclear and radiological incidents and emergencies, including those involving terrorist attacks;
- to assist Montenegro in the development of interim arrangements to respond promptly to a nuclear or radiological emergency. This assistance will include suggested steps that can be taken immediately to utilize better the existing capabilities.
- to provide a basis upon which Montenegro can develop a *longer-term programme* to enhance their ability to respond.

1.2. Scope

The review focused on Montenegro's ability to respond to a radiation emergency and was based on an assessment of existing response provisions and capabilities. The mission did not include a detailed appraisal on the status of the national regulatory infrastructure under development. The review was carried out in accordance with the Guidelines developed for the EPREV services. Specifically, the review considered the country's emergency arrangements at the national level in the following areas:

a) Emergency management

b) Emergency preparedness
c) Radiation protection
d) Law enforcement
e) Medical response
f) Public information
g) National capability to support and provide training to local response teams

The mission involved three team members (including the team leader), and the mission's duration was five working days. Montenegro's emergency preparedness and response arrangements were reviewed at two levels:

- **Review of the national emergency preparedness and response capabilities**: This activity reviewed the response of national level organizations that initiate or support local response to an emergency. The review was conducted within the framework of the IAEA Requirements [2] and Guidelines contained in the EPR-METHOD [3] document for threat categories IV and V. This review focused on national level preparedness for threats such as (a) nuclear installations in the nearby countries, (b) emergencies due to the malicious use of radioactive sources (RDD), and other special concerns such as possible orphaned sources (lost or stolen), transport accidents, various scenarios such as overexposures, contamination (both intentional and non-intentional), etc.,. One goal was to establish clearly the roles and responsibilities of the national organizations and their means for coordination, command, and control. In the area of preparedness, the mission reviewed the relevant training, implementation of drills and exercises, provision of public information, inclusion of quality assurance, as well as the notification system and the command (decision-making) system. This review of national policy also assessed the conditions that ensure fulfillment of state obligations resulting from the relevant international Agreements and Conventions [1].

- **Local and facility response review:** This part of the mission reviewed the ability of first responders to identify and respond promptly and effectively to nuclear and radiological emergencies, including the availability of facility and on-site plans in relevant cases, as well as medical preparedness and response.

The two levels of review named above were used to assess the emergency preparedness arrangements in Montenegro for these two different regulatory and operational environments, and generalized findings were subsequently developed.

The collected data and analysis contained in this report rely on interviews with representatives of key response organizations, and on personal impressions obtained during visits to various sites and institutions. The mission concentrated on those areas that the team viewed as crucial to the establishment of a sound interim emergency response capability.

1.3 Process

The general schedule for the mission is shown in Table 1. The mission team visited the named authorities and facilities where interviews were conducted. In addition, the team gathered the information described in the assessment sheet (Appendix IV). The major organizations with which the mission team interacted were:

- the Environmental Protection Agency, which will assume the role of the radiation and nuclear safety regulatory body;

- the Clinical Centre Podgorica, as the organization involved in radiation practices in medicine, as well as the institution responsible for medical emergency response;
- the Centre for Ecotoxicological Research, as the public institution which, among other activities, is the lead national institute for radiation monitoring;
- the Division for Emergencies and Civil Protection within the Ministry of Interior and Public Administration, as the lead authority for national emergency planning.

The review consisted of:

- determining whether, and to what extent, the arrangements for preparedness and response for radiation emergencies within Montenegro were in conformity with the International Requirements [2];
- identifying methods and means of meeting the relevant International Requirements and other good practices. The EPR-METHOD [3] and the expertise of the mission team members provided the basis for these suggestions.

The members of the mission team (see Appendix II) were selected based on their relevant experience in the above-mentioned areas.

This mission was designed as a full-scope Type III EPREV. Types I and II are intended for countries with facilities that fall into threat category I or II respectively [3]. The Type III EPREV performed for countries such as Montenegro is described in greater detail in the Annex. This mission was not preceded by a Pre-EPREV, the main goal of which is to collect missing information for the Terms of Reference, to clarify the roles and responsibilities of the participating organizations, and to check the logistics. The team had access to limited information, could not clarify in advance its expectations for the various sites, and received relatively little written information prior to the site visits. Therefore, these visits were extremely important to gather direct information from actual and potential stakeholders in the country's emergency planning and response.

1.4 Inputs and Guidance for the Assessment

The EPREV mission was conducted in accordance with the Terms of Reference (ToR) developed and adapted in October 2008.

The team obtained its main information about current status and future plans to establish a sound emergency response infrastructure from the representatives of organisations visited during the mission.

The relevant pieces of legislation, some of which were in draft form (i.e., Law on Protection against Ionizing Radiation), also provided valuable information to understand the relationship and responsibilities of organizations involved in emergency planning and response. Another important input for assessing the country's radiological emergency preparedness and response capabilities was information on the Internet sites of the relevant institutions. These sites provided insight into the institutions' organizational structure, history, responsibilities, activities, and references.

Table 1. Mission Schedule

Date	Subject
Day 1 24.11.2008	Introductory Meeting with representatives of the Montenegrin institutions dealing with emergency matters. (A complete list of participants is contained in Appendix III.) Work on the assessment sheet
Day 2 25.11.2008	Meeting in the Environmental Protection Agency with representatives of the Meteorological Institute, Ministry of Health, Ministry of Tourism and Environment, and the Center of Ecotoxicological Research. Work on the assessment sheet
Day 3 26.11.2008	Visit to the Clinical Centre Podgorica, with walk-down of the Radiotherapy Department and the Nuclear Medicine Department. Visit to the Center of Ecotoxicological Research, with walk-down of the premises, including the environmental monitoring laboratories
Day 4 27.11.2008	Visit to the Division for Emergency Situations within the Ministry of Interior and Public Administration, including: - presentation of their role, work, future plans and legislation - presentation of the Argos project
Day 5 28.11.2008	Exit meeting with all participants of the previous meetings. Finalization of the assessment sheet

2. SUMMARY OF FINDINGS

2.1. Introduction

The mission team formulated its recommendations and suggestions based on its findings. These recommendations should be addressed in order to conform to the relevant IAEA Requirements [2]. Therefore, these recommendations are stated as actions that should be implemented, with the corresponding paragraph from the IAEA Requirements [2] shown in parenthesis. To help implement the recommendations, the mission team has issued supporting recommendations on ways to meet the IAEA Requirements and other good practices.

The summary actions are divided into two groups:

- **interim** actions that should and can be addressed immediately, using existing capabilities, to improve significantly the country's response capabilities. These findings should be addressed as early as possible, preferably within six months to one year after the National Radiological Emergency Plan has been adopted.
- actions pertaining to national and local response organization and coordination which should be addressed over the **longer term**.

The report reflects the current status of Montenegro's radiological emergency preparedness, which to a certain extent reflects that this country is in transition, in many regards. Since its independence in 2006, Montenegro has been strongly committed to establishing its own independent administrative infrastructure. The team observed that this is more than a general declared intention, because the country shows a very proactive attitude in the area of nuclear and radiation safety. One of its first actions to demonstrate its commitment to building a sound regulatory infrastructure and legislative framework in the nuclear and radiological area was the country's application for membership to the IAEA during its first year of independence. Montenegro is now a member of the IAEA, and it is working to make full use of the various IAEA services. The most urgent tasks Montenegro should perform to establish its interim emergency response capability are summarized as follows:

- Finalization and adoption of the draft Law on Radiation Safety and Protection Against Ionizing Radiation is an important step to provide the legal framework for licensing radioactive sources as the first line of defense to prevent emergencies, and also to establish inspection control over sources of ionizing radiation.

- Establishment of the regulatory body for radiation safety is envisaged within the Environmental Protection Agency. The regulatory body should implement licensing activities, and it should be responsible for establishing a regular inspection programme for radioactive sources. The regulatory body should be independent in its decisions, but in the area of emergency preparedness it should work hand in hand with the MOI Division for Emergencies and Civil Protection. In accordance with the "all hazards" response system concept, the MOI is responsible to act during any type of emergency in Montenegro, as well as to provide assistance and resources abroad, if requested.

- As soon as possible, begin drafting the National Radiological Emergency Plan (NREP). In Montenegrin legislation, this term is defined as a "national action plan in the event of a radiation emergency." The NREP is important as a concise document in which the roles and responsibilities of all stakeholders in the preparedness and response phases of an

emergency are clearly outlined. General responsibilities are stated in the relevant legislation, but the legislation can never be as detailed and specific as the NREP. The concept of operations is also an item that should be developed as an input to the NREP, and all subsequent efforts should clarify the details of this concept. Various examples of the concept of operations are given in [3]. While finalizing the draft NREP, the authors should be aware that the NREP is a consensus document. Therefore, the draft should be circulated to all stakeholders for their feedback and comments. This dialogue will ensure that the various responsibilities and the concept of operations are well understood by all stakeholders, and that the stakeholders feel involved in the process and develop a sense of ownership for the document.

- Once the NREP is adopted, it must be tested in an exercise. This exercise will provide valuable feedback to assess the appropriateness of resources allocated (including manpower, equipment and communications). The exercise will also assess the concept of operations, procedures, and all other details which emerge during an exercise (i.e., compatibility, bottle-necks, a consistent understanding of messages among various stakeholders, etc.).

2.2. Interim (Immediate) Actions

1. **The draft Law on Radiation Safety and Protection Against Ionizing Radiation should be finalized and adopted as soon as possible.** This will ensure the necessary legal framework for the radiation protection regulatory authority, as well as a legal basis for creating conditions to support the prevention of radiation emergencies and enforce the relevant legal requirements. ([2]:para.1.7, 3.4)

2. The **radiation protection regulatory authority,** which is foreseen as an independent unit within the Environmental Protection Agency, should establish an inspection system which adequately addresses, *inter alia*, the licensee's emergency preparedness and response procedures. ([2]:para.3.3, 3.8, 3.9)

3. The **draft National Radiological Emergency Plan (NREP) must be written** as soon as possible. The NREP is an essential and very important step toward establishing an interim emergency response capability. The methodology is thoroughly described in [3]. Other recommended IAEA documents include references [4, 5, 6, 9 and 11]. It is strongly suggested to involve in writing the NREP those persons who have attended the relevant IAEA courses. In case of doubt or lack of guidance, seeking IAEA's advice may be the most efficient way to find adequate solutions. ([2]:para.5.13)

4. The future radiation protection authority should set up a **registry of radioactive sources** as soon as possible. This registry will serve as one of the necessary inputs to perform a comprehensive threat analysis. ([2]:para.3.15)

5. Perform a **threat assessment for radiation emergencies,** taking into account all sources that exist in the country, as well as other relevant practices and activities (e.g., transport of radioactive sources, the possibility of finding a source in scrap metal, and possibly terrorist activities such as use of a radiological dispersal device). The basic policy for threat assessment should follow the latest IAEA Guidelines, using the five-threat category definition and implementing terms, plus the definitions and terminology contained in the Guidelines. ([2]:para.3.15-3.20)

6. **Establish a sound radiation emergency response organization**. The proposal to create such an organization is located in Appendix 1. The local responders will presumably be the first to arrive on the scene. Since Montenegro is a small country, expert assistance can be delivered from the national level (i.e., by the national technical support organization). ([2]:para.3.3, 3.11)

7. As soon as telephone number 112 is fully operational, the appropriate **procedure should be developed to ensure that the "112 incoming call receiving centre"** promptly notifies the institutions that play roles in radiation emergency response. This procedure should be harmonized with the National Radiological Emergency Plan. ([2]:para.4.16, 5.21)

8. The **first responders** (i.e., police, first aid, firefighters, members of Civil Protection) **should receive basic instructions on how to respond in the event of a radiation emergency**. These instructions should include: recognition of the event (radiation signs, transport codes), guidance on whom to call to report the event, how to secure the site and protect those on-site, how to mitigate risks associated with radiation, and how to avoid potential contamination while rendering first aid to injured persons. ([2]:para.4.18, 5.33)

9. The **Contact Point data for the IAEA Conventions on Early Notification and Assistance should be sent as soon as possible to the IAEA**, and should ensure that the basic requirements are met. (That is, the Contact Point should be manned around-the-clock, and should be capable of triggering the national emergency response.) ([2]:para.4.29)

10. Although the ad hoc threat assessment performed by the team did not reveal any need for special and demanding mitigatory actions associated with potential radiation emergencies, **Montenegro should carefully analyze its current needs for expert support provided by the technical support organisations**. The team's impression was that these resources do exist, and are of adequate quality. However, this impression does not mean that nothing else is needed. A thorough assessment of these issues (e.g., timely response, quality of measurements, manpower, communication of results, radiological assessment, dosimetry, protective action advice) is needed for the future emergency response capability. Such an assessment should take into account the relevant international experience, and should verify the arrangements via exercises. ([2]:para.4.35)

11. For effective performance of the licensing process, **brief guideline should be developed** by the regulatory body that specifies **which procedures the operators of threat category IV practices should include in their instructions** for coping with emergency situations. ([2]:para.3.9)

12. For the sake of consistency and compliance with international standards, it is recommended to **adopt generic intervention levels for urgent protective actions**, although the likelihood of their application may be negligible. ([2]:para.4.42)

13. In the event that threat category III radioactive sources are utilized, the **appropriate arrangements (including evacuation) to ensure the safety of all persons** on the site should be developed and implemented. ([2]:para.4.51)

14. The National Radiological Emergency Plan may **foresee notification of the endangered population in the event of certain radiation emergencies** (e.g., large transport accident, radioactive source involved in a fire, large scale contamination). This notification may be implemented by direct method (i.e., word-of-mouth), and at certain times may provide the population with instructions based on the radiological assessor's advice. ([2]:para.4.53)

15. The **emergency workers' turn-back dose levels and guidance** should be adopted and introduced in the radiation emergency documents (e.g., in the future NREP). ([2]:para.4.56, 4.60)

16. In the National Radiological Emergency Plan (or similar document), **additional issues** should be adequately covered beyond turn-back dose levels and guidance regarding **emergency workers.** These issues should include: **(a) medical surveillance, (b) training, and (c) appropriate protective equipment** (dosimeters as a minimum), as well as protective clothing and breathing equipment if needed. ([2]:para.4.58, 4.62-64)

17. For the sake of consistency with international standards, the **operational intervention levels (OILs)** should be quoted in the relevant documents. The OILs should provide reference values which mandate the introduction of countermeasures. The OILs will also be useful in explaining to the public the measured values on home territory, in the event of a nuclear accident abroad. ([2]:para.4.71)

18. For the first responders who are responsible for first aid, and for other medical staff who may encounter potentially contaminated patients, it is necessary to include in their **training programme instructions on how to treat potentially contaminated patients**. Specifically, these instructions should include the decontamination of patients, and should increase awareness that the customary medical protective clothing (e.g., gowns, face masks, latex gloves, shoe covers) also provides excellent protection against contamination. ([2]:para.4.77, 5.31)

19. Public information should be addressed in the future National Radiological Emergency Plan. The **staff responsible for preparation of press releases** should be designated in advance. In addition, the **information pathways** should be described in the NREP or its procedures, and should address to which media the information is sent, by which means (facsimile, e-mail, telephone), identification of the responsible parties to authorize and release the information, etc.,. ([2]:para.4.82-83)

20. **Testing public information arrangements during an exercise or a specific drill** is highly recommended, but it is difficult to reveal all shortcomings through exercises alone. Therefore, it is also recommended to collate the information from these experiences, along with public information from other real emergencies, and to apply the various lessons learned during radiation emergency response. ([2]:para.4.82, 5.33)

21. **Templates of press releases are a useful tool**. For some of the more credible emergency scenarios, a short synopsis of a press release can be prepared in advance (e.g., in the event of a lost source or large scale contamination) and incorporated in the appropriate procedure. ([2]:para.4.82, 5.21-22)

22. **The operational intervention levels for agricultural countermeasures and action levels for food consumption in the event of an emergency should be adopted** and introduced in the radiation emergency documents (e.g., in the future NREP). In addition, responsibilities for decision-making regarding agricultural countermeasures and food consumption in the event of an emergency should be clearly addressed in the future NREP. ([2]:para.4.85, 4.88)

23. **The sampling principles for food and agricultural soil** in the event of an emergency should be included in the future NREP (i.e., where to take soil samples, which crops to sample and where, frequency and size of samples, etc.). These principles should reflect the national capabilities to perform measurements of radioactivity (e.g., how many samples of each type can be made, and how many samples can be measured in a given timeframe). ([2]:para.4.89)

24. Since **the non-radiological consequences of emergencies** are not among the most important priorities while establishing an interim response capability, the following are considered long-term activities: ([2]:para.4.94)
    - The team responsible for public information should follow the media coverage and response from the public. The public information team should develop working patterns (mechanisms) to ensure that press releases sent out after the initial message will correct any false or misinterpreted information that may have appeared in the media.
    - The non-radiological consequences include other issues such as economic losses (loss of income, loss of property), security concerns (in case of evacuation), fear of losing loved ones, etc. Although it is impossible to consider all these issues, the response should foresee and address some of them (i.e., insurance for economic losses, or advice by a team of psychologists to handle unjustified fears and worries).

25. All emergency response organizations should start developing **procedures for radiological emergency response** based on the concepts devised in the NREP. The importance of writing and adopting the NREP as soon as possible is discussed in Chapter 2.1 “Introduction.” ([2]:para.5.21-22)

26. During the preparation of the NREP, a **thorough analysis should be performed to determine whether the available resources meet the needs** of an emergency response which addresses the scenarios foreseen by the threat analysis. ([2]:para.5.25)

27. In addition to the identification of roles and responsibilities for various organizations during an emergency, **facilities (premises)** to be used by these organizations during emergency response **should be identified** as well. ([2]:para.5.28-29)

28. A coordinated approach should be developed (via a written plan) for the necessary manpower buildup and training in all organizations involved in radiological emergency response, in order to cope with any future radiation emergency situations. Within this plan, **maintaining the competence of first responder organizations should be addressed, and the plan should require a training programme for the first responders**. The MOI Division for Emergencies and Civil Protection should develop and carry out this training programme, which will provide first responders with the necessary knowledge and skills to take part in any emergency involving the hazard of ionizing radiation. ([2]:para.5.31)

29. **The emergency response capability must be tested** in an exercise with a suitable scenario. The exercise should be thoroughly analyzed, and the lessons learned should be fed back into the process, with the aim of improving the emergency response capability. ([2]:para.5.33)

30. Establishing and maintaining the required **high quality of radiation monitoring instrumentation** should be considered an ongoing task. ([2]:para.5.37)

31. To **ensure the participation of various organizations** (both private and public) in emergency preparedness and response, as well as to ensure availability and reliability of their resources, **contractual obligation is considered a preferred mode** to reach this goal. ([2]:para.5.30)

2.3. Long-Term Actions

1. To **optimize the inspection system (**since the regulatory authority and the registry of sources are under development), and to improve overall technical and administrative capabilities for responding to radiation emergencies, all activities should be performed in cooperation between the radiation protection regulatory authority and the MOI Division for Emergencies and Civil Protection. ([2]:para.3.3, 3.8-9)

2. It is recommended to review the **threat assessments at regular intervals (**for instance every five years, or at least once every ten years), since Montenegro is a country with a relatively low risk profile for radiation emergencies. The regular review of threat assessments is important to maintain an up-to-date perception of potential risks and to make necessary adjustments to emergency plans if necessary. ([2]:para.3.16)

3. **Emergency documentation (plans, arrangements, procedures) should be updated and finalized** in an appropriate time frame (e.g., within three years) after the interim emergency response capability is established. The outcome should be assessed within the framework of the Requirements described in [3]. The frequency of regular updates for this documentation should be established after the full emergency response capability is developed. ([2]:para.5.13)

4. To **strengthen border control over the illegal import or export of radioactive substances,** portal (or fixed) radiation monitors should be installed at some of the main border crossings. ([2]:para.2.1)

5. Since in Montenegro the likelihood is relatively small that people would receive doses causing acute radiation syndrome, the following are classified as long-term actions:
   - Develop an outreach campaign to **raise awareness among general practitioners of the medical symptoms of radiation exposure**. For more details, see the IAEA leaflet on recognition of radiation injuries and also [9]. ([2]:para.5.77)
   - In the event of **severe radiation injuries,** the option of sending such patients for medical treatment abroad should be anticipated and planned. ([2]:para.4.75)

6. **Regional cooperation** in emergency response should be further enhanced. It may be formalized with **bilateral agreements** between the coordinating countries. ([2]:para.5.10)

7. **A Quality Management System for radiation emergency response capability should be established**. All organisations within the emergency response organisation should be awarded quality standard certificates. ([2]:para.5.37)

8. **A long-term radiation emergency exercise programme** should be adopted and implemented. ([2]:para.5.33)

9. **The issues of training for a nuclear and radiological emergency** must be addressed in a strategic manner. A long-term training program should be adopted and implemented. To facilitate this effort, the long-term (regional) training program of the IAEA may be taken into consideration. ([2]:para.5.31)

2.4. Assessment Sheets

As part of the appraisal methodology, the answers to questions from the assessment sheets (Appendix IV) were collected during the visit. Based on the facts, interviews, and documents obtained during the visit, the EPREV team made an independent judgement on the prevailing situation in Montenegro with regard to all appraisal criteria. The assessment sheets in this document represent the first version; therefore, they can be used as benchmarks against which to measure any possible improvement in the future. In this first version of the assessment sheets, the documents primarily reflect the judgement of the EPREV team, and therefore may be biased. Following future missions, and as additional progress is achieved by the Montenegrin authorities, the data in this document will more accurately reflect the actual situation and the willingness of Montenegrin authorities to improve their system of emergency preparedness and response.

From the assessment sheets, it is clear that certain key areas have not yet been addressed. These areas need immediate attention. The action plan to improve emergency preparedness and response, which is to be adopted by the Montenegrin authorities, will clearly describe how to meet the requirements from the assessment sheets. It is important to highlight that not all requirements from the assessment sheets are equally difficult to implement. Clearly the requirements which can be quickly implemented should receive adequate attention as early priorities.

3. DETAILED FINDINGS

3.1. Introduction

The EPREV mission team's detailed evaluation of the Montenegrin emergency preparedness and response system is based on information provided by Montenegrin Government officials and experts, as well as the representatives whom the mission team interviewed. (Please see Appendix III for the list.) Due to the time constraint of finalizing the mission in five days, it was not possible to verify all the information provided. In some cases, the information was not fully consistent. This was, in part, due to the fact that the national radiological emergency arrangements and support documents, including legislation, are currently being developed. Some information provided by the participants reflects their intentions regarding how to tackle various issues, rather than describing the existing situation.

One of the challenges of the EPREV mission was to take a snapshot of the rapidly changing situation in Montenegro, where the institutions are still being established, and while the functional and infrastructural elements of radiation emergency preparedness are still under development (e.g., the relevant legislative framework, the national emergency plan, the nuclear and radiation safety regulatory authority). During the mission, the team received the impression that its counterparts were strongly motivated and committed to comply with international standards. This attitude is in line with the country's commitment to initiate the EU accession process in the nearest future. The EPREV team also recognized that the country has limited resources, which causes staffing problems. Some difficulties stem from the fact that Montenegro is a relatively new independent state (having announced its independence in 2006), although the country possessed a certain degree of independence and sovereignty in the past.

Where appropriate, the mission team listed interim findings to indicate preliminary actions that should be taken immediately, using existing capabilities, to strengthen Montenegro's emergency preparedness and response. Following these interim findings, the team listed long-term findings regarding actions the mission team felt should be implemented within one to three years to provide a solid foundation for emergency preparedness and response, consistent with the IAEA Requirements [2] and Guidelines [3].

The following sections address Requirements [2] and associated Guidelines [3] concerning the basic responsibilities, threat assessments, response functions and infrastructure.

3.2 Basic Responsibilities

Regarding the Requirements set out in [2] for basic responsibilities, the following appraisal criteria were investigated:

- Establishment or identification of an existing governmental body or organization to act as a national coordinating authority (NCA)
- Clear assignment of the functions and responsibilities of users and response organizations that are understood by all response organizations
- Establishment of a regulatory and inspection system that provides reasonable assurance that emergency preparedness and response arrangements are in place for all facilities and practices

3.2.1. Current Situation

Since the radiation emergency preparedness and response system is under development in Montenegro, the EPREV team in this chapter tried to capture the current situation. They sought to assign roles and responsibilities in accordance with their understanding of the system and the stakeholders' manpower, authority, and capabilities.

Regarding the current legal framework, there is one law in force and another law in preparation. The Law on Protection and Rescue was adopted in 2007. It is the main document that defines the system of civil protection and rescue in Montenegro. The responsibility for implementation of this law lies with the Ministry of Interior and Public Administration (MOI). According to the law, MOI is responsible for the following functions: adoption of national action plans for protection and rescue (i.e., national emergency plans); approval of lower level emergency plans (municipal and company/facility emergency plans); adoption of programmes for equipment procurement and development of the system of protection and rescue (P&R); monitoring and analysis of the P&R situation; data collection; performance of inspections; regulation of technical standards in P&R; cooperation with international institutions; and decision-making on requesting and rendering assistance. Within the MOI, the Division for Emergencies and Civil Protection was established to perform these duties. This Division has roughly 170 employees and contains the following units:

- strategy, development and legal affairs
- operations
- civil protection
- risk management
- notification centre
- inspection
- helicopter unit

The MOI Division for Emergencies and Civil Protection has experience responding to all kinds of emergencies. The team considers that this organization may play a pivotal role in response to radiation emergencies. This is also in line with the principles of the incident command system (ICS), which are outlined in [3, p.214]. Other factors supporting the MOI Division for Emergencies and Civil Protection's suitability to play this role are the following:

- The Division will operate telephone number 112, which will be available around-the-clock. This number will be used for all emergencies to facilitate the initial notification and coordination of all stakeholders taking part in an emergency.
- The MOI Division for Emergencies and Civil Protection is implementing the Argos project. This project will comprise a network of fixed monitors to provide, *inter alia*, on-line measurements of gamma dose rates from selected stations across the country, as well as decision-making support for radiation or chemical emergencies based on the Argos software, which will be supplied from the Danish Emergency Management Agency.

Both projects ("112" and "Argos") are planned to become operational in 2009.

The Law on Radiation Safety and Protection Against Ionizing Radiation is still under preparation. However, the draft is nearly ready, and during the mission extensive consultations took place almost daily to finalize it. The law covers emergency preparedness issues, but another important part of the future law is licensing for ionizing sources, which is

an important step in preventing eventual radiation emergencies. Regarding emergency preparedness, the draft law addresses:

- immediate notification to the authorities
- declaration of the emergency
- participation in the National Radiation Emergency Plan

The licensing process, as contained in the draft law, provides reasonable assurance that the likelihood of emergencies and the magnitude of their consequences will be minimized. Among other requirements, the draft law also mandates the establishment and implementation of the radiation emergency plan.

The draft law on radiation safety was reviewed by IAEA legal experts. Their comments were taken into consideration in the latest version, thus ensuring compatibility with the relevant IAEA Guidelines and Standards.

The regulatory authority responsible for licensing radiation sources is one unit within the recently established Environmental Protection Agency (EPA), which has not yet assumed all its functional responsibilities. The radiation regulatory authority will be the unit directly attached to the Director of EPA, accountable and reporting to him. The other main units of EPA include: communication and public relations, monitoring and analysis, inspection, licensing, and public affairs. The regulatory authority will also have the power to inspect licensees, including their emergency plans (which is, according to the draft law, a licensing condition). EPA's role during emergency response will be determined based on its capabilities. EPA may assume an advisory role to the incident commander (e.g., interpreting the measuring results, assisting in media communication) and may provide inspection control.

The Public Institution Centre for Ecotoxicological Research was founded in 1996, and is the lead institution for radiation measurements in Montenegro. It implements the environmental radiation monitoring programme for the entire territory of Montenegro. Its duties include: performing measurements of background radiation; radon mapping; gamma spectrometry of environmental samples, human food, animal feedstuffs, and building materials. The Centre for Ecotoxicological Research was awarded with ISO 9001:2000 and ISO/IEC 17025 certificates. It is a member of the ALMERA (Analytical Laboratories for the Measurement of Environmental Radioactivity) network run by the IAEA. The Centre is capable of assuming the role of the primary technical support organization (TSO) in the event of a radiation emergency. The University of Montenegro also possesses some capabilities for radiation measurements and can act as a support organization, as well as organize training for emergency responders.

In the event of more complex emergencies, other state institutions can also implement some of these activities, as well as taking part in the preparedness phase, including the following functions:

- The Ministry of Health can provide medical response to the first responders, and can treat persons injured by radiation.
- The Ministry of Agriculture can implement food control in cooperation with the Ministry of Health and the Centre for Ecotoxicological Research.
- The Ministry of Defense can provide some special equipment and manpower.
- The Ministry of Foreign Affairs can be involved in facilitating international assistance to other countries, if such assistance is requested by the third party.

The scheme in Appendix 1 gives the mission team's view on how the emergency response organization may be structured in Montenegro in the future. This is not a currently existing scheme, but was designed based on the experience and information the team gained during its mission.

3.2.2. Good Practice

Montenegro, as a newly independent country, has stated its priority to establish the new legislative framework. It is encouraging that radiation safety legislation will be adopted relatively soon, will incorporate the IAEA Standards, and will utilize IAEA expertise and services. This legislation will serve as a good basis for assigning the functions and responsibilities of stakeholders in the radiation emergency response organization.

3.2.3. Recommendations

Interim

1. The draft Law on Radiation Safety and Protection Against Ionizing Radiation should be finalized and adopted as soon as possible. This will ensure the necessary legal framework for the radiation protection regulatory authority, as well as a legal basis for creating conditions to facilitate the prevention of radiation emergencies and the enforcement of legal requirements.

2. The radiation protection regulatory authority foreseen as an independent unit within the Environmental Protection Agency should establish an inspection system that adequately addresses, *inter alia*, the licensee's emergency preparedness and response procedures.

3. It is essential to write the draft National Radiological Emergency Plan (NREP) as soon as possible. The NREP is a necessary and very important step toward establishing the interim emergency response capability. The methodology for doing so is thoroughly described in [3]. Also, other IAEA documents are recommended [4, 5, 6, 9 and 11]. It is strongly suggested to involve in writing the NREP those persons who have attended the relevant IAEA courses. In the event of doubt or a lack of guidance, seeking IAEA advice may be the most efficient way to find adequate solutions.

Long Term

4. It is necessary to optimize the inspection system while the regulatory authority and the registry of sources are being established, and to improve the overall technical and administrative capabilities for responding to radiation emergencies. These activities should be performed in cooperation between the radiation protection regulatory authority and the MOI Division for Emergencies and Civil Protection.

3.3. Assessment of Threats

Regarding the requirements identified in [2] for threat assessment, the following appraisal criterion was investigated:

- Perform threat assessments for the facilities and activities in the state, and categorize them in accordance with the five threat categories in Table I of GS-R-2.

3.3.1. Current Situation

A radiological emergency threat assessment for Montenegro has not yet been performed. The EPREV team undertook an initial estimate of this threat assessment. This estimate is based on the following information, which was collected during the mission:

- The most active sources in the country are probably those installed in the lightning rods on building roofs across the country. These lightning rods will probably be dismantled in the near future (currently there are fewer than one hundred of them), since their use is no longer justified, and the installation of new ones is prohibited.

- In medicine, there are few highly active radioactive sources. The radiation devices recognized during the visit to the Clinical Centre Podgorica were the linear accelerator (for treatment) and the technetium (Tc-99) generator for diagnostics in the Nuclear Medicine Department of the same institution.

- There are some radioactive sources in industry. However, these sources are mainly used as gauges for measuring thickness or density and, in some cases, within level gauges in various silos or containers.

- The radioactive sources used for radiography in shipbuilding, piping inspection or civil engineering are temporary imports (mainly from Serbia). After these temorary services are completed, these devices--together with their sources--are immediately exported back to the country of origin.

- The transport of radioactive sources is relatively modest. Specifically, fewer than ten transport licenses for radioactive material are issued by the Ministry of Interior per year. These transports mainly involve radiography devices and molybdenum used for the production of Tc-99 (as mentioned in the above paragraphs).

- Radioactive waste storage is under construction. The building is finished from the civil engineering point of view, but it is not functional. Nor has it been licensed yet. At the time of the visit, the premises were empty, and no radioactive sources were stored in the building.

In conclusion, the mission could not identify the existence of any threat category III radioactive sources in Montenegro. Based on the information above, the mission has provisionally categorized Montenegro among the threat category IV and V countries.

In addition, Montenegro considers itself an ecological state, which is also a policy declared in the national strategy. Therefore, no major industrialization projects (e.g. building of nuclear power plants or heavy industry) are currently foreseen.

There is no complete registry of radioactive sources in the country. This fact seriously hinders the implementation of threat analysis. Some efforts have occurred to establish or collect some data for a registry of radioactive sources in the country, but this task has not yet been completed.

3.3.2. Good Practice

The mission team acknowledges the Centre for Ecotoxicological Research effort, based on good interpersonal relations, to make a list of radioactive sources. This effort is complicated because, following the independence of Montenegro, many of these data have remained in the files of institutions based in the capital of the former federal country.

3.3.3. Recommendations

Interim

1. The future radiation protection authority should establish a registry of radioactive sources as soon as possible. This registry will serve as a necessary input to perform a comprehensive threat analysis.

2. A threat assessment for radiation emergencies should be performed, taking into account all sources which exist in the country, as well as other relevant practices and activities (e.g. transport of radioactive sources, potential of finding a source in scrap metal, perhaps terrorist activities such as use of a radiological dispersal device). The basic policy for threat assessment should follow the latest IAEA guidance using the five threat category definition and implementing terms, definitions and terminology in the guidance.

Long Term

3. It is recommended to review the threat assessment in regular intervals, for instance every five years or at least every ten years, since this country has a relatively low risk profile for radiation emergencies. Regular review of the threat assessment is important to maintain an up-to-date perception of potential risks and make necessary adjustments to the emergency plans if necessary.

3.4. Establishing Emergency Management and Operations: Authority, Organization, and Coordination of Emergency Response

Regarding the Requirements set out in [2] for establishing emergency management and operations, the following appraisal criterion was investigated:

- Make arrangements to coordinate the emergency response of all off-site and on-site response organizations, to include a command and control system for local and national response to any nuclear or radiological emergency.

3.4.1. Current Situation

The preferred concept for management of operations is the so-called “all hazards” approach, which means that management of operations and basic infrastructural building blocks are the same for all types of emergencies. In Montenegro, this approach has been incorporated into legislation via the Law on Protection and Rescue, which was adopted in 2007. In addition, the Ministry of Interior has been appointed the responsible institution for implementing most emergency response tasks for all types of hazards. Within the Ministry of Interior is a Division for Emergencies and Civil Protection, to which the actual tasks for emergency

preparedness and response have been delegated. There are also 17 regulations that clarify and define the requirements of the law in greater detail. The EPREV team did not have an opportunity to learn more about these regulations, but it assumes there is no specific regulation to cover radiation emergency issues.

There are roughly 170 employees within the Division for Emergencies and Civil Protection. There are also roughly 2,000 members of Civil Protection who are on call, and uniformly distributed across the country. These members are not full-time Civil Protection employees, but are under contract to be available during emergencies only, and are also willing to undertake training. The Division has good transportation methods (including both overland vehicles and helicopters), and efficient communications. As mentioned previously, the Division will operate telephone number 112, and has wireless communications to support field teams. The Division is located within the Ministry of Interior, which means it has close ties with the police. The EPREV team took note of the effort and desire of Division management to establish a robust system to provide emergency response for all events in the country, as well as to provide assistance and support to countries in the region.

However, radiation emergency preparedness and response entail rather specific needs. In addition to general support that can be provided by the MOI Division for Emergencies and Civil Protection, special support is also needed. In providing this support, other stakeholders can play an important role. The EPREV team identified the following institutions:

- Environmental Protection Agency (EPA)
- Centre for Ecotoxicological Research
- Health Authorities

EPA will incorporate a radiation protection regulatory body in its organization structure. The members of the regulatory body should assume an expert and advisory role during an emergency, as well as within licensing, inspection, and national planning documents during the preparedness phase.

The Centre for Ecotoxicological Research of Montenegro was founded in 1996, in accordance with the governmental policy to establish one organization in charge of environmental monitoring. In addition to environmental and workplace monitoring, the radioactive waste storage facility was built next door to the Centre, and its staff will operate the facility. The staff also has experience in decontamination, and is involved in researching ionizing radiation, as well as analyzing accidental situations.

A widespread radiation emergency in Montenegro is highly unlikely except in the event of a terrorist attack. In such a case, the National Crisis Committee is activated. This Committee is headed by the prime minister, while the members include the various ministers (or their deputies) responsible for interior, transportation, agriculture, foreign affairs, environment, defence, etc.,.

3.4.2. Good Practice

The MOI Division for Emergencies and Civil Protection acts on the basis of the “all hazards” approach in Montenegro. This concept has proven efficient during many emergencies worldwide, and also in Montenegro. All expertise available in the country in the field of radiation protection should also be integrated with the system of emergency management. The MOI Division for Emergencies and Civil Protection is well equipped and has dedicated

management, with a strong commitment to establish a Civil Protection organization which renders its services in accordance with international standards.

The other key organizations involved in emergency management (e.g., EPA and the Centre for Ecotoxicological Research) seem aware of their responsibilities, and are committed to perform their duties.

3.4.3. Recommendations

Interim

1. It is recommended to establish a sound radiation emergency response organization. One proposal for such an organization is contained in Appendix 1. \The local responders are assumed to be first on the scene. Since Montenegro is a small country, expert assistance can be delivered from the national level (i.e., by the national technical support organization).

Long Term

2. Emergency documentation (plans, arrangements, procedures) should be updated and finalized in an appropriate timeframe (e.g., within three years) after the interim emergency response capability is established. The outcome should be assessed compared to the Requirements described in [3]. A regular schedule for updating the documentation should be established after the full emergency response capability is developed.

3.5. Identifying, Notifying, and Activating

Regarding the Requirements set out in [2] for identifying, notifying, and activating the emergency response system, the following appraisal criteria were investigated:

- Establish a Contact Point that operates 24 hours per day, 7 days per week.
- Ensure awareness of radiological hazards for on-site facility managers (e.g., for scrap metal processing facilities) and the national border control authorities.
- Ensure first responders are aware of the symptoms, the appropriate notification, and other immediate actions warranted if an emergency is suspected.
- Establish a system to initiate promptly an off-site response in the event of an emergency.
- Ensure response organizations have sufficient personnel.
- Inform the IAEA and other states of Montenegro's single warning point of contact responsible for receiving emergency notifications and information both from other states and the IAEA.

3.5.1. Current Situation

The MOI Division for Emergencies and Civil Protection has started with the introduction of a single (or universal) emergency telephone number 112 for the whole country. During the introduction of telephone number 112, arrangements will be made in the country to meet the international requirements for identification of a radiological emergency, notification of the competent organizations, and activation of the necessary resources. This number will be the emergency telephone number for both mobile and fixed-line telephones. The emergency

telephone number will be answered by an emergency service dispatcher, who connects the call to the appropriate emergency service, which then dispatches the appropriate assistance. If multiple services are needed to respond to a call, the most urgent steps must be determined, while other services should be called upon as needed. The number 112 operates around-the-clock.

It is planned to establish the National Early Warning System under the Argos project, which is currently being implemented. The MOI Division for Emergencies and Civil Protection is responsible for installation and for making this system operational. The system will consist of gamma dose-rate monitors located around the country. These monitors will send on-line measurements to the central computer, where all measurements will be checked and appropriate response can be initiated if increased levels are detected.

The potential first responders (e.g., police, first aid, firefighters or members of Civil Protection) should know how to react in the event of a radiation emergency. To date, these issues have not been considered.

Montenegro is a Party to the IAEA Conventions on Early Notification and Assistance. Future bilateral agreements with neighboring countries will probably cover cooperation in the area of civil protection in general, rather than a specific area of early notification and radiation or nuclear information exchange. If future bilateral agreements are concluded with neighboring states on cooperation in the area of civil protection, it is recommended that these agreements should also cover prompt information exchange for data related to nuclear or radiation emergencies.

The Centre for Ecotoxicological Research performs radiation monitoring with hand-held instruments, and scans all scrap metal shipments across the border, both import and export. Representatives from all countries of the former Yugoslavia meet regularly, and have established contacts to follow all rejected shipments of scrap metal back to the country of origin if radioactive material is found. This may be considered a good practice, but it is not listed in the appropriate section below because, if the shipment goes to a country without adequate control, the radioactive source can be easily "re-orphanized." (In other words, the source can be lost again, instead of being recovered and securely stored.)

In Montenegro, there are no facilities for which off-site emergency plans would be required; therefore, direct activation of off-site response through the facility emergency plan is not anticipated. It is assumed that the facility plans include notification to the authorities, who trigger the response based on the information received. The EPREV team was not aware of any threat category I, II, or III facility in Montenegro that would need to declare emergency classes.

3.5.2. Good Practices

The introduction of telephone number 112 complies with international standards, and ensures a coordinated response from the onset for all emergencies, including a radiation or nuclear emergency.

Radiation monitoring is performed by the staff of the Centre for Ecotoxicological Research at all border crossings (both sea and overland) for all shipments of scrap metal (both imported and exported).

3.5.3. Recommendations

Interim

1. As soon as telephone number 112 is fully operational, an appropriate procedure should be developed for the incoming call receiving centre. The centre should promptly notify the institutions playing roles in radiation emergency response. This procedure should be harmonized with the National Radiological Emergency Plan.

2. The first responders (i.e., police, first aid, firefighters, members of Civil Protection) should receive basic instructions on how to respond to a radiation emergency. These instructions should include: recognition of the event (e.g., radiation signs, transport codes); identification of whom to call to report the event; guidance on how to secure the site and protect those on-site; the risks associated with radiation; and guidance on how to avoid potential contamination while rendering first aid to injured persons.

3. The Contact Point data under the IAEA Conventions on Early Notification and Assistance should be sent as soon as possible to the IAEA, ensuring that basic requirements are met (i.e., the Contact Point is manned around-the-clock, and is capable of triggering the national emergency response).

Long Term

4. To strengthen border control over illegal import or export of radioactive substances, portal (or fixed) radiation monitors should be installed at some of the main border crossings.

3.6. Taking Mitigatory Action

Regarding the Requirements set out in [2] for taking mitigatory action, the following appraisal criteria were investigated:

- Make arrangements to provide expertise and services in radiation protection promptly to local officials, and to first responders involved in actual or potential emergencies involving Threat Category IV.
- Give basic instruction to the operators who could be involved in Threat Category IV.
- Make arrangements to initiate a prompt search and issue a warning to the public if the loss of a dangerous source occurs.
- Make arrangements for mitigatory action to prevent an escalation of the threat, to return the facility to a safe and stable state, to reduce the potential for releases of radioactive material or exposures, and to mitigate the consequences of any actual releases or exposures.

3.6.1. Current Situation

The EPREV team did not identify any facility at which a potential emergency scenario would comprise a transient situation (i.e., an emergency whose classification can change over time as the situation changes, since the status of an emergency can be a complex time-dependent process). In principle, the operators are responsible to take mitigatory actions within the facility. All probable radiation emergency scenarios in Montenegro are quite stationary, and would require radiation measurements to assess the situation prior to recovery of the source

and decontamination of an area if needed. The only exceptions would be a spill of radioactive liquid, and a source caught by fire or an explosion. Since radioactive sources in Montenegro generate relatively low activity, it is likely that dilution (in water, soil, or air) would minimize the potential risks.

The team believes there is sufficient expertise for professional radiological assessment during a nuclear or radiological emergency in the Centre for Ecotoxicological Research and possibly in other institutions (e.g., the University of Montenegro's Faculty of Natural Sciences and Mathematics). However, the team had not visited the university. In the event of an emergency, all expert support and radiological assessment services (including TLD dosimetry), as well as decontamination and source recovery can be provided at the national level by the previously mentioned institution(s).

In the event of a more complex emergency, the initial assessment can be made within the existing national emergency response system, and the IAEA Convention on Assistance may be invoked.

With regard to a threat category IV event, the relevant information and instructions on emergency situations will be addressed by the licensing process, when the applicant is requested to demonstrate its capability to cope with an accident and other emergency situations.

3.6.2. Good Practice

The Centre for Ecotoxicological Research has appropriate measuring equipment for field work, and is capable of performing on-the-scene measurements of radiation, including quick identification of radionuclides. The Centre also has experience with decontamination of soil (depleted uranium) and hangars (thorium).

3.6.3. Recommendations

Interim

1. Although the ad hoc threat assessment performed by the team did not reveal any need for special mitigatory actions associated with potential radiation emergencies, Montenegro should carefully analyze its current needs for expert support to be provided by the technical support organisations. The team's impression was that these resources do exist and are of adequate quality. However, this does not mean that nothing else is needed. A thorough assessment of these issues (e.g., timely response, quality of measurements, manpower, communication of results, radiological assessment, dosimetry, protective action advice) is needed to establish the future emergency response capability, taking into account international experience, and verifying the arrangements through exercises.

2. To ensure an effective licensing process, a brief guideline should be developed by the regulatory body to outline which practices the operators of threat category IV facilities should include in their instructions for coping with emergency situations.

3.7. Taking Urgent Protective Action

Regarding the Requirements set out in [2] for taking urgent protective action, the following appraisal criteria were investigated:

- Adopt national intervention levels for taking urgent protective action in accordance with international standards.
- Make effective arrangements for undertaking and implementing decisions on urgent protective action to be taken off-site.
- Make arrangements to ensure the safety of all persons on-site in the event of a nuclear or radiological emergency.

3.7.1. Current Situation

Montenegro does not have facilities in threat categories I, II and III. There are neither facilities nor practices that would warrant urgent protective action off-site. The only case by which urgent protective action may be triggered is activation of a radiological dispersal device.

Currently, the arrangements to ensure the safety of all persons on-site (e.g., in the Clinical Centre Podgorica) in the event of a radiation emergency do not anticipate significant evacuation, except leaving the room, since the risk associated with such an event is small.

3.7.3. Recommendations

Interim

1. For the sake of consistency and compliance with international standards, it is recommended to adopt generic intervention levels for urgent protective action, although the likelihood of application is almost negligible.

2. If threat category III radioactive sources are utilized in the country, appropriate arrangements (including evacuation) to ensure the safety of all persons on-site should be established.

3.8. Providing Information, Issuing warnings and Instructions to the Public

Regarding the Requirements set out in [2] for providing information, warnings and instructions to the public, the following appraisal criterion was investigated:

- Make arrangements to provide prompt warnings and instructions to permanent, transient, and special population groups or those responsible for them, and to special facilities in the emergency zones when an emergency is declared.

3.8.1. Current Situation

This Requirement contains specific guidance on providing instructions to the population within the emergency planning zones around facilities having off-site emergency plans. Since there are no such facilities in Montenegro, this requirement is not applicable.

When issuing information to the population endangered under a threat category IV event, it is expected that the number of people needing instructions would be relatively low (i.e., not more than 100 people), and that these people can be informed directly (i.e.. by emergency workers going door to door, or by using loudspeakers).

3.8.3. Recommendations

Interim

1. The National Radiological Emergency Plan should foresee notification of the endangered population during certain radiation emergencies (e.g., a large transport accident, a fire involving a source, or large scale contamination) by the direct method (word-of-mouth). The NREP should also ensure that, when necessary, this population will be provided with instructions based on the radiological assessor's advice.

3.9. Protecting Emergency Workers

Regarding the Requirements set out in [2] for providing protection to emergency workers, the following appraisal criterion was investigated:

- Make arrangements for taking all practicable measures to provide protection for emergency workers and response personnel.

3.9.1. Current Situation

The staff of the future radiation protection authority is aware of the issue of protecting emergency workers. This issue is rather new in Montenegro and should be addressed by the authorities as well as the employers of potential emergency workers (e.g., MOI, hospitals, medical centers, police, and fire brigades).

In general, the incident commander is responsible for giving on-the-scene instructions to emergency workers. However, this person cannot act alone (not being fully competent in these issues), and may require expert advice by the radiation protection staff.

Usually the firefighters have quite suitable protective equipment, because autonomous respirators and protective clothing can also be used during radiation emergencies. However, they may not have radiation alarm dosimeters, which are needed to enter the cordoned-off area.

3.9.3. Recommendations

Interim

1. Guidance for emergency workers on turn-back dose levels should be adopted and implemented in the radiation emergency documents (e.g., in the future NREP).

2. In the National Radiological Emergency Plan (or similar document) additional issues for emergency workers should be adequately covered, including: medical surveillance, training, and appropriate protective equipment (with dosimeters at the minimum), as well as protective clothing and breathing equipment if needed.

3.10. Assessing the Initial Phase

Regarding the Requirements set out in [2] for assessing the initial phase, the following appraisal criterion was investigated:

- Establish default operational intervention levels (OILs) for radiological emergencies.

3.10.1. Current Situation

The default operational intervention levels (OILs) have been devised to make an estimate, based on measurements, if the generic intervention levels are exceeded during a nuclear accident [4]. Since all nuclear power plants are located far from Montenegro (hundreds of kilometers away), it is very unlikely that the OILs would be exceeded and that countermeasures would need to be introduced. The only exception may be agricultural countermeasures, which are considered in Chapter 3.13.

For the sake of consistency with international standards, the OILs can be introduced into the relevant documents. These OILs can also be used as reference values when assessing measured levels (in the event of a nuclear accident abroad) against the levels requiring the introduction of countermeasures. .

3.10.3. Recommendation

Interim

1. For the sake of consistency with international standards, the operational intervention levels (OILs) should be quoted in relevant documents. The OILs should provide reference values that would warrant the introduction of countermeasures. The OILs may be useful when explaining to the public the measured values on home territory in the event of a nuclear accident abroad.

3.11. Managing Medical Response

Regarding the Requirements set out in [2] for managing medical response, the following appraisal criteria were investigated:

- Ensure awareness by general practitioners and emergency staff of the medical symptoms of radiation exposure, and of the appropriate notification procedures if a nuclear or radiological emergency is suspected.
- Make arrangements, at the national level, to provide initial treatment for people who have been exposed or contaminated.

3.11.1. Current Situation

Two aspects of medical response were discussed with the mission team's counterparts:

- Awareness by general practitioners of the medical symptoms of radiation exposure has not been systematically addressed in Montenegro. This awareness is important in cases when people are unaware that radiation sources are involved, and thus are unwittingly exposed to radiation. These cases are mostly related to events in which lost sources of high activity are found in scrap metal, etc.,. Primarily, such sources originate from medicine or industrial radiography. Since there have been no such cases of exposure in Montenegro, and since high activity sources do not exist (to the best knowledge of the involved counterpart institutions), the need for awareness by general practitioners is not a high priority.

- Another issue of a general nature is accepting potentially contaminated patients into general hospitals after a mass casualty event (e.g., the activation of a radiological dispersal device). The hospital staff should be aware that customary medical protective clothing (gowns, face masks, latex gloves, shoe covers) provides excellent protection against the contamination of medical staff dealing with such patients.
- Regarding the hospital treatment of radiation-injured patients, the mission team's counterparts mentioned that departments for plastic surgery and treatment of burns may also treat radiation-injured patients. In the EPREV team's opinion, the treatment of radiation-injured persons is highly specialized, and adequate expertise has been accumulated only in the world's leading centres for treatment of radiation injuries. Moreover, it is very unlikely to encounter in Montenegro many cases of radiation injuries caused by the same event. Therefore, it seems a better solution to rely on assistance from abroad (i.e., sending patients to specialized institutions abroad), rather than developing Montenegro's own capability.

3.11.3. Recommendations

Interim

1. For the first responders who are responsible for first aid, and for other medical staff who may encounter potentially contaminated patients, it is necessary to include in their training programme instructions regarding treatment of potentially contaminated patients. These instructions should describe procedures for decontamination of patients, and should raise awareness that customary medical protective clothing (gowns, face masks, latex gloves, shoe covers) provides excellent protection against contamination.

Long Term

2. Since the likelihood of a situation involving acute radiation syndrome is relatively small in Montenegro, the following items are classified as long-term actions:
    - Develop an outreach campaign to raise awareness among general practitioners of the medical symptoms of radiation exposure. For details, see the IAEA leaflet on recognition of radiation injuries and also [9].
    - In the event of severe radiation injuries, the option of sending such patients for medical treatment abroad should be planned.

3.12. Keeping the Public Informed

Regarding the Requirements set out in [2] for keeping the public informed, the following appraisal criterion was investigated:

- Make arrangements for providing useful, timely, truthful, and consistent information to the public; responding to incorrect information and rumors; responding to requests for information from the public and mass media.

3.12.1. Current Situation

Providing useful, timely, truthful, and consistent information to the public requires not only persons qualified to provide such information, but also continuous work with the media to build mutual trust and partnership between journalists and spokespersons. Since Montenegro

is still developing its radiation emergency response capability, it is not surprising that public information issues have not yet received sufficient attention. The EPREV team learned that the Government has identified a spokesperson to assume this role during any widespread emergency, including a possible radiation emergency.

Public information is an important issue, and its effects and consequences should not be underestimated. For the most credible scenarios, a short synopsis for a press release may be prepared in advance (i.e., in the event of a lost source or large-scale contamination). Even for less credible events such as satellite re-entry, preparations may be undertaken, involving not only general information to the public, but also information for the so-called "potentially affected population." In the unlikely event of satellite re-entry, the impact area may be the whole country.

3.12.2. Recommendations

Interim

1. Public information should be addressed in the future National Radiological Emergency Plan. The staff responsible for preparation of press releases should be designated in advance. In addition, the information pathways should be described in the NREP or its procedures, outlining to which media information should be sent, by which means (facsimile, e-mail, telephone), and identifying the responsible person to authorize and send out this information.

2. Testing public information arrangements during an exercise or a specific drill is highly recommended, but it is difficult to reveal all shortcomings via exercises alone. Therefore, it is also recommended to assess experiences involving public information from other real emergencies, and to apply these lessons learned to radiation emergency response.

3. Templates of press releases are a useful tool. For the most credible emergency scenarios, the short synopsis of a press release may be prepared in advance (i.e., in the event of a lost source or a large-scale contamination) and integrated with the appropriate procedure.

3.13. Taking Agricultural Countermeasures Against Ingestion and Longer-Term Protective Actions

Regarding the Requirements set out in [2] for agricultural countermeasures against ingestion and longer-term protective actions, the following appraisal criteria were investigated:

- Adopt national intervention and action levels for agricultural countermeasures.
- Make arrangements, concentrating on the use of existing capabilities, for undertaking effective agricultural countermeasures.

3.13.1. Current Situation

The action levels for food contamination during an emergency are not addressed in legislation or other documents. The Ministry of Health, together with the Ministry of Agriculture (for products of animal origin) is responsible to regulate the import, domestic production, and

consumption of food during normal circumstances. The Centre for Ecotoxicological Research is the designated laboratory for the measurement of food and environmental samples.

In the event of an emergency, the decision-making mechanism regarding agricultural countermeasures and food consumption has not yet been determined. The adoption of national intervention and action levels for agricultural countermeasures may be a good initial step. Next, the responsibility for decision-making should be assigned to the appropriate authorities. The stakeholders in this decision-making process would be the Centre for Ecotoxicological Research as technical support organization (provider of measurements); the Ministry of Health and Ministry of Agriculture as responsible institutions to provide practical recommendations; and the Incident Commander, who would make the actual decisions based on all information at his/her disposal.

The Centre for Ecotoxicological Research also has experience in area decontamination at Boka Kotorska bay, which was contaminated by depleted uranium originated from missiles and bullets launched during the military operations in 1999.

3.13.2. Good Practice

The Centre for Ecotoxicological Research is the lead technical institution in radiation environmental monitoring in Montenegro. It has international certificates and regularly participates in IAEA inter-comparison measurements. This institution is fully capable of implementing the radiation monitoring programme in the event of large-scale contamination caused by a nuclear accident abroad.

3.13.3. Recommendations

Interim

1. The operational intervention levels for agricultural countermeasures and action levels regarding food consumption in the event of an emergency should be adopted and integrated with the radiation emergency documents. In addition, responsibilities for decision-making regarding agricultural countermeasures and food consumption in the event of an emergency should be clearly addressed in the future NREP.

2. Sampling procedures for food, crops, and agricultural soil in the event of an emergency should be included in the future NREP (i.e., where to take soil samples, which crops and where should be sampled, frequency and size of samples, etc.). These procedures should reflect national capabilities to perform radioactivity measurements (e.g., how many samples of each type should be taken, and how many samples should be measured within a given timeframe).

3.14. Mitigating the Non-Radiological Consequences of Emergency and Response

Regarding the Requirements set out in [2] for mitigating the non-radiological consequences of emergency and response, the following appraisal criterion was investigated:

- Make arrangements for responding to public concerns in an actual or potential nuclear or radiological emergency.

3.14.1. Current Situation

The major concern in this area is the possibility of circulating false information, rumors, and non-credible allegations that may cause panic or unsubstantiated fear. The best method for managing this risk is proper communication. The importance of useful, timely, truthful, and consistent information was addressed in Chapter 3.12. If applied properly, these practices can substantially minimize public concern and fear. Practically speaking, this means that public response to emergency information should be monitored. A lack of adequate information may easily generate false information, rumors, etc.

In Montenegro, the mitigation of non-radiological consequences has not yet been considered. In addition to the need for proper information, other issues include economic losses (loss of income, loss of property), security concerns (in the event of evacuation), the fear of losing loved ones, etc. These issues may become quite complex during large-scale emergencies. Since such radiation emergencies are not very likely in Montenegro, these issues are placed lower on the priority list.

3.14.3. Recommendations

Long Term

1. Since the non-radiological consequences of emergencies are not among the most important priorities for establishing an interim response capability, the following issues are considered long-term activities:

    - The team responsible for public information should follow media coverage and the public response. The public information team should develop working practices to ensure that the messages (press releases) sent out after the initial notification contain information to correct false or misinterpreted reports, if such reports appear in the media.
    - The non-radiological consequences include economic losses (loss of income, loss of property), security concerns (in case of evacuation), the fear of losing loved ones, etc. It is impossible to consider all these issues, but the response may foresee and address some of them, (i.e., insurance in the event of economic losses or advice by a team of psychologists to handle unjustified fears and worries).

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3.15. Requirements for Infrastructure

Regarding the Requirements set out in [2] for infrastructure, the following appraisal criteria were investigated:

- Develop emergency plans that are consistent with the threats and coordinated with all response organizations.
- Develop the procedures needed to perform response functions.
- Concentrating on existing capabilities, provide adequate tools, instruments, supplies, equipment, communication systems, facilities, and documentation needed during an emergency.
- Identify facilities at which the following will be performed: (a) coordination of on-site response actions; (b) coordination of local off-site response actions (both radiological

and conventional); (c) coordination of national response actions; (d) coordination of public information; and (e) coordination of off-site monitoring and assessment.
- Concentrating on existing capabilities, make arrangements for the selection of personnel and training.
- Conduct exercises and drills to ensure that all specified functions required for emergency response, all organizational interfaces for the facilities in Threat Categories I, II and III, and the national level programmes for Threat Category IV and V are tested at suitable intervals.
- Make arrangements to ensure the availability and reliability of all supplies, equipment, communication systems, and facilities needed during an emergency.

3.15.1 Current Situation

Regarding the first criterion (the requirement for plans), the draft National Radiological Emergency Plan (NREP) should be adopted by the MOI as stipulated by the legislation. Since authorities have not yet begun drafting the NREP, the EPREV team wishes to emphasize that it is an essential requirement to have the NREP in place in order to establish an interim radiation emergency response capability. The methodology for writing the NREP is thoroughly described in [3]. Many inputs are required before the NREP is finalized. One important input is the threat assessment, which defines the scope of the NREP. In addition, documents regarding the planning basis and concept of operations are needed to write the NREP.

Regarding the second criterion (the requirement for operating procedures on the facility level, as well as for response organizations), complex emergency procedures for licensees are not anticipated in Montenegro. The licensee's emergency plans or instructions in an emergency will be subject to licensing and inspection, in which the regulatory body will assume its functions. However, the emergency response organizations should have procedures developed and harmonized with their tasks, as required by the NREP. The procedures for responders should not focus on execution of regular work (e.g., the EPREV team is sure that the Centre for Ecotoxicological Research has adequate procedures for measuring radiation). Instead, the procedures should focus on emergency-specific issues such as management and communication interfaces (to whom and when the information should be sent, by which communication means, who is in charge to order implementation of the task), the need for special equipment (protective clothing, etc.), training requirements, and other emergency-related requirements.

Regarding the third criterion (the requirement for necessary equipment, instrumentation, monitoring etc.), the situation is the following:

- The national early warning system is part of the "Argos project", which is being implemented by the MOI Division for Emergencies and Civil Protection. The system will consist of gamma dose-rate monitors, located throughout the country. These monitors will send on-line measurement results to the central computer, where all data will be checked, and the appropriate response will be initiated when elevated levels occur.

- The MOI Division for Emergencies and Civil Protection is establishing a decision-making support system for radiation or chemical emergencies based on the Argos software, which is supplied by the Danish Emergency Management Agency.

- The Centre for Ecotoxicological Research implements the regular national radiation environmental monitoring programme in Montenegro. It performs laboratory and in-situ high resolution gamma spectrometry measurements, and will to enhance its capabilities with alpha spectrometry. The Centre also has equipment for radiation field measurements, as well as experience in decontamination.

The team's general impression is that suitable equipment, instrumentation and skills exist in Montenegro to cope with the anticipated spectrum of radiation emergencies. Nevertheless, during preparation of the NREP, a thorough analysis should be performed to confirm whether these items are sufficient and adequate (e.g., some items are perishable, such as protective clothing, electronic personal dosimeters, and communications equipment). The EPREV team suggests that it is better to rely on instrumentation in regular use, rather than instrumentation stored in a warehouse.

Regarding the fourth criterion (the identification of facilities and organizations where various emergency response functions will be performed), the situation is as follows:

(a) Coordination of on-site response actions is the responsibility of the operator, user, or licensee.
(b) Coordination of local response actions can be done, in the first phase, by the local first responder who has the highest rank. Later, it should be delegated to the national level, since it is anticipated that most responses will be coordinated directly at the national level).
(c) Coordination of national response actions is the responsibility of the MOI Division for Emergencies and Civil Protection. In the event of a large-scale emergency, the National Crisis Committee may take the leading role.
(d) Coordination of public information is the responsibility of the government, but it is expected that more practical solutions for radiation emergencies will be found when the NREP is written.
(e) Coordination of off-site monitoring and assessment may be the responsibility of the future radiation protection regulatory body. However, the practical implementer will be the Centre for Ecotoxicological Research, which could also involve other institutions (e.g., the University of Montenegro).

Regarding the fifth criterion (making arrangements based on existing capabilities for personnel selection and training), the EPREV team had the impression that arrangements for staffing and specific training for radiation emergency response are in the preparatory phase. It must be acknowledged that the emergency response staff has very good general knowledge, and regularly updates this knowledge through IAEA training courses and other means. The staff is highly skilled for their daily work. However, a specific training syllabus for radiation emergency response, including among other details the communication and coordination between various stakeholders, has not yet been developed. One reason might be that the NREP has not yet been written.

Regarding the sixth criterion (conducting exercises), the team takes into account that Montenegro is a threat category IV and V country. No radiation emergency exercises have yet been prepared to test the response capability. Only the Centre for Ecotoxicological Research participated in the Convex 2b exercises organized by the IAEA. The MOI Division for Emergencies and Civil Protection is aware of the need for exercises.. Therefore, an exercise is planned during the emergency response exercises connected with the international conference in June 2009 on the Montenegrin coast.

The seventh criterion (ensuring the availability and reliability of all supplies, equipment, communication systems and facilities, etc.) concerns maintenance of the emergency response system. Currently, the arrangements (both procedures and contracts) for supply of services or equipment do not exist. During preparation of the NREP, arrangements and contracts should be concluded to ensure the availability and reliability of equipment and services. The Quality Management System may ensure higher reliability, but this system will only be integrated with radiation emergency preparedness and response after the interim capability is established. However, the Centre for Ecotoxicological Research has been awarded certifications under various quality management systems. The procedures and contracts to ensure availability and reliability may be included in the emergency preparedness Quality Management System.

3.15.2. Good Practice

Utilizing an international conference to organize exercises, and using the available international experience to conduct and assess the exercises, are considered good practices. Without experience in conducting radiation emergency exercises, the MOI Division for Emergencies and Civil Protection has decided to organize a radiation emergency exercise in a series also involving forest fire and a traffic accident. This series of exercises will take place on the margins of the international conference in June 2009 on the Montenegrin coast.

3.15.3. Recommendations

Interim

1. All emergency response organizations should begin developing procedures for radiological emergency response based on the NREP. The importance of preparing and adopting the NREP as soon as possible is described in Chapter 2.1, "Introduction."

2. In addition to the NREP preparation, a thorough analysis should be performed to determine whether the available resources meet the needs of emergency response, including scenarios anticipated by the threat assessment.

3. In addition to the identification of roles and responsibilities for various organizations during an emergency, facilities or premises to be used by these organizations during emergency response should also be identified.

4. A coordinated approach in writing should be developed for manpower buildup and training in all organizations involved in radiological emergency response in order to cope with any future radiation emergency situations. Within this plan, maintaining the competence of first responder organizations should be addressed, including a training programme for first responders. The MOI Division for Emergencies and Civil Protection should develop and implement this training programme to provide first responders with the knowledge and skills to address any emergency involving the hazard of ionizing radiation.

5. The emergency response capability should be tested in an exercise with a suitable scenario. The exercise should be thoroughly analyzed, and lessons learned should be integrated to improve the emergency response capability.

6. Establishing and maintaining the required quality of radiation monitoring instrumentation should be an ongoing task.

7. To ensure the participation of various organizations (both private and public) in emergency preparedness and response, and to ensure availability and reliability of resources, contractual obligation is a preferred method to achieve this goal.

Long Term

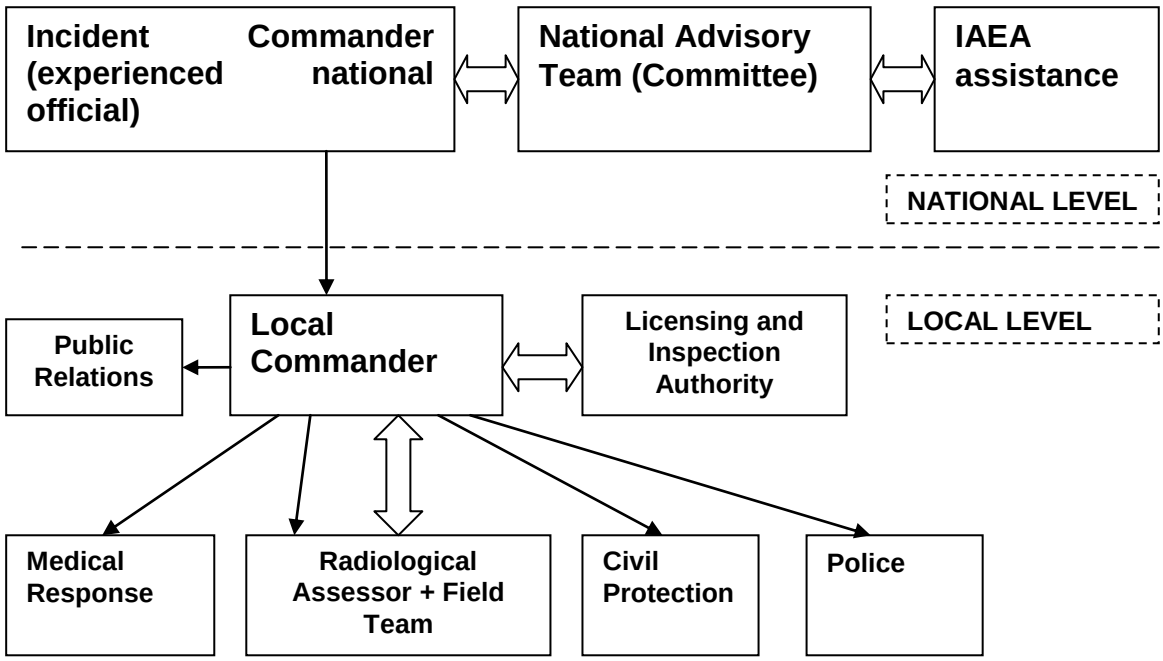
8. Regional cooperation in emergency response should be enhanced further, and may be formalized via bilateral agreements between countries.

9. A Quality Management System should be established for radiation emergency response (e.g,, all emergency response organisations should be awarded quality standard certificates).

10. A long-term radiation emergency exercise programme should be adopted and implemented.

11. The issues of training for nuclear and radiological emergencies should be addressed in a strategic manner. Therefore, a long-term training programme should be adopted and implemented. To facilitate this effort, the IAEA's long-term (regional) training programme may be taken into consideration.

APPENDIX I – ASSUMED ORGANIZATION OF NATIONAL LEVEL RESPONSE TO A RADIATION EMERGENCY



Single-direction arrows denote the direction of subordination. Two-direction arrows denote the exchange of information in both directions.

Important note: This scheme has been depicted taking into account the team's understanding of response to a radiation emergency in Montenegro. It is not based on an existing national emergency plan, since these documents did not exist when the mission team visited. This scheme is also provided without prejudice to any actual scheme the Montenegrin authorities may adopt or consider in the future. The team's main goal was to represent the main stakeholders in emergency response as follows. After the Local Commander, they are listed in alphabetical order:

- Local Commander
- Centre for Ecotoxicological Research
- Environmental Protection Agency
- Health Authorities
- Ministry of Interior

These should be the key players during a radiological emergency involving a local area. Only in extreme cases of widespread emergency should the national level be activated. In this case, the key players should also include:

- the Incident Commander, who may be supported by a national advisory team including high ranked officials responsible for a specific area of public administration (e.g., health, criminal investigations, social affairs, meteorology, the environment). Only in extreme situations should the highest national level be active.

- the National Crisis Team (Committee), which provides advice to the national commander, as well as support from their respective institutions. This body includes representatives of the ministries responsible for the interior, transportation, agriculture, foreign affairs, environment, defence, etc., as well as other institutions such as Red Cross, the meteorological office, and so on.

APPENDIX II — MISSION TEAM COMPOSITION

Peter Zombori	Team Leader, IAEA
Igor Grlicarev	Slovenian Nuclear Safety Administration, Slovenia
Karol Janko	Slovak Nuclear Regulatory Authority, Slovakia

APPENDIX III: List of Participants at the IAEA EPREV Mission Briefing

Date: Monday, 24 November 2008
Place: Agency for International Scientific, Educational, Cultural and Technical Cooperation, Njegoševa 2, Podgorica

No.	Name	Position, Activity
1.	Mr. Derviš Selhanović	Director, Agency for International Scientific, Educational, Cultural and Technical Cooperation
2.	Mrs. Smilja Kažić Vujačić	Senior Adviser, Agency for International Scientific, Educational, Cultural and Technical Cooperation
3.	Mr. Zoran Begović	Assistant Minister, Ministry of Interior and Public Administration
5.	Mr. Milorad Kustudić	Advisor, Ministry of Health, Labour and Social Welfare
6.	Mrs. Milena Frana	Lawyer, Ministry of Health, Labour and Social Welfare
7.	Mrs. Sonja Ivanović	Chief of Dept., Clinical Centre of Montenegro
8.	Mrs. Tamara Djurović	Advisor for Radiation Protection, Ministry for Tourism and Environmental Protection
9.	Mrs. Daliborka Pejović	Director, Environmental Protection Agency
10.	Mrs. Mara Scepanović	University of Montenegro, Faculty of Natural Sciences and Mathematics
11.	Mr. Tomislav Andjelić	Center for Ecotoxicological Research
12.	Mr. Dražen Vuković	Head of Border Police Dept., Police Administration-Sector for Borders
13.	Peter Zombori	EPREV Team Leader, IAEA
14.	Karol Janko	Team Member, Slovak Regulatory Authority
15.	Igor Grlicarev	Team Member, Slovenian Nuclear Safety Administration

APPENDIX IV — ASSESSMENT SHEET FOR MONTENEGRO

The following table provides the key to the performance indicators (PI) that may be used in the assessment check list.

Table 1. Performance indicators for the assessment sheet

PI Grade	Definition
3	**Appraisal criterion is fully met.**
2	**Appraisal criterion is partially met – and an action plan is implemented to fully meet the criterion within a defined time scale.**
1	**Appraisal criterion is not met – and actions are under way to make improvements, but these will not achieve full compliance with the criterion.**
0	**Appraisal criterion is not met - and no significant efforts are being made to improve the situation.**

The task numbers in the table below describe the macro-processes to achieve an interim basic response capability.

Table 2. Assessment check list

Task No.	Brief description	Possible IAEA Input			Self-assessed status	
		Doc[1]	WS[2]	Other[3]	PI	Comments
1	**Responsibilities, threat assessment, and coordination**					
	Identify a national coordinating authority				**3**	**The Ministry of Interior and Public Administration-Sector for Emergencies and Civil Protection is identified as the coordinating authority regarding emergencies. Close cooperation with EPA is foreseen.**

1 Documents: TECDOC, Safety Standards, etc.
2 Workshops and training.
3 Expert mission, scientific visit, equipment, etc.

Task No.	Brief description	Possible IAEA Input			Self-assessed status	
		Doc[1]	WS[2]	Other[3]	PI	Comments
	Clearly assign functions and responsibilities	●			**1**	**According to the proposed new Law on Radiation Protection, the lead agency would remain MOI, with the professional competence to be provided by EPA. The technical support (radiological assessment) is to be provided by the Centre for Ecotoxicological Research, the University of Montenegro and Hydromet. Stakeholders: MOI, EPA, CETR, University of Montenegro, MOH, Ministry of Agriculture, Ministry of Foreign Affairs, Ministry of Defence.**
	Establish a regulatory and inspection system	●			**1**	**In the proposed new Law on Radiation Protection, this is an explicitl requirement. The opinion of MIPA on emergency preparedness issues is also requested. A quick change of PI is expected.**
	Perform a national threat assessment		●	●	**0**	**There is a registry of radiation sources, but it is not complete. There are not any Cat. I and II facilities, & it is unknown (but unlikely) whether Cat III sources exist. The country is typically Cat IV, with some medical, industrial sources, contamination from abroad, etc.**
	Make arrangements to coordinate the emergency response of all off-site response organizations with the on-site response, to include a command and control system for the local and national response to any nuclear or radiological emergency					**Not applicable.**
2	**Identification, notification, activation**					
	24/7 notification points established				**2-3**	**MOI is implementing telephone number 112. This is a single telephone number to report to all emergencies, which will meet international standards. Probably fully operational in second quarter of 2009.**

Task No.	Brief description	Possible IAEA Input			Self-assessed status	
		Doc[1]	WS[2]	Other[3]	PI	Comments
	Inform scrap metal processing and border crossings	●	●		**2-3**	**The regulatory authority (EPA) together with the Centre of Ecotoxicological Reasearch, the Institute of Metallurgy and the Police Headquarters, performs regular inspection of scrap metal dealers. All import and export shipment of scrap metal is checked. There is a list of goods (e.g. metals) to be checked when entering the country. This is performed by the Centre of Ecotoxicological Reasearch. For food imports, the Ministry of Health and the Ministry of Agriculture order contamination checkups.**
	First responders' awareness	●	●		**1**	**Training at Police Academy: search for sources. Some basic training exists. But the outreach campaign and training should be performed in a systematic manner for all first responders (e.g., medical sector, fire fighters, police).**
	Classification system for category I and II					**Not applicable.**
	Appropriate response for emergency class category I, II or III					**Not applicable.**
	Sufficient personnel available to perform initial response actions		●		**2**	**Considering the low radiation emergency risk profile of Montenegro, sufficient personnel exist to cope with emergencies. Training and emergency plans should be put in place.**
	IAEA informed of the state's Contact Point	●			**1**	**The form for Contact Point should be properly completed and sent to the IAEA as soon as possible.**
3	**Taking initial actions**					
	On-call advice and team to assist first responders		●		**2-3**	**Centre for Ecotoxicological Research (CETR) will be contacted in all such cases, and will provide appropriate assistance to local authorities. In the National Radiological Emergency Response plan it should be determined how CETR is activated.**
	Instruction to operators of threat category IV practices (14)	●			**2-3**	**The draft Law on Radiation Protection requires that the licensee's has the emergency plan which covers this issue.**
	Search and public warning if a dangerous source is lost or stolen (15)		●		**1**	**A procedure for search of a lost source needs to be written.**

Task No.	Brief description	Possible IAEA Input				Self-assessed status
		Doc[1]	WS[2]	Other[3]	PI	Comments
	Mitigatory action in threat category I, II or III (16)					**Not applicable - Impact assessment will be performed in case of a future installation (e.g. radioactive waste storage aassessment of potential consequences).**
	Intervention levels for urgent protective action (17)	●			**0**	**These intervention levels have not been adopted yet.**
	Effective implementation of urgent protective action for category I or II (18)					**Not applicable. There are no cat. I and II facilities in country.**
	Safety of those on-site at category I, II or III (19)					**Currently no such facilities exist. In the future, there may be radioactive waste storage.**
	Protection for emergency workers and response personnel		●		**1**	**The authorities should be aware of the issue of protecting emergency workers. So far, this issue has not been adequately addressed.**
	OILs for radiological emergencies		●		**0**	**To be included in the draft NREP.**
	Assessment of on-site (EALs) and off-site emergency conditions (OILs) for category I or II		●		**0**	**To be included in the draft NREP.**
4	**Public warnings and information**					
	Prompt warning/instruction to the public for category I or II					**Not applicable.**
	Useful and consistent information to the public and media	●	●		**0-1**	**Has not been addressed yet.**
	Responding to public concern		●	●	**0-1**	**Has not been addressed yet.**
5	**Medical**					
	Medical practitioner awareness	●			**1**	**The level of awareness of general practitioners should be increased.**
	National capability for initial treatment of radiation injuries			●	**1**	**There are some limited capabilities to treat radiation injuries. Arrangements should be made to provide specialized treatment in institutions abroad.**
	Consultation with experienced practitioners	●			**1**	**To be performed and included in the outreach campaign.**
6	**Agriculture**					

Task No.	Brief description	Possible IAEA Input			Self-assessed status	
		Doc[1]	WS[2]	Other[3]	PI	Comments
	Intervention/action levels for agricultural countermeasures	●			**0**	**To be included in the future NREP.**
	Taking agricultural countermeasures for category V	●	●		**0**	**To be included in the future NREP.**
7	**Infrastructure**					
	Emergency plans for 1) on- and off-site response at category I, II and III; and 2) the national response for all categories	●	●	●	**0**	**The national radiological emergency response plan needs to be written.**
	Response procedures for: 1) On- and off-site response at category I, II and III 2) National response 3) First responders' response to radiological emergencies		●	●	**1**	**1) Not applicable;** **2) MoI;** **3) MoI and CETI**
	Supplies, equipment, and documentation	●	●	●	**2**	**The equipment is satisfactory but documentation needs to be written.**
	Emergency facilities for category I and II					**Not applicable.**
	Training of responders		●	●	**2**	**This should be performed more systematically, and focused on actual response system and equipment. Non-existence of the NREP is a serious obstacle to developing a training programme.**
	Conduct: 1) National table-top level exercises 2) Exercise for threat category I, II or III 3) Drill for first responders		●	●	**1**	**To be implemented in accordance with the exercise plan after it is developed.**
	Inventories, resupply, tests, and calibrations of supplies and equipment, and updates to plans and procedures		●	●	**1**	**Procedures for processes, quality management system, regular checks and calibration of instruments are still to be written.**

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GLOSSARY

arrangements (for emergency response): The integrated set of infrastructure elements necessary to provide the capability for performing a specified function or task required in response to a nuclear or radiological emergency. These elements may include authorities and responsibilities, organization, coordination, personnel, plans, procedures, facilities, equipment, or training.

dangerous source: A source that could, if not under control, give rise to exposure sufficient to cause severe deterministic health effects. This categorization is used for determining the need for emergency response arrangements and is not to be confused with categorizations of sources for other purposes.

deterministic effect: A health effect of radiation for which generally a threshold level of dose exists, above which the severity of the effect is greater for a higher dose. Such an effect is described as a 'severe deterministic effect' if it is fatal or life threatening, or results in a permanent injury that reduces quality of life.

emergency: A non-routine situation or event that necessitates prompt action, primarily to mitigate a hazard or adverse consequences for human health and safety, quality of life, property or the environment. This includes nuclear or radiological emergencies and conventional emergencies such as fires, release of hazardous chemicals, storms, or earthquakes. It includes situations for which prompt action is warranted to mitigate the effects of a perceived hazard.

emergency action level (EAL): A specific, predetermined, observable criterion used to detect, recognize and determine the emergency class.

emergency class: A set of conditions that warrant a similar immediate emergency response. The term used for communicating to the response organizations and the public the level of response needed. The events that belong to a given emergency class are defined by criteria specific to the installation, source or practice which, if exceeded, indicate classification at the prescribed level. For each emergency class, the initial actions of the response organizations are predefined.

emergency classification: The process whereby an authorized official classifies an emergency in order to declare the applicable level of emergency class. Upon declaration of the emergency class, the response organizations initiate the predefined response actions for that emergency class.

emergency plan: A description of the objectives, policy, and concept of operations for the response to an emergency and the structure, authorities and responsibilities for a systematic, coordinated, and effective response. The emergency plan serves as the basis for the development of other plans, procedures, and checklists**.**

(emergency) preparedness: The capability to take action that will effectively mitigate the consequences of an emergency for human health, safety, quality of life, property, and the environment.

emergency procedures: A set of instructions describing in detail actions to be taken by response personnel in an emergency.

(emergency) response: The performance of actions to mitigate the consequences of an emergency on human health and safety, quality of life, property, and the environment. It may also provide a basis for the resumption of normal social and economic activity.

emergency services: The local off-site response organizations that are generally available and that perform emergency response functions. These may include police, fire and rescue brigades, ambulance services, and control teams for hazardous materials.

emergency worker: A worker who may be exposed in excess of occupational dose limits while performing actions to mitigate the consequences of an emergency for human health and safety, quality of life, property, and the environment.

emergency zones: The precautionary action zone and/or the urgent protective action planning zone.

exposure: The act or condition of being subject to irradiation. Exposure can be either external exposure (irradiation by sources outside the body) or internal exposure (due to a source within the body).

first responders: The first members of an emergency service to respond at the scene of an emergency.

generic intervention level: The level of avertable dose at which a specific protective action is taken in an emergency or situation of chronic exposure.

generic action level: The concentration (Bq/g) of specific isotopes in food or water at which consumption should be restricted if replacement food or water is available.

initial phase: The period of time from the detection of conditions warranting the implementation of response actions that must be taken promptly in order to be effective until those actions have been completed. These actions included taking mitigatory actions by the operator and urgent protective actions on and off the site.

intervention: Any action intended to reduce or avert exposure or the likelihood of exposure to sources which are not part of a controlled practice or which are out of control as a consequence of an accident.

intervention level: The level of avertable dose at which a specific protective action is taken in an emergency or situation of chronic exposure.

longer-term protective action: A protective action which is not an urgent protective action. Such protective actions are likely to be prolonged over weeks, months, or years. These include measures such as relocation, agricultural countermeasures, and remedial actions.

non-radiological consequences: Effects on humans or the environment that are not deterministic or stochastic effects. These include effects on health or the quality of life resulting from psychological, social, or economic consequences of the emergency or the response to the emergency.

notification:

1. A report submitted to a national or international authority providing details of an emergency or potential emergency, for example as required by the Convention on Early Notification Convention of a Nuclear Accident
2. A set of actions taken upon detection of emergency conditions, with the purpose of alerting all organizations with responsibility for taking emergency response actions in the event of such conditions

notification point: A designated organization with which arrangements have been made to receive notification (meaning 2 in this glossary) and to initiate promptly the predetermined actions to activate a part of the emergency response.

nuclear or radiological emergency: An emergency in which there is, or is perceived to be a hazard due to:

- The energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or
- Radiation exposure.

off-site: Outside the site area.

on-site: Within the site area.

operational intervention level (OIL): A calculated level, measured by instruments or determined by laboratory analysis, that corresponds to an intervention level or action level. OILs are typically expressed in terms of dose rates or activity of radioactive material released, time-integrated air concentrations, ground or surface concentrations, or activity concentrations of radionuclides in environmental, food, or water samples. An OIL is a type of action level that is used immediately and directly (without further assessment) to determine the appropriate protective actions on the basis of an environmental measurement.

operator (or operating organization): Any organization or person applying for authorization or authorized and/or responsible for nuclear, radiation, radioactive waste, or transport safety when undertaking activities or in relation to any nuclear facilities or sources of ionizing radiation. This includes private individuals, governmental bodies, consignors or carriers, licensees, hospitals, and self-employed persons. This also includes those who are either directly in control of a facility or an activity during use (such as radiographers or carriers) or, in the case of a source not under control (such as a lost or illicitly removed source or a re-entering satellite), those who were responsible for the source before control over it was lost.

practice: Any human activity that introduces additional sources of exposure or exposure pathways or extends exposure to additional people, or modifies the network of exposure pathways from existing sources, so as to increase the exposure or the likelihood of exposure of people or the number of people exposed.

precautionary action zone: An area around a facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to reduce the risk of server deterministic health effects off the site. Protective actions within this area are to be taken before or shortly after a release of radioactive material or exposure on the basis of the prevailing conditions at the facility (EALs).

protective action: An intervention intended to avoid or reduce doses to members of the public in emergencies or situations of chronic exposure.

radiation emergency: A nuclear or radiological emergency.

radiological emergency: An emergency involving an actual or perceived risk from activities that could give rise to a nuclear or radiological emergency at an unforeseeable location. These include non-authorized activities, such as activities relating to dangerous sources obtained illicitly. They also include transport and authorized activities involving dangerous mobile sources such as industrial radiography sources, radio thermal generators, or nuclear powered satellites.

radiological dispersal device (RDD): A device constructed by terrorists to spread radioactive materials using conventional explosives or other means.

regulatory body: An authority or a system of authorities designated by the government of a state as having legal authority for conducting the regulatory process, including issuing

authorizations, and thereby regulating nuclear, radiation, radioactive waste and transport safety.

response organization: An organization designated or otherwise recognized by a state as being responsible for managing or implementing any aspect of a response.

significant transboundary release: A release of radioactive material to the environment that may result in doses or levels of contamination beyond national borders from the release which exceed international intervention levels or action levels for protective actions, including food restrictions and restrictions on commerce.

site area: A geographical area that contains an authorized facility, activity or source, within which the management of the authorized facility or activity may directly initiate emergency actions. This is typically the area within the security perimeter fence or other designated property marker. It may also be the controlled area around a radiography source or a cordoned off area established by first responders around a suspected hazard.

source: Anything that may cause radiation exposure (such as by emitting ionizing radiation or by releasing radioactive substances or materials) and can be treated as a single entity for protection and safety purposes. For example, materials emitting radon are sources in the environment, a sterilization gamma irradiation unit is a source for the practice of radiation preservation of food, an X-ray unit may be a source for the practice of radio diagnosis. A nuclear power plant is part of the practice of generating electricity by nuclear fission, and may be regarded as a source (e.g., with respect to discharges to the environment) or as a collection of sources (e.g., for occupational radiation protection purposes). A complex or multiple installations situated at one location or site may, as appropriate, be considered a single source for the purposes of application of international safety standards.

stochastic effect (of radiation): A radiation induced health effect, the probability of occurrence of which is greater for a higher radiation dose and the severity of which (if it occurs) is independent of dose. Stochastic effects may be somatic effects or hereditary effects, and generally occur without a threshold level of dose. Examples include thyroid cancer and leukemia.

threat assessment: The process of analyzing systematically the hazards associated with facilities, activities, or sources within or beyond the borders of a state in order to identify:

1. Those events and the associated areas for which protective actions and emergency countermeasures may be required within the state, and
2. The actions that would be effective in mitigating the consequences of such events.

transnational emergency: A nuclear or radiological emergency of actual, potential or perceived radiological significance for more than one state. This includes:

1. A significant transboundary release of radioactive material. (However, a transnational emergency dose not necessarily imply a significant transboundary release or radioactive material.)
2. A general emergency at a facility or other event that could result in a significant transboundary release (atmospheric or aquatic) of radioactive material
3. A discovery of the loss or illicit removal of a dangerous source that has been transported across or is suspected of having been transported across a national border
4. An emergency resulting in significant disruption to international trade or travel
5. An emergency warranting the taking of protective actions for foreign nationals or embassies in the state in which it occurs

6. An emergency resulting in or potentially resulting in severe deterministic health effects and involving a fault and/or problem (such as in equipment or software) that could have implications for safety internationally
7. An emergency resulting in or potentially resulting in great concern among the population of more than one state owing to the actual or perceived radiological hazard

urgent protective action: A protective action that, in the event of an emergency, must be taken promptly (normally within hours) in order to be effective, and the effectiveness of which will be markedly reduced if it is delayed. The most commonly considered urgent protective actions in a nuclear or radiological emergency are evacuation, decontamination of individuals, sheltering, respiratory protection, iodine prophylaxis, and restriction of the consumption of potentially contaminated foodstuffs.

urgent protective action planning zone: An area around a facility for which arrangements have been made to take urgent protective actions in the event of a nuclear or radiological emergency to avert doses off the site in accordance with international standards. Protective actions within this area are to be taken on the basis of environmental monitoring or, as appropriate, prevailing conditions at the facility.

ACRONYMS

AISECTC	Agency for International Scientific, Educational, Cultural and Technical Cooperation
CETR	Centre for Ecotoxicological Research
EAL	emergency action level
EPA	Environmental Protection Agency
EP	emergency planning
EPREV	emergency preparedness review
GC	IAEA General Conference
IAEA	International Atomic Energy Agency
MOH	Ministry of Health
MOI	Ministry of Interior and Public Administration
NREP	National Radiological Emergency (Response) Plan
OIL	operational intervention level
PI	performance indicator
P&R	protection and rescue
RDD	radiological dispersal device
TLD	thermoluminescent dosimeter/dosimetry
UN	United Nations
WHO	World Health Organization

ANNEX — EPREV PROCESS

Type III EPREV

Type III EPREVs are intended for facilities with no significant off-site risk, but with the potential for emergencies resulting in deterministic health effects on-site. In the scope of this type, activities related to threat category IV and V are reviewed. In brief, this type of EPREV comprises all threat categories except threat category I and II. In some countries, there are no facilities of threat category III. Therefore, the EPREV will review only preparedness related to threat category IV and V. In some exceptional cases, the facilities of threat category I are located many thousands of kilometers from the border. Therefore, almost no planning is warranted except for citizens abroad, staying or traveling to the territory of the threat category I facility, and for import of food and goods.

Some Remarks Regarding the EPREV Classification

In the facilities of threat category III, urgent off-site countermeasures are not anticipated, and there are no protection planning zones off-site. Thus, the EPREV may focus on:

- detection and mitigation of the consequences of an emergency
- decision-making, implementation and managing actions and operations to protect the employees and persons at the site, including those off-site emergency response services that could be called to respond to an emergency on-site
- notification of the off-site authorities and provision of support for the off-site impact assessment and protective action decision-making

Threat category IV addresses preparedness for events such as transportation emergencies, lost or stolen sources, and local contamination events. The resources required for responding to such events generally come from national organizations with little or limited radiation protection training (e.g., police forces, traffic control forces, fire fighters, medical staff, etc.). Threat category events can happen almost anywhere in the country. The main challenges associated with the threat category IV event are:

- the large number of organizations that may need to be consulted
- the range of different organizations at the local, regional and national levels that must covered by the review, and
- the geographic distribution of the organizations visited

It may be possible to optimize the process through representative sampling. For example, to assess the state of preparedness of police forces to respond to a transport emergency involving radioactive sources, the review may first look at the national training courses for police staff and examine any generic procedures, if they exist. The review may then assess selected police departments, possibly in higher-risk zones.

Reviewing threat category V, the national capabilities should be assessed, including how the state can manage the implementation of longer-term protective actions (e.g., food monitoring). The review will tend to focus on national organizations and the national network.