

EPREV REPORT

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

RESTRICTED DISTRIBUTION



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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 the protection of health against exposure to ionizing radiation, and of providing for the application of these standards. In addition, under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the ‘Assistance Convention’) [1] the IAEA has a function, if requested, to assist a State Party or a Member States in preparing both emergency plans in the case of nuclear accidents and radiological emergencies and appropriate legislation.

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

Estonia is a state in the Baltic region of Northern Europe with a population of 1.34 million. It is bordered to the north by the Gulf of Finland, to the west by the Baltic Sea, to the south by Latvia (343 km), and to the east by the Lake Peipsi and the Russian Federation (338.6 km). Across the Baltic Sea lies Sweden in the west and Finland in the north. The territory of Estonia covers 45,227 km².

Estonia is a Member State of the IAEA since 1992. The Estonian public adheres to the peaceful use of atomic energy and the Estonian Authorities allocate due attention to issues of radiation safety and protection. With respect to this, in 2008 the Ministry of Environment issued, after consultations with all other responsible authorities, the “*National Radiation Safety Development Plan 2008 – 2017*” (NRSDP), which is a ten year programme for developing and enhancing radiation safety in Estonia. The NRSDP has been elaborated based on the “*Radiation Act*” provisions and taking into account all the relevant regulations in the field. The NRSDP includes an analysis of the existing situation in the country, specifies priorities for radiation safety improvement until the year 2017 and establishes the relevant actions that have to be implemented for the achievement of the envisaged objectives.

In 2009, the Estonian parliament approved the “*National Development Plan of the Energy Sector until 2020*”, which gives a green light in principle for (peaceful) use of nuclear energy in Estonia. The Plan includes specific provisions for specialized training and relevant legislation elaboration (by 2012), as very important steps for developing in the future nuclear industry in Estonia¹.

¹ For more information please see the Eesti Energia website: <https://www.energia.ee/et/home/start>

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1. INTRODUCTION

1.1. Background

The obligations, responsibilities, and requirements of preparedness and response to nuclear and radiological emergencies are defined in the Safety Standards, and in particular the 2002 requirements publication titled: Preparedness and Response for a Nuclear or Radiological Emergency (Safety Requirements No GS-R-2) [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 Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency (EPR-METHOD) [3] 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 the IAEA requirements [2].

The Authority of Estonia 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 the capabilities of Estonia to respond to radiological incidents and emergencies, regardless of the cause;
- to assess the condition in which Estonia resides with regard to international standards for emergency preparedness and response;
- to assist Estonian Authorities in the development of national legislation and interim arrangements to promptly respond to a radiological emergency. This will include suggested steps that can be taken immediately to better use existing capabilities;
- to assist Estonian Authorities in providing a basis upon which they can develop a longer term programme to enhance the Estonian ability to respond to radiological emergency situations.

1.2. Scope

The review focused on the ability of the relevant Estonian organizations to respond to a radiological incident or emergency, and was based on an assessment of existing response provisions and capabilities. The scope of the mission including emergency arrangements on-site, local and national levels was:

- (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.

Not all the items above were covered completely; items (c), (d) and (f) were covered only partially.

The mission followed the basic concepts set out in the EPREV Guidelines, to review all aspects of the Member State’s arrangements to respond to a nuclear or radiological emergency. The review was based on the

international requirements in GS-R-2 [2] and supporting IAEA guidance contained in the EPR-METHOD [3] and other guidance documents [4, 5]. The team members provided recommendations/suggestions based on their experience and good international practices. In order to focus efforts and to provide insights that were of immediate practical value, the mission concentrated on: a) the ability to respond to a radiological incidents and emergency (Threat Category IV) that occurs in a specific jurisdiction; b) the ability to respond to emergencies at specific facilities in Threat Category III; and c) the national capability to respond to emergencies characterized by Threat Category V.

The mission was composed of four members, covering the following areas during the EPREV mission:

(a) Review of the national emergency preparedness and response capabilities: This activity reviewed the response of national level organizations that initiate national response or support local response and the ability of facilities in Threat Category III, IV and V.

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

The collected data and analysis contained in this report relies on materials presented by the host country, interviews with representatives of key response organizations, and on personal impressions obtained during the visits to different sites and institutions.

1.3. Process

The general schedule for the mission is shown in Appendix I. The major organizations with which the mission team interacted were:

- Organizations, subordinated to the Rescue Board (RB) under the auspices of the Ministry of the Interior (MI):
 - Crisis Management Department
 - Rescue Works Department
 - Explosive Ordnance Disposal Centre
 - Emergency Centre
 - North-Estonian Rescue Centre
 - Police and Border Guard Board
- Organizations, subordinated to the Ministry of Environment (ME):
 - Environmental Board (EB)
 - Department of Radiation Safety of the EB
 - Environmental Inspectorate (EI)
- Organizations, subordinated to the Ministry of Social Affairs:
 - Health Board (HB)
- Estonian Tax and Customs Board
- Veterinary and Food Board (VFB)
- Radioactive waste management organization, AS ALARA
- Scandinavian Clinics, Industrial irradiation plant
- North Estonia Medical Centre

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

1.4 Inputs and guidance for the assessment

The EPREV mission was conducted in accordance with the Terms of Reference (ToR), developed before the EPREV mission took place.

An important input for the assessment of the Estonian radiation emergency preparedness and response capabilities was provided by the self-assessment sheets based on the self-assessment given by the Department of Radiation Safety in combination with data taken from the IAEA archives (country status reports at the IAEA meetings and WS, Estonian country profile, etc.). The assessment sheets presented in Appendix III were amended by the EPREV team based on the information gathered during the EPREV mission.

2. SUMMARY OF FINDINGS

2.1. Introduction

The major conclusion made by the EPREV team after reviewing the presented materials, interviews during the mission and further gaining insight in the national EPR infrastructure is that Estonia has established an operational emergency preparedness and response capability based on an integrated all hazard approach including radiological emergencies.

During the mission, the EPREV team recognized a high level of knowledge and dedication of the counterparts and their commitment to improve further and to harmonize their capabilities with the international standards (GS-R-2) was appreciated.

Considering the IAEA recommendation, particularly the Requirements on Preparedness and Response for a Nuclear or Radiological Emergency (GS-R-2) [2] and the relevant IAEA guidance (e.g. EPR-METHOD) [3], further development in Estonia should focus on the following major tasks:

- To foster the use in national regulations of five threat categories given in Table 1 of GS-R-2 requirements in order to implement an internationally accepted graded approach to establishing and maintaining adequate arrangements for preparedness and response to nuclear and radiological emergencies. Accordingly, a comprehensive reassessment of threats needs to be performed. It should take into account all types of emergencies within Estonian territory and beyond its borders. In a longer term perspective, a summary description of a complex assessment of threats shall create a base for the review and further development of the National Radiological Emergency Plan.
- The potential impact of a trans-boundary nuclear accident should be carefully analyzed and possible consequences of such severe accidents should be reflected in the planning, including the preparedness to implement necessary protective measures. This assessment could be initiated in the frame of bilateral agreements with neighboring countries operating nuclear power plants.
- Further efforts to develop the national radiation emergency plan consistent with the IAEA requirements and approach should be carried out. To meet this goal, findings from the current Report should be taken into account.

The mission team formulated recommendations based on its findings. The recommendations need to be addressed in order to reach better compliance with the IAEA requirements [2]. These are therefore stated as actions that shall be implemented, with the corresponding paragraphs in the IAEA requirements [2] shown in parenthesis. In section 2.2 below the summary recommendations are given. The detailed findings and description of the current situation are in Chapter 3, which provides more background to the proposed actions.

2.2. Summary recommendations

2.2.1 The ME (EB) as a regulatory authority on radiation protection and the MI (RB), as a coordinating authority on emergency situations shall make all reasonable efforts to promote the updating of the existing radiation related legislation with due account to the requirements of international standards (GS-R-2) [2] and Safety Guides (GSG-2)[10].

2.2.2 The structure and scope of the existing Radiation Emergency Plan (nREP) should be reviewed and supplemented with additional sections (e.g. planning basis, emergency preparedness process, logistics), which gives a complex framework for the emergency preparedness and response activities. The revised nREP should clearly specify the requirements on lower level planning (paragraph 7 of the Emergency Act). All emergency response organizations, identified in the nREP, should develop or review their plans and procedures harmonized with their tasks, which should then be included into the nREP. The methodology for doing so is described thoroughly in EPR-METHOD-2003 [3]. Consideration of guidance provided in other IAEA publications is also recommended [4-10].

2.2.3 During the planning phase further development in the area of coordinating response to transboundary nuclear accidents should be considered and incorporated into the nREP. Thyroid blocking should be considered as a potential protective action for the special critical group of children in case of significant I-131 accidental emission at a nuclear installation close to the Estonian borders. The crisis management committees at all levels should ensure that arrangements for local and national organizations involved in preparedness and response to such accidents are in place ([2]:para.4.9 -4.10; 5.25, 5.13).

2.2.4 The EB, in cooperation with the RB, should check and ensure that regional, local government and facility plans will foresee notification of the endangered population during certain radiation emergencies at facilities/practices in Threat Categories III and IV (e.g. a large transport accident, a fire involving a source, or large scale contamination). These written procedures should become a part of the future revised nREP ([2]: para. 5.21).

2.2.5 Additional default Operational Intervention levels (OILs) should be established as triggers for implementing protective actions for the population in case of radiological emergencies, according to the latest international guidance GSG-2 ([2]:para.4.46).

2.2.6 The command chain of the healthcare system, main roles and responsibilities of different stakeholders (the HB, hospitals) subordinated to the Ministry of Social Affairs need to be specified by legislation and reflected in the revised nREP accordingly ([2]:para.4.77 – 4.81).

2.2.7 The revised nREP should have attachments with arrangements and procedures for agricultural countermeasures in areas with threat category V. These procedures may include rules for restriction of the consumption, distribution, and trade of imported or locally produced foods following radioactive contamination of agricultural areas (e.g. due to a fire involving radioactive material, Radiological Dispersal Device (RDD), or an accident at a nuclear facility abroad).([2]:para.4.88 -4.91).

2.2.8 The radiation monitoring capabilities in Estonia (the Early Warning System, mobile laboratories and reference laboratories) should be reviewed and arrangements should be made to ensure a sufficient level of readiness in case of a possible large scale radioactive contamination (e.g. in case of possible significant radioactive material emission at one of the nuclear installations of the neighboring countries ([2]:para.5.28, 4.71).

2.2.9 The EB should issue a regulation which specifies the requirements for the radiation monitoring system and the training of workers at scrap metal facilities, including reporting anomalies to the Information and Analysis Department of the MI. The compliance with the regulation requirements must be an obligatory precondition of issuing a license for scrap metal practice ([2]:para.1.7 and 4.33).

2.2.10 The EB should take measures to establish the appropriate formal procedure for recordkeeping and dose control of all workers engaged in response to a radiological emergency, covering all local responders and on-site emergency workers, who may be beyond a routine individual monitoring program. This should include issuing guidance on how to manage, control and record doses of exposures during various types of response activities. Default operational dose levels for emergency workers should be established in quantities that can be directly monitored and that take into account all exposure pathways (i.e. external radiation, inhalation, and ingestion) ([2]: para.4.62).

2.2.11 The RB should ensure that the training syllabus for emergency workers is reviewed and amended to explain clearly the effects and risks of radiation exposure, and the meanings of radiation signs and placards ([2]:paras.4.18, 5.33)

2.2.12 The HB, in cooperation with the EB, is recommended to request the IAEA assistance in organizing training of national specialists regarding medical response to radiological emergencies, early diagnosis and initial treatment of radiation injuries ([2]:para.4.77, 5.31).

2.2.13 The testing of public information arrangements during an exercise or a specific drill is highly recommended, and real journalists could be invited to participate. It is also recommended to assess experiences in communicating with the public during past emergencies, and to apply the lessons learned to the radiation emergency response ([2]:para.5.33).

2.2.14 The guidance on establishment and maintenance of a quality assurance program should be developed and integrated in the national radiological emergency plan, in accordance with GS-R-2. The programme will ensure a high degree of availability of all supplies and equipment necessary to perform an effective response. The maintenance of the existing resource catalogue could be an integral part of this program ([2]:para.5.37-5.39).

DETAILED FINDINGS

3.1 INTRODUCTION

The EPREV mission team's detailed evaluation of the emergency preparedness and response system in Estonia is based on information provided by Estonian Governmental officials, facility managers and experts, as well as the representatives whom the mission team interviewed (see Appendix IV).

Where appropriate, the mission team listed interim recommendations to indicate preliminary actions that should be started immediately, using existing capabilities to strengthen emergency preparedness and response system in Estonia. Following these, long term findings are listed pertaining to actions, that the mission team felt to be implemented within one to three years to provide a solid foundation for an emergency preparedness and response programme consistent with IAEA requirements [2] and guidelines [3].

3.2. BASIC RESPONSIBILITIES

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

- Establish or identify an existing governmental body or organization to act as a national coordinating authority.
- Clearly assign the functions and responsibilities of users and response organizations, and ensure they are understood by all response organizations.
- Establish 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

The emergency preparedness and response system in Estonia has been in the process of reorganization since 2009. The Emergency Act provides legal basis for the crisis management system covering preparedness for and response to emergencies in the country and designates the Ministry of the Interior (MI) to act as a national coordination authority, whose function, among others, is to coordinate the arrangements for preparedness and response to radiological emergencies.

The Act empowers the MI *inter alia* to:

1. coordinate the work of crisis management committees (para 3 (3), the Minister of the Interior is the chairman of the crisis management committee of the Government of the Republic);
2. coordinate the preparation of emergency risk assessment;
3. issue regulations and guidelines for preparing emergency plans;
4. establish requirements for the content of exercises and the frequency of organising regional and local government exercises.

The Rescue Board (RB) belonging to the Ministry of the Interior is the professional organization responsible for the coordination of any kind of emergency in the Estonian territory, which directs the response to an emergency and performs rescue work.

The other key organisation is the Ministry of Environment (ME) that has functions of the National Regulatory Authority. The Environmental Board (EB) under the auspices of the ME is the National Competent Authority in the area of radiation protection. The EB is also responsible for providing environmental and individual radiation monitoring in the Estonian territory (Appendix V).

The functions and responsibilities of all state authorities and response organizations to be involved in response to a radiological emergency are summarized in the national Radiological Emergency Response Plan (nREP), approved by the Government on the 4th of August 2011 and draft Regulation on the Intervention in the Situation of Accidental or Lasting Exposure, based on the Draft Amendment of the Radiation Act (the Act has been endorsed by all concerned state authorities and submitted to the Parliament of Estonia for consideration in autumn of 2011). These two documents define duties for: EB, RB, Health Board (HB), Police and Border Guard Board (PBGB), Veterinary and Food Board (VFB), local government units, health service providers, Institute of Physics of the University of Tartu, the providers of vital services and the national administrator of a radioactive waste management facility (AS ALARA Company). The responsibilities of response organisations as described in the nREP and draft regulation are assigned in a consistent way.

In addition, the new Rescue Act, enforced in September of 2010 to regulate the administration of fire fighting and rescue, provides for the duties and liability of natural and legal persons, local governments and state agencies in this field. The rescue units (Rescue Board) have important roles in responding to different types of emergencies including chemical and radiological emergencies.

The Radiation Act, para. 30, specifies the responsibilities of users to: (i) inform immediately the EB and the Emergency Response Centre of the Rescue Board of the accidents, which might occur during radiation practices; (ii) mitigate the consequences of the radiological emergencies (accidents); and (iii) prepare and test an emergency plan (for high risk radiation practices).

The licensing and inspection systems are in place. The EB has the responsibility of issuing licenses for radiation practices. The Environmental Inspectorate (EI) is responsible for implementing an inspection system according to the Environmental Supervision Act (RTI 2001, 56, 337), and the Environmental Board may be involved in the inspection.

In the case of radiation practices classified by local regulation as high risk practices, the license requirements include submission of an emergency response plan (para.18 (11)), which should be reviewed by the EB. The scope of inspections covers the verification of the fulfilment of license conditions and other obligations of the users of radioactive materials according to the Radiation Act. Based on the results of the inspection, an enforcement procedure could be applicable by the EI. An inspection check list is available and used during the inspections, although written procedures do not exist. The cooperation between the EB and the EI has been fixed in the Regulation of the Minister of the Environment of 19th January 2009 "Environmental Board's Statute", which in para.18 (5) identifies, that the EB's Radiation Safety Department's main task in the field of radiation protection and inspections is "to arrange supervision of radiation practice licenses in cooperation with the EI".

3.2.2 Good Practice

3.2.2.1 Competencies of the ME (EB), as a regulatory authority, and the clear role of the MI (RB) as a coordinating authority for management of emergencies enables an effective coordination and control of the arrangements for preparedness and response to radiological emergency in Estonia.

3.2.3 Findings

Interim

3.2.3.1 The ME (EB) as a regulatory authority on radiation protection and the MI (RB), as a coordinating authority on emergency situations should make all reasonable efforts to promote the updating of the existing radiation related legislation with due account to the requirements of international standards (GS-R-2).

3.2.3.2 The responsibilities and functions of the national administrator of a radioactive waste management facility AS ALARA in responding to situations with orphan radioactive sources should be clearly specified in the nREP and in the relevant radiation protection legislation. These include remediation of control over radioactive sources, mitigatory actions, and storage/disposal of orphan sources.

3.2.3.3 With respect to the specific qualification requirements of the inspectors involved in inspecting the radiation practices, the EI should consider assigning a dedicated group of inspectors covering the radiation protection area. The IAEA could support training of the dedicated inspectors through the organisation of a national training course or fellowships and/or scientific visits.

3.2.3.4 The EI in cooperation with the EB should develop a written guidance on how to perform an inspection of the existing radiation practices, including inspection of emergency response plans.

3.2.3.5 The professional staff of the EB and EI should observe selected emergency exercises or drills in the frame of their inspection activities.

Long term

3.2.3.6 At the final stage of establishing an emergency response capability, it is necessary to perform a gap analysis, which would show weak points, i.e. the functional and infrastructural elements, which are not adequately covered or are not covered at all. All institutions taking part in the response according to the National Radiological Emergency Plan should perform an assessment, to verify if they are able to meet the requirements, and to produce a list of what is still needed in terms of equipment, training, manpower, or similar. In the long term, the issue of financing such needs should also be addressed, especially for the organizations which do not have budget lines for emergency preparedness in their financial plans.

3.3. ASSESSMENT OF THREATS

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

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

3.3.1 Current Situation

Although Estonia does not use the IAEA guidance (GS-R-2) for the threat assessment and categorization of the radiation related threats, the existing legislation and assessments of the radiological risks provide a good basis for implementing these international requirements, in order to achieve a harmonized graded approach for establishing arrangements for preparedness and response to radiological emergencies.

For the regulatory purposes the radiation practices are divided, according to the Radiation Act (2009), para. 18, into three risk categories:

- *low risk radiation practices*, which may cause effective doses to exposed personnel up to 1 mSv per year;
- *moderate risk radiation practices*, which might expose personnel to effective doses above 1 mSv but lower than 6 mSv in a year;
- *high risk radiation practices* are defined as those practices that might cause exposure of personnel at effective doses higher than 6 mSv per year; in addition, according to the Radiation Act, the practices related to radioactive waste management and the practices which are using high activity radioactive sources are included in the category of *high risk radiation practices*.

A separate regulation, No. 113 “*Activity levels of radionuclides and the requirements for the premises where radiation sources are located, the marking of such premises and the radiation sources*”, revised in May 2006 (RTL 2006, 47, 842), gives a definition of a high activity radioactive source. This definition is fully consistent with the European Directive on High Activity Sealed Radioactive Sources and Orphan Sources, 2003/122/EURATOM.

The Emergency Act (2009) defines clearly an obligation of the Government of Estonia to establish a list of emergencies, which necessitate risk assessment, and nominate the responsible state authority in charge with the preparation of the respective assessments. The Emergency Act defines *risk assessment* as a document, which describes: the emergency; the threats and hazards causing the emergency; the probability of an emergency; the consequences of the emergency; other important information related to the emergency; and also the reference materials used as a basis for the risk assessment. The responsible state authorities shall at least once in every two years conduct a review of emergency risk assessment, in order to take into account any changes to the threats and make amendments as necessary.

The guidelines for preparing risk assessments have been enforced by regulation of the MI. Based on these guidelines and according to the above stated Emergency Act provisions, a group of experts from the relevant state authorities have prepared two documents on the risk assessment of radiological emergencies, arising accordingly from the trans-boundary effects (a significant release of radioactive material from NPP of neighbouring counties, re-entry of a satellite with radioactive material) and due to accidental situations with radioactive sources inside the country (lost, orphan or accidental sources, transport accidents, dirty bomb).

The risk assessment includes a short analysis of the postulated situations, in particular the probability and severity of different events. Thus, the probability of transboundary emergencies has been assessed as “1” - very small (on a scale from 1, very small to 5, very high); the consequences are specified as very severe, endangering several vital services (used in the terms of the Emergency Act), e.g. food supply, water, communication, etc., and ranked according the guidance scale as “D” (scale A, Minor – E, Catastrophic). The Early Warning System (EWS), mobile monitoring capabilities (laboratories) and the ARGOS system are to be used in assessing the radiological consequences.

The risk assessment of the domestic radiological emergencies has a similar format. It lists the most important radiological accidents since 1994 (approximately 20 accidents). Following similar considerations as the case of transboundary emergencies, the risk matrix gives a “2C” classification. The most critical scenarios recognized are: lost/found source, stolen source, violation of transport conditions required for radioactive materials, radiological dispersion device (RDD, ‘dirty-bomb’).

All the expected consequences arising from these scenarios are in line with the radiological emergencies for which planning exists. The identified needs for improvement of the preparedness have been recognized mainly

as: strengthening the regulatory framework, strengthening the radiation control at border crossing points and at scrap metal facilities, increase of the availability of AS ALARA (changing 13/7 readiness to 24/7 readiness), strengthening an effective cooperation between the EI and the EB, ensure safe storage/disposal of radioactive waste at Paldinski site. The management of mitigatory actions should be done in close cooperation between the Ministry of Environment (the EB) and the Ministry of the Interior (the RB).

The above mentioned risk assessments were agreed by the Head of the EB approved by the Decree of the EM and submitted to the Ministry of the Interior that is responsible for producing the risk analyses summary. On the basis of the risk assessment a national Radiological Emergency Response Plan (nREP) and a communication plan for notification of the public have been developed. The communication plan is produced to ensure effective notification arrangements in the event of emergency situations, which is the responsibility of the RB. These communication plans do not cover the notification in the event of a threat of radiological contamination, as this is the responsibility of the EB.

The radiation related threats in Estonia are rather limited due to the limited use of atomic energy in the country. According to the National Register of Sources and Practices, which is continuously updated by the EB, the main points to be considered in threat assessment include high activity radioactive sources presented in the table below. There are also other, less powerful sources, which may be taken into account.

The high activity radioactive sources, which are used in different practices in Estonia (status by September 2011)		
<i>Nuclide</i>	<i>Activity (Bq)</i>	<i>Number of radioactive sources and the respective facility where they are in use</i>
Co-60	4×10^{14}	23 radioactive sources / Irradiation facility in Tallinn
I-125	4×10^{11}	4 radioactive sources / Brachytherapy facilities in Tartu
Cs-137	1×10^{13}	2 radioactive sources / installed in gauges devices in Tallinn and Püssi
Ir-192	1×10^{12}	4 radioactive sources / Brachytherapy facilities in Tallinn and Tartu

Estonia is surrounded by nuclear installations located in neighboring countries: Loviisa NPP in Finland (103 km), Leningrad NPP in Russia (79 km) and Ignalina NPP in Lithuania (215 km, under decommissioning since 2009).

3.3.2 Findings

Interim and long term

3.3.2.1 The basic policy for assessment of radiological threats at all levels (licensee, local, regional and national) should follow the IAEA requirements (GS-R-2), using the five threat category definitions and implementing terms. Table 1 defining five categories of nuclear and radiation related threats is given in Appendix VI (taken from GS-R-2).

3.3.2.2 At the national level, the assessment of risk of a radiological emergency due to accidents in nuclear facilities of neighboring countries should be supplemented by a comprehensive threat assessment, performed in accordance with paragraphs. 3.14-3.17 of the GS-R-2.

3.3.2.3 The operators at local and facility level (e.g. AS ALARA company) and local government units should conduct or review/update the assessment of radiation related threats and categorize them in the manner prescribed in paragraphs 3.6 and 3.14-3.20 of the GS-R-2. The categorization will establish a basis for requirements to the content and scope of facility emergency plans/procedures according to existing risks.

3.3.2.4 At the local and national level the threat assessment should identify the locations most likely to contain a dangerous source that has been lost, abandoned, illicitly removed, or illicitly transported. This should cover locations of brachytherapy sources, scrap metal facilities, national border crossings, and abandoned military facilities where high activity sources may have been used. Situations which combine both radiological and conventional emergencies (e.g. earthquake, landslides, re-entry of a satellite with radioactive material aboard) should also be considered.

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 response organizations with the on-site response, including a command and control system for local and national response to any nuclear or radiological emergency.

3.4.1 Current Situation

Emergency response to any emergency is organized under the Emergency Act. The Emergency Act establishes response conditions on the basis of an all-hazard concept; the available infrastructure is used for any type of emergency.

Coordination of emergency response is performed by the crisis management committees established at:

- State level (Crisis Management Committee of the Government of the Republic of Estonia)
- Regional level (regional crisis management committees)
- Local governmental level (crisis management committees of the local government).

The facility response should be performed in accordance with the facility/radiation practice emergency plan.

The roles of crisis committees have a common basis and cover the necessary elements required for crisis management at each level. The regional crisis management committee e.g., has the following tasks:

- 1) monitor and analyse the crisis management system, including the preparation for emergencies, responding to emergencies and ensuring the continuous operation of vital services in the region;
- 2) analyse the probability of the occurrence of emergencies and make proposals to the Crisis Management Committee of the Government of the Republic and competent agencies with respect to preparing for emergencies, responding to emergencies and organising the continuous operation of vital services in the region;
- 3) review the part of the emergency risk assessment concerning the area of activity of the crisis management committee;

- 4) assist the emergency situation response coordinator in the coordination of the response to the emergency, if necessary, and perform other duties assigned by the emergency situation response coordinator;
- 5) assist agencies responding to emergencies that have a regional impact, in the organisation of exchange of information and the coordination of the response to the emergency;
- 6) decide the organisation of regional crisis management exercises;
- 7) inform the public of the emergency on the bases and in accordance with the procedure established by the Government of the Republic;
- 8) form a territorial crisis management committee, if necessary, appointing its chairman, approving its statutes and staff.

The nREP allocates an executive power in response to a radiological emergency to the RB or a rescue centre (hereinafter jointly a rescue institution), which should direct the response to the radiological emergency. Rescue institutions have the right to engage institutions and persons in the response to an emergency in accordance with the procedure established in the Administrative Cooperation Act.

A rescue institution forms a management structure for the organisation of directing the response to an emergency depending on the emergency: (i) at the site of the event; (ii) in the extent of the area of activity of the rescue institution; (iii) at the national level. The crisis management committees, if necessary, assist the rescue institution in their area of activity in responding to an emergency.

The relations between crisis management committees and rescue centre command posts are demonstrated in Appendix VII. The role of key response organizations expected to be involved in response to radiation emergencies is described in the nREP (see Appendix V).

As there are no Threat Category I or II facilities in the country, the coordination needs of emergency response between off-site and on-site response organizations is limited to coordination of off-site support and assistance to facilities and coordination of information provision (public, international communication). The experts recognized that different facilities in Estonia have different arrangements with respect to this requirement. For example, an emergency plan of the ⁶⁰Co irradiator facility (Threat category III) is fully coordinated with the local rescue and ambulance services and is a part of the plan of the local government, while the AS ALARA waste storage facility is not required to coordinate its emergency response documents with off-site organizations.

Procedure on response in case of lost-found sources have been developed by the national radioactive waste management facility (AS ALARA). According to the nREP AS ALARA's responsibilities are covering management, transport and storage of radioactive waste and participation in arrangements for decontamination of the contaminated areas.

3.4.2 Good Practice

3.4.2.1 There is a clear, legally supported deployment of responsibilities among the different levels of public administration in Estonia. This could serve as a good basis for required upgrading of radiation emergency management and the concept of operations at all levels, including the operator's emergency plans, in compliance with the GS-R-2 requirements.

3.4.3 Findings

Interim

3.4.3.1 Further development in area of response coordination to trans-boundary nuclear accidents should be devoted and reflected by the nREP. The crisis management committees at all levels should ensure that arrangements for local and national organizations involved in preparedness and response to such accidents are in place.

3.4.3.2 It is especially important to verify that all facilities in threat category III (e.g. AS ALARA radioactive waste storage facility) specify adequate emergency arrangements in their emergency response plans. These plans should include both on-site management and coordination with off-site organizations. All threat category III facilities should inform the dedicated police, rescue units and local governments of the activities they will perform and the assistance which they should expect from the off-site organizations in the event of a radiological emergency at the facilities.

Long term

3.4.3.3 All emergency documents (plans, arrangements, and procedures) should be updated and finalized in an appropriate timeframe. Special attention should be given to verify, if the proposed concepts of operations are functional, and if responsibilities are fully understood by all response organizations. The outcome should be assessed versus the requirements described in [2]. 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 following appraisal criteria were investigated:

- Establish 24 hours a day, 7 days a week contact point
- Make aware of the radiological hazards for on-site managers of the facility (e.g. scrap metal processing facilities) and 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 for promptly initiating an off-site response in the event of an emergency.
- Ensure response organizations have sufficient personnel.
- Make known to the IAEA and other Member States, the Member State's single warning point of contact responsible for receiving emergency notifications and information from other Member States and information from the IAEA.

3.5.1 Current Situation

The Emergency Act includes specific requirements in relation to the notification of emergencies. Thus, the persons of the public “shall be obligated to immediately notify the *emergency line 112* of the emergency or the impending risk of emergency they have learnt of, unless there is reason to believe that the agency competent to respond to the emergency has already been notified”. Also, the agencies or legal persons “shall be obligated to immediately notify the MI of the emergency that has occurred in the fulfilment of their responsibilities and in their area of activity or of the impending risk of such emergency”.

The *emergency line 112* is continuously available 24 hours/day and 7 days per week and dedicated for receiving notifications of any type of emergency, including a radiological emergency. The medical and rescue events have been already integrated in the *112 emergency service* structure, and there are plans for integrating the police events into the same system (scheduled to have been completed by the end of 2015).

The *emergency line 112* is established at the Emergency Response Centre belongs to the RB, under the Ministry of Interior. The Emergency Response Centre is composed of four facilities situated in the four regions of Estonia (North, South, East and West regions), which are fully connected and can support each other in special, overloaded situations.

According to the description provided by the Estonian experts, the Emergency Response Centre of the Rescue Board has clear procedures in place for responding to medical and rescue emergency events and a comprehensive database with the available response resources of the country has been established. The set of procedures includes special medical and rescue questionnaires, used by an emergency service dispatcher for clarification of situations. A specific questionnaire on how to respond to notification of radioactive pollution event and/or a radiological incident is in place.

When an emergency event is notified on the *emergency line 112*, the dispatcher uses the questionnaires for establishing the priority of the emergency, and accesses the resource database to identify the most appropriate Rescue Unit for responding to the notified event. The Rescue Unit which is the closest to the location of the event is contacted immediately after receiving the notification. When the accidental event involves a radiological threat, the CBRN Unit of the RB is also notified and activated immediately in order to support the local Rescue Unit in the field. According to the Directive of the Rescue Board Director “The procedure of forwarding operational information of the Emergency Response Centre” there is a list of State institutions which are to be notified immediately, in parallel with the Rescue Board services, if a radiation related event occurs. These are the:

- Information and Analysis Department of Ministry of Interior;
- Environmental Inspectorate (Ministry of Environment);
- Environmental Board through the Radiation Safety Department;
- Police and Border Guard Board;
- Health Board.

All or part of these organizations will be activated and will participate at the intervention only at the request of the Rescue Unit and CBRN Unit. The notification scheme is presented in Appendix VIII.

The Estonian Early Warning System, operated by the Ministry of Environment (EB), consists of ten environmental gamma radiation monitoring stations. From these, three stations are using only Geiger-Muller (GM) detectors and are used for gamma dose rate measurements. The remaining seven stations are called PMS (Permanent Monitoring Station) and include NaI(Tl) detectors in addition to the GM tubes. When the pre-established alarm level (200 nSv/h) is exceeded, a warning message is sent to the EB duty officer, who has to validate the received data, and if the alarm has been confirmed, the other relevant agencies are notified according to the procedure given in Regulation no. 57 “Procedure for notification of Ministry of interior of emergency or

impending risk of occurrence of emergency” (2010). This means that the EB notifies the RB emergency service (112), who shall activate an operational phase of the response. In parallel, the EB notifies the Information and Analysis Department of the MI, who must communicate the information to the chairman of the Crisis Management Committee and to other members of the Committee, at the request of the Chairman. When the situation takes place, the Crisis Management Committee assists the response organizations in managing the emergency response. The scheme is shown in Appendix IX.

The rescue workers, together with the emergency medical staff and police units are the first responders in case of any type of emergency. Rescue workers have basic training in radiation protection, according to their specific qualification. Mainly, the basic training includes the recognition of the “radiation sign”, different marking signs of dangerous materials, and basic information about ionizing radiation types. One of the sections of the Instructions Manual “PÄÄSTEJUHISED KEEMIAÕNNETUSTEL 2009” (RESCUE GUIDELINES FOR CHEMICAL ACCIDENT), includes instructions for rescue workers on the immediate actions they have to take in case of a radiation related emergency. Some of the Rescue Units are provided with pagers which give a basic indication of radioactivity being present. Local Rescue Units could always rely on the support of the CBRN Unit of the RB to provide technical expertise at their request.

In the Estonian territory there are at present 81 Rescue Units acting under the RB command. According to the law, the Rescue Units are coordinating the response at the scene. When a situation takes place, according to the nREP provisions, the AS ALARA, national administrator of the radioactive waste management facility, arrives at the scene of the accident to organize transport, management, safe storage of the radioactive waste and decontamination activities at the site.

In case of a radiological emergency, the PBGB cooperates with the Rescue Unit in the field, with the medical staff, local authorities and with the CBRN Unit. During emergencies, the main tasks of the PB are: public order, registration of individuals affected by the emergency, traffic control, evacuation, management of several points (point of non-victims, point of victims, point of evacuees, point of movables, check-point, point of technical staff, point of transport) and roads (in and out). As described during the meetings, the PBGB has no special equipment, instructions or training for acting in radiological emergencies.

Each major area in Estonia has a hospital network, which provides medical services by a tertiary level hospital and/ or central hospital. 14 hospitals and 10 independent (autonomous) ambulance service providers may be used in any kind of emergency. The ambulances closest to the emergency scene, are activated by the 112 emergency response service. In general, the emergency medical staff has no special equipment, instructions or training for acting in radiological emergencies, however ambulance services in the four rescue regions have protective clothing and breathing equipment (see also chapter 3.12 of this Report).

According to the discussions carried out and after visiting different response organizations, the mission team concluded that arrangements are in place and the response organizations have qualified personnel available to perform their assigned initial response actions. However, for the time being, the available police and medical personnel may not be sufficient, especially in the event of large scale radiological emergency, because only one ambulance team in each of the four regions has radiation protection capabilities, and the medical personnel involved in responding to radiological emergency may be not adequately trained.

In Estonia there are two major scrap metal facilities, one of which grinds the recyclable metallic materials, but there are no melting facilities. The scrap metal is exported abroad, usually to Finland and Sweden.

The managers of scrap metal facilities are aware of the possibility that the recycled materials might have radioactive content and therefore, in order to protect their business, they conduct measurements to detect

radioactivity. The major facilities are equipped with portal monitors, and smaller collection points are using portable radiation detection equipment for checking the level of radioactivity on the site. However, it is not certain that the on-site scrap metal managers have a clear idea of what to do in the case of radioactivity levels above the normal natural background being detected. It is likely they will call the *emergency line 112* in order to notify and activate the emergency response team.

At the borders, the Estonian Tax and Customs Board is responsible for the control of goods which are imported, exported or in transit. There are five external border points:

- Three border points on the Estonian –Russian border;
- One border point in Muuga harbour;
- One border point in Tallinn airport.

There are two specific legislative acts which regulate the radioactivity control at the customs points: Regulation no. 243 of 8 July 2004 “ Specifications for Processing Documents of Import, Export and Transit of Radioactive Waste Based on Country of Origin and Destination of the Waste“ and "Radiation Control Joint Guide for Customs and Border Quard Officers", issued in 2010. The Radiation Control Joint Guide is a protocol for cooperation and response in case of radiological incidents at borders between the Estonian Tax and Customs Board and other State organizations: Rescue Board, Secret Police and Environmental Board.

All customs officers receive a basic training in radiation protection. In addition, the Tax and Customs Board has benefited from the support of the USA Energy and Environmental Directorate for specific training of customs officers and also for the endowment of customs points with radiation detection equipment. Thus, new radiation monitors were installed on the Eastern Border (Koidula, Luhamaa, Narva) in the period 2009 – 2010 and in Muuga Port and on Sillamäe Port in 2011. In addition, in 2012 new equipment for radiation monitoring will be installed in Tallinn airport.

In 2011, over 1600 alarm signals have been generated at the Eastern Border, mainly from different goods (fertilizers, bricks, ceramics, glass, etc.) with detected radioactivity values that exceeded permissible levels of natural radioactivity.

Estonia is a Party to the IAEA Conventions on Early Notification and Assistance. According to the nREP, para 8.5, Chapter 8: “Organization of international cooperation upon responding to radiological emergencies”, it is the EB, that “shall organize the exchange of information with the European Commission and the International Atomic Energy Agency, in coordination with the Rescue Board”. The Radiation Safety Department of the EB is identified in the IAEA List of National Contact Points as single warning point of contact responsible for receiving emergency notifications and information from other Member States and information from the IAEA.

It should be noted, however, that the above mentioned EB functions should be coordinated somehow with paragraphs 8.2 - 8.4 of the same chapter, which defines the responsibility of the RB to request international assistance in case of emergencies, including radiological emergencies.

3.5.2 Good Practice

3.5.2.1 The emergency response system 112 is very efficient and well organized for any medical or rescue event that might occur. The actual legal framework for the notification and exchange of information, the use of 112 emergency response system together with the early warning system managed by the EB ensures that notification of any type of emergency, including radiological emergencies, will promptly reach the respective organizations, which are responsible according to the nREP to participate in the response.

3.5.2.2 The training of the rescue workers on different levels of qualification is recognized as a good practice. The training is performed regularly and testing of the response personnel is carried out every year.

3.5.3 Findings

Interim

3.5.3.1 The EB should provide managers of the scrap metal facilities with basic instructions on how to respond to a situation when identifying a sealed radioactive source or contaminated scrap metal materials. These instructions should include: recognition of the event (e.g., radiation signs, transport codes), identification of who 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.

3.5.3.2 Although custom officers are regularly trained in radiation protection, it is recommended to include in their internal training programs other organizations which may be involved in responding to radiological emergencies on the custom borders. The standard IAEA materials can be used for this purpose, and national training courses may be organized using the support of the IAEA.

3.5.3.3 The ME in cooperation with the MI should ensure that the national legislation clearly identifies the role and functions of the EB as the National Competent Authority and the Contact Point to request to the IAEA international assistance in case of radiation emergencies.

Long term

3.5.3.4 The EB should issue the regulations which will specify the requirements for the radiation monitoring system and training of workers at scrap metal facilities, including reporting anomalies to the Information and Analysis Department of the MI.

3.5.3.5 The implementation of regulatory requirements must be a precondition to issuing by the relevant state authority a license for performing scrap metal practice. Furthermore, the Environmental Inspectorate should oversee compliance with these requirements.

3.6. TAKING MITIGATORY ACTIONS

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

- Make arrangements to provide expertise and services in radiation protection promptly to local officials and first responders responding to actual or potential emergencies involving practices in Threat Category IV.
- The operator of the practice in Threat Category IV shall be given basic instructions.
- Make arrangements to initiate a prompt search and issue warning to the public in the event of loss of a dangerous source.
- Make arrangements for mitigatory actions 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

Estonia has a properly organized and well coordinated procedures established for responding to actual or potential radiological emergencies involving radiation practices in Threat Category IV. It includes clear arrangements that the radiation protection expertise and services would be provided promptly on the request of the local Rescue Unit or local authorities by the EB Radiation Safety Department and CBRN Unit of the Rescue Board; both have qualified teams in emergency response with 24 hour preparedness.

The Radiation Act, paragraph 30, requires the operator of the practice in Threat Category IV to provide training and safety instructions to workers dealing with radiation. The relevant arrangements are also addressed in the licensing process, during which an applicant is requested to demonstrate its emergency response capability and emergency plan and/or instructions on actions in the event of a radiological accident. ME Regulation, No 41 of 29 April 2004, paragraph 18: “Time limits for proceedings to issue, amend or revoke radiation practice licenses, specific requirements for and format of applications for radiation practice licenses”, defines that a package of license documentation shall contain instructions (rules) on dealing with radiation sources in emergency situations and schedule instructions and training for staff. The high risk radiation practices, which in most cases in Estonia are covered by Threat Category IV, are required to have and demonstrate to the regulatory body an emergency response plan.

An emergency response plan of high risk facilities and operator’s instructions are required to describe actions for prompt search of the lost/stolen source. The licensees have the responsibility to promptly notify the Emergency Centre of the RB and the Radiation Safety Department of the EB, which in turn have the obligation to activate prompt search and and issue warnings to the public. However, a written standard procedure on how the organisations involved in response to such event (operator, RB, EB, Police, Crime investigator, EI) will act and interact in this case has not been established.

According to Radiation Act, paragraph 30, the licensee has obligation for taking mitigatory actions within the facility and shall take measures to protect workers and the public from the consequences of the accident. In Estonia the mitigatory actions of operators would mainly require radiation measurements to assess the situation prior to recovery of the radioactive source and decontamination of an area, if needed. The only exceptions would be a spill of radioactive liquid, and a source caught on fire or an explosion involving a radioactive source.

Interviews with operator staff led to the conclusion that the operators are aware of their responsibilities concerning these mitigatory actions and have the relevant provisions in their emergency response plans.

Moreover, the team believes that there is sufficient expertise of the operators for professional radiological assessment during such situations from the EB, AS ALARA and within the RB (CBRN unit). The EB has a well equipped laboratory and conducts regular environmental radiation monitoring; it can provide TLD dosimetry and has experience in radiation measurements. The RB units have capabilities for decontamination, mainly of equipment and people, and the AS ALARA has experience and is adequately equipped for decontamination of the workplace.

In the event of a more complex emergency, the initial mitigatory actions can be taken within the existing national emergency response system, and the IAEA Convention on Assistance may be invoked. However, the nREP should address arrangements for initial assessment of the situation and for mitigatory actions to prevent any unnecessary threat to the emergency workers and the population.

3.6.2 Good Practice

3.6.2.1 The EB Radiation Safety Department has knowledgeable staff available 24 hours, who are capable of performing on-the-scene radiation measurements and providing advice to local authorities and rescue teams on the required recovery procedures. The Rescue Board, through the regional units, CBRN unit and Bomb Squad, have the equipment and knowledge for organizing mitigatory actions. Training of staff is an ongoing effort in all the aforementioned departments.

3.6.3 Findings

Interim

3.6.3.1 To ensure an effective licensing process, brief guidelines should be developed by the EB Radiation Safety Department to outline which mitigatory actions the operators of threat category IV practices should include in their official instructions for responding to emergency situations.

3.7. TAKING URGENT PROTECTIVE ACTION

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

- Adopt national intervention levels for taking urgent protective actions in accordance with international standards.
- Make arrangements for effectively making and implementing decisions for urgent protective actions to be taken offsite.
- Make arrangements to ensure the safety of all persons onsite in the event of a nuclear or radiological emergency.

3.7.1 Current Situation

National intervention levels are established in the current legislation, in compliance with international recommendations.

Regulation no. 93/2004 “Intervention and action levels and emergency exposure limits in a radiological emergency” specifies Generic Intervention Levels (GILs) for urgent (sheltering, evacuation, thyroid blocking) and late (temporary relocation, returning, permanent resettlement) protective actions, and prescribes action levels for foodstuffs, which are consistent with the internationally recommended values. GILs are included as Annex into the nREP, but not in total compliance with Regulation no. 93/2004.

In the Regulation, distinct values are set up for thyroid blocking implementation: 10 mGy thyroid dose for administering stable iodine tablets to children, 100 mGy for administering stable iodine tablets to adults less than 50 years old, and 1 Gy for administering stable iodine tablets to adults aged above 50 years.

Estonia does not have facilities in threat categories I, II and the number of facilities of threat category III is yet to be confirmed by the threat assessment. There are neither facilities nor practices that would warrant urgent

protective actions off-site. Nevertheless, the emergency plan of the Co60 irradiator (AS ENKO) specifies a 500m off-site emergency zone, for which urgent protection actions may be required in case of an emergency involving aircraft or a bomb attack, and the arrangements for urgent protection actions (warning public, evacuation) are in place.

In reality, a case by which urgent protective actions may be triggered in Estonian territory is activation of a “dirty bomb” or a radiological dispersal device. The other case is the probability of a significant release of radioactive materials due to a serious accident at the NPP of neighboring countries (less than 100 km distance). Although the risk for such transboundary radiological impact is of very low probability, in light of experience from the accident at Chernobyl and recent lessons learned from Fukushima, the mission team supports the Estonian approach that attention should also be paid to planning appropriate urgent actions upon the notification of a severe accident at a nearby nuclear power plant. Specific recommendations below derive from consideration and support of the above stated approach.

The arrangements to ensure the safety of all persons *on-site* (e.g. at Co 60 irradiator or AS ALARA radioactive waste storage facility) in the event of a radiation emergency do not anticipate significant actions, except that non-essential staff should leave the premises. The appropriate on-site emergency management is a part of the operating procedures (safety requirements and emergency handling), which are a prerequisite of issuing a license for commissioning of the facility.

3.7.2 Findings

Interim

3.7.2.1 Executing its regulatory functions, the EB should take measures to ensure that the risk to the population living in the vicinity of AS ALARA radioactive waste storage facility has been assessed, and the existing facility emergency plan has been commensurate with this risk. In case of a potential need for an off-site response, the plan should be coordinated with off-site response organizations and local authorities to ensure their response in the event of a radiological accident without site release.

3.7.2.2 GILs in the nREP and in Regulation no. 93/2004 “Intervention and action levels and emergency exposure limits in a radiological emergency” should be revised in order to be fully consistent.

Long term

3.7.2.3 Thyroid blocking should be considered in the planning phase as a potential protective action for the special vulnerable group of children in case of significant I-131 accidental emission at one of the nuclear installations close to the Estonian borders. With respect to this, the availability in the country of stable iodine tablets is recommended to be considered.

3.7.2.4 EB should develop specific procedures, which would take into account how to apply generic intervention levels, since the intervention levels cannot be measured directly.

3.8. PROVIDING INFORMATION, ISSUING WARNINGS AND INSTRUCTIONS TO THE PUBLIC

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

- Make arrangements to provide prompt warning and instruction to the permanent, transient and special population groups or those responsible for them, and to special facilities in the emergency zones upon declaration of an emergency class.

3.8.1 Current Situation

This requirement contains specific guidance on providing instructions to the population within the emergency planning zones around facilities in threat category I and II. In Estonia this requirement may be applicable only to some exclusive radiological emergencies (e.g. a large transport accident, a fire involving a source, or large scale contamination due the accident at a NPP abroad).

Nevertheless, arrangements are in place on how to provide the public with prompt warnings and instructions in case of any type of emergency, and radiological emergencies are included.

In Estonia, it is the obligation of the EB and RB to issue warnings and instructions to the public upon receiving notification from the licensee of an incident / accident on the site.

The corresponding responsibilities are given in the nREP, chapter 7: “Organization of public notification”, which defines that: “the EB shall notify the public of an impending risk of a radiological emergency occurrence and a rescue institution shall notify the public of the response to a radiological emergency”. Moreover, “a rescue institution in cooperation with the EB shall issue guidelines to the public on how to behave in a radiological emergency, in order to prevent the occurrence of risks to human life or health, property, the environment and the continuous operation of vital services”.

Therefore, in any emergency situation which could actually or potentially affect the Estonian territory, the RB is the major organization responsible for coordinating the elaboration and distribution of instructions and information to the public. The RB has developed two specific Communication Plans (CP), which describe the framework and basic information to the public in case of radiological emergencies. The one titled: “HOT 8: ÜLEPIIRLISE LEVIKUGA TUUMAÕNNETUS (TÕ)” (NUCLEAR ACCIDENT WITH TRANSBOUNDARY EFFECTS) outlines the plan for communication to the public who may be affected by the consequences of an NPP accident abroad, and the other CP “HOT 8: KIIRGUSHÄDAOLUKORD”, (RADIATION EMERGENCY) is designed mainly for threat category IV events.

Since the threat assessment for Threat Category III facilities in Estonia has not been completed, the information is incomplete on how many people off-site need prompt information about measures to be taken if a facility emergency is declared. The Co60 irradiator (ENKO), which has been visited by the EPREV team, has adequate arrangements, made in cooperation with the local government, to inform people located nearby, if urgent actions are needed.

Notification of the public and the roles of different authorities in this process are also defined in the Governmental Regulation no. 92 “Procedure for notification of public of impending risk of occurrence of emergency, of emergency and of response to emergency and requirements for information to be communicated”.

3.8.2 Findings

Long term

3.8.2.1 The EB in cooperation with RB should check and ensure that the future development of nREP, as well as regional, local government and facility plans will foresee notification of the endangered population during certain radiation emergencies at facilities/practices in Threat Categories III and IV (e.g. a large transport accident, a fire involving a source, or large scale contamination).

3.9. PROTECTING EMERGENCY WORKERS

Regarding the requirements set out in [2] for protecting 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

A legal basis for the protection of emergency workers is outlined in Regulation no. 93/2004: “Intervention and action levels and emergency exposure limits in a radiological emergency” that includes provisions related to the dose limits, which have to be applied for the emergency workers. According to this regulation, a dose limit of 100 mSv effective dose per event is established. Nevertheless, for life saving actions, the dose limit for the emergency workers might be exceeded, but only on a voluntary basis.

In the nREP, the dose limits for intervention personnel are much more detailed, according to the specific tasks (lifesaving actions, mitigatory actions, recovery actions, etc).

In order to protect the emergency workers, specific provisions are included in the Radiation Act, paragraph 56: “Monitoring of persons participating in intervention operations or incurring emergency exposure”. According to the act: “persons directing the response actions shall ensure that the volunteers participating in intervention operations and persons present in the area of accidental exposure undergo individual monitoring”. In addition, in case of an accidental exposure, the EB shall ensure the assessment of individual doses as necessary, and shall report the results of the assessment to the doctor conducting the individual monitoring.

According to the nREP, paragraph 5.2.7, the EB is responsible for assessing the individual doses of those who have been exposed during the emergency and in cooperation with the HB to ensure the submission of the assessment results to the medical specialist. There is no clear definition of emergency workers in relation to radiological events. There is no clear description of how the individual dosimetry and dose management is performed for the emergency workers.

The first responders, in particular RB units, have initial training in radiation protection and some have pagers to detect levels of radiation. The CBRN unit has personal protection equipment, radiation detection instruments and decontamination devices for conducting the response actions in the field. A list and photos of the equipment used by the CBRN unit of the RB is provided in Appendix X.

3.9.2 Good practice

3.9.2.1 The endowment of the CBRN unit is state of the art, the documentation is available in electronic format and there is regular training for the emergency workers in using the technique.

3.9.3 Findings

Interim

3.9.3.1 Regulation no. 93/2004: “Intervention and action levels and emergency exposure limits in a radiological emergency” and the nREP should be revised in order that the dose limits for emergency workers are fully consistent in both documents.

3.9.3.2 The legislative framework should be amended to include a clear definition of the emergency workers in relation to the radiological events.

3.9.3.3 The EB should take measures to establish the appropriate formal procedure for recordkeeping and dose control of all workers engaged in response to a radiological emergency, covering all local responders and on-site emergency workers, who may be beyond a routine individual monitoring program. This should include issuing guidance on how to manage, control and record doses of exposures during various types of response activities. Default operational dose levels for emergency workers should be established in quantities that can be directly monitored and take into account all exposure pathways (i.e. external radiation, inhalation, and ingestion).

3.9.3.4 The RB should ensure that the training syllabus for emergency workers is reviewed and amended to explain clearly the effects and risks of radiation exposure, and the meaning of radiation signs and placards.

3.9.3.5 In the nREP, additional issues for emergency workers in radiological events should be adequately covered, including: medical surveillance, training, and appropriate protective equipment (with alarm dosimeters as the minimum requirement), as well as protective clothing and breathing equipment, if needed.

Long term

3.9.3.6 Arrangements should be made to develop the capabilities for assessing the doses that may be received by emergency workers due to the intake of radionuclides in the event of an emergency involving unsealed radioactive sources. (This should be done in compliance with paragraph 4.60 of GS-R-2). Training to handle an unsealed source in case of an emergency, as well as protective clothing and breathing equipment, should be provided to the personnel who may potentially be involved in responding to this type of emergency.

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

Operational Intervention Levels are only adopted in the new approved nREP (2011). In Annex 1 of the nREP the OILs are established in order to provide guidelines for the approximate radius of the inner cordoned area in radiological emergencies. These OILs are expressed as gamma dose rates (microSv/h), alpha surface contamination (Bq/cm²) and beta surface contamination (Bq/cm²).

3.10.2 Findings

Interim

3.10.2.1 Additional default OILs should be established as triggers for introducing protective actions for the population in case of radiological emergencies, according to the latest international guidance GSG-2.

3.11 MANAGING THE MEDICAL RESPONSE

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

- Make arrangements for general practitioners and emergency staff to be made aware of the medical symptoms of radiation exposure and 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

The emergency medical staff is fully aware about the medical response they have to provide in emergency situations. The 112 emergency response system for notification and activation in case of emergencies is well known by the medical personnel working at the emergency department of hospitals. The rescue units, ambulances and police units are notified, activated and arriving at the scene of the accident at the same time. Annual exercises are performed for testing the response actions and cooperation in the field of all first responders: rescuers, medical staff and policemen.

However, the medical staff, in the past few years, has not been provided with specific training covering the medical response of radiation emergencies. The general training of medical doctors and residents does not include a chapter on medical response in radiation emergencies. Therefore, with few exceptions (few experts that have benefited from training more than ten years ago), medical personnel are not aware of the medical symptoms of radiation exposure.

According to the nREP, the authority responsible for the provision of healthcare services in a radiological emergency is the Health Board (HB), subordinated to the Ministry of Social Affairs. The HB has no special unit or specialists in radiation protection field. Therefore, there is a good cooperation with the EB, who provides the HB with technical expertise in this special field.

The medical services in any emergency are provided by hospitals, under the HB coordination. Although there is no specific reference in the nREP, as a practical rule, the treatment of patients in case of a radiological emergency (the in-patient care) will be provided in the regional hospitals, which have departments of hematology: Tartu University Hospital (Tartu), North Estonia Medical Centre (Tallinn), Children's Hospital (Tallinn). Outpatient care will be provided by family doctors, guided by the HB experts. The hospitals have no special decontamination units for radiation emergencies. In any accidental situation, the decontamination of persons (injured or not) is the responsibility of the Rescue Units. The medical staff is assisting the rescuers in the decontamination of injured persons.

The North Estonia Medical Centre in Tallinn has been recently modernized, and different activities have been developed with modern medical equipment and facilities. At the new emergency department entrances (one for pedestrian patients and one for ambulances) there are installed fixed portal monitors for radiation detection. Working procedures and portable radiation equipment for checking radioactivity contamination are available in case an alarm is triggered in the fixed portal monitors. Arrangements are in place for the decontamination or isolation and treatment of patients, in case of emergency. Therefore, no special techniques are required for using the existing facilities in case of a radiation emergency.

However, the medical staff of this medical centre may not be adequately trained in responding to a radiation emergency or for providing early diagnosis and treatment of radiation injuries. There are no guidelines in place for the treatment of overexposed or radioactive contaminated people. In any accidental situation involving overexposures or severe radioactive contamination of one or more persons, the Estonian authorities will need international medical assistance.

3.11.2 Findings

Interim

3.11.2.1 Training of medical personnel involved in the radiological emergency response is not sufficient and needs to be improved. The HB, in cooperation with the EB, is recommended to request the IAEA assistance in organizing the training of national specialists regarding medical response to radiological emergencies, early diagnosis and initial treatment of radiation injuries.

3.11.2.2 Guidelines have to be elaborated by the HB with special instructions for general practitioners (including family doctors) about how to recognize radiation symptoms and how to provide early diagnosis of such symptoms.

Long term

3.11.2.3 The command chain of the healthcare system, main roles and responsibilities of different players (the HB, hospitals) subordinated to the Ministry of Social Affairs, need to be specified by law or regulations.

3.11.2.4 It is the opinion of the EPREV team that there is a need to officially determine the referral hospital for the initial treatment of radiation injured patients, which will ensure the continued training of the medical staff for such purposes, as well as making known to other emergency responders which hospital such patients should be sent to.

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, both responding to incorrect information and rumors, and responding to information requests from the public, news, and information media.

3.12.1 Current Situation

Arrangements are in place at the national and regional level to provide the public with useful, timely, truthful, consistent and appropriate information throughout a radiological emergency. With respect to this topic, the Emergency Act includes paragraph 9, chapter 3: “Informing on emergencies” with a specific requirement that “the public shall be immediately notified of the impending risk of the occurrence of an emergency, of the emergency and the response to the emergency, if the failure to inform may endanger the lives or health of people, cause major proprietary damage or otherwise significantly disrupt the ordinary way of life”. To implement this general requirement, a specific Governmental Regulation No 92 was issued in 2010, titled: “Procedure for notification of public of impending risk of occurrence of emergency, of emergency and of response to emergency and requirements for information to be communicated”. The Regulation includes detailed responsibilities of different authorities concerning public notification of an impending risk, of the emergency occurrence and of the response to an emergency, in conformity with their domain of activities.

Concerning radiation emergencies, the EB has the obligation to notify the public if the situation arisen as a consequence of a radioactive contamination due to a nuclear accident abroad or if a radiological accident occurred in the country; the Rescue Units are responsible to inform the public about fires, explosions and transport accidents involving radioactive materials and/or radioactive sources.

Regulation no. 92/2010 also defines the responsibilities of the Crisis Management Committees at all levels (local, regional and national) to assist the responsible authorities in informing the public of the situation. At the same time, the MI has to notify the public in relation to the activities and decisions of the Crisis Management Committee of the Government of the Republic, the Rescue Centres have to notify the public about the activities and decisions of the regional Crisis Management Committees, and the relevant local Governmental units have to notify the public in relation to the activities and decisions of the local Crisis Management Committees.

According to the Emergency Act provisions, the information on a radiation hazard is transmitted to members of the public by television, radio and other means of mass communication in accordance with the Crisis Management Committee’s decision. The content of respective messages will be prepared by the Committee’s Management Group and transmitted by the Management Group’s Press Centre. Content of the group’s messages follows the guidelines for radiological emergencies prepared by the EB.

Provisions are included in Regulation 92/2010 concerning the information to be communicated to the public. In chapter 3 of the Emergency Act, the duties of mass-media in emergency situations are established. The owners of mass-media means: “shall in unaltered form and free of charge announce the notices of the Government of the Republic, the Crisis Management Committee, the emergency situation response coordinator, the emergency situation operations coordinator and the ministries or other agencies responding to the emergency concerning the impending risk of the occurrence of an emergency, the emergency and the response there to, including notices concerning the declaration, alteration or termination of the emergency situation”.

3.12.2. Findings

Interim

3.12.2.1 Consideration should be paid in any emergency situation that public information should be jointly managed in between all levels of response organizations and the Crisis Communication Groups established in emergency situations at local, regional and national level.

Long term

3.12.2.2 Templates of press releases are useful tools. For the most likely emergency scenarios, a short synopsis of a press release may be prepared in advance in plain language (i.e. in the event of a lost source or large scale contamination). Also, for less likely events, such as satellite re-entry, preparations may be undertaken, involving not only general information to the public, but information for the potentially affected population.

3.12.2.3 Providing useful, timely, truthful, and consistent information to the public requires the availability of persons qualified to provide such information, and also continuous work with the media to build mutual trust and partnerships between journalists and spokespersons. The testing of public information arrangements during an exercise or a specific drill is highly recommended, and real journalists could be invited to participate. It is also recommended to assess experiences in communicating with the public during past genuine emergencies, and to apply the lessons learned to the radiation emergency response.

3.13. TAKING AGRICULTURAL COUNTERMEASURES AGAINST INGESTION AND LONGER TERM PROTECTIVE ACTIONS

Regarding the requirements set out in [2] for taking 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 effective agricultural countermeasures.

3.13.1 Current Situation

National intervention and action levels have been adopted in compliance with the international recommendations. Regulation no. 93/2004: “Intervention and action levels and emergency exposure limits in a radiological emergency” includes Generic Action Levels for foodstuff.

Response activities related to agricultural countermeasures are addressed by the nREP that assigns major responsibilities to the Veterinary and Food Board (VFB), the EB and HB. These boards should:

1. organise the monitoring of the radioactive contamination of foodstuffs and the radiological analysis of foodstuffs (in coordination with the EB);
2. develop guidelines for members of the public on the restriction of the use of drinking water and foodstuffs.

Planning of the surveillance activities is performed by the VFB. The regional officers of this board are taking samples for routine surveillance regularly at the county level. The officers are trained and have necessary procedures and equipment for this purpose. But they do not have the experience of working and taking samples in radiological contaminated territories. A procedure for taking sampling in the event of a radiological release is not in place.

All samples are analyzed in the laboratory belonging to the EB. This laboratory is equipped with modern equipment and is designated and accredited for gamma spectrometry and TLD dosimetry. Routine analyses cover

determination of Cs-134, Cs-137, Am-241 and Sr-90 in samples from the environment and food chain. Measurements of other isotopes are expected to be done on contractual basis. The laboratory regularly participates and has excellent results in international comparison tests. The Agricultural Research Centre is capable of analysing Cs-137 in foodstuff.

The system seems to work well in a normal situation, however in the event of wide spread contamination (e.g. from a nuclear accident abroad), the measuring capacity may encounter a bottle neck, thereby preventing a representative picture of the situation in the country being known. There was an impression that neither the EB nor the VFB have a sampling strategy for such a case.

3.13.2 Findings

Interim

3.13.2.1 The operational intervention levels for agricultural countermeasures regarding food consumption in the event of an emergency should be adopted and integrated into the radiation emergency documents. The OILs as given in the EPR-METHOD [3] and Safety Guide GSG-2 provides guidelines on this subject.

Long term

3.13.2.2 For accidental events abroad that might contaminate the territory of Estonia, the responsible authorities should elaborate a plan for taking effective agricultural countermeasures covering any stage of production, distribution and sale of food and agricultural produce, following a release of radioactive material. The plan should cover actions for the management of product processing, use of contaminated land, as well as measuring livestock, gardens, forest products, fishing and water supplies.

3.13.2.3 In case of a significant radioactive material emission at one of the nuclear installations located close to the Estonian borders, the contamination of land will impose intensive radiation monitoring of environment and foodstuffs. Therefore, the radiation monitoring capabilities of the country should be improved in the future, as the actual capacity to deal with environmental radioactivity monitoring seems to be quite reduced and inadequate for an accidental event which might produce large scale radioactive contamination in the vicinity of Estonia.

3.14. MITIGATING THE NON-RADIOLOGICAL CONSEQUENCES OF THE EMERGENCY AND RESPONSE

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

- Make arrangements for responding to public concern 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. In Estonia, informing the public during emergencies is well addressed in the legislative

framework and also at a practical level, as it was already described in paragraph 3.11 of this report “Keeping the public informed”.

In addition, a special paragraph 11: “Organisation of psychological defence” is included in chapter 3 of the Emergency Act. A psychological defence is defined in this act as being the set of activities of the State aimed to ensure “the prevention of the spread of incorrect information and moods causing panic arising from the emergency or the risk of emergency”. According to the same Act, the Psychological Defence Plan shall be developed by the State Chancellery and approved by an Order of the Government of the Republic.

In addition to the mitigating of the psychological effects, other non-radiological consequences include economic losses (loss of income, loss of property), security concerns (in the event of evacuation), the fear of losing loved ones, etc. Untimely or inappropriate response of the responsible authorities can also cause concern in other unaffected areas, which may influence trade (people do not want to buy goods from the affected region), transport (people do not want to travel there), all sorts of relations (cultural, scientific, political, and social). These issues may become quite complex during large-scale emergencies. Since such radiation emergencies are not very likely in Estonia, these issues were not considered in detail during the mission.

3.14.2. Good Practices

3.14.2.1 Addressing the psychological defense issues in the legislative framework is recognized as a good practice.

3.14.3. Findings

Long term

3.14.3.1 The EB and ER, in cooperation with the other relevant authorities, should consider the preparations for promptly responding to public concern in the event of a radiological emergency. Preparations should include the development of plain language information explaining any health risks, the appropriate and inappropriate personal actions for reducing risks, and issuing instructions to the public for a range of possible emergency scenarios. For this purpose, leaflets and brochures developed by the IAEA may be used.

3.14.3.2 In the field of radiation hazards, misunderstandings and incorrect concepts may lead to inappropriate personal actions (e.g. spontaneous evacuation, food hoarding, and unwarranted termination of pregnancy). Therefore, the legislation should designate the organization(s) responsible for identifying the reasons for such actions (e.g. false information from the media or rumors), and making recommendations to counter them.

3.14.3.3 Although it is not possible to cover all non-radiological issues, measures can be taken to address some of them (i.e. insurance in the event of economic loss or advice from a team of psychologists to handle unjustified fears and worries, specific information on trade for a target audience, transport and different events such as: cultural, sports, religious, political, etc).

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.
- Operating and response organizations should develop the procedures needed to perform their response functions.
- Provide, concentrating on the use of existing capabilities, adequate tools, instruments, supplies, equipment, communications systems, facilities, and documentation.
- 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.
- Make arrangements, concentrating on the use of existing capabilities, for the selection of personnel and training.
- Conduct exercises and drills to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for the facilities in Threat Categories I, II, and III and the national level programs for Threat Categories IV and V are tested at suitable intervals.
- Make arrangements to ensure the availability and reliability of all supplies, equipment, communications systems, and facilities needed during an emergency.

3.15.1 Current Situation

Ref. to (i): According the Emergency Act (paragraph 7) emergency plans should be developed at the national and, if necessary, at the regional and local government level. The outline requires addressing the following parts:

- 1) the organization of responding to emergencies;
- 2) the management structure of responding to emergencies;
- 3) the responsibilities of the agencies or persons participating in responding to emergencies;
- 4) the organization of exchange of information participating in responding to emergencies;
- 5) the organization of informing the public of emergencies;
- 6) the organization of international cooperation in responding to emergencies;
- 7) other important issues related to responding to emergencies.

The results of emergency risk assessment shall be taken into account (paragraph 6) for development of the plans. Plans should be reviewed at least once every two years.

Radiation risk has been assessed in cooperation of the relevant state authorities (the EB, EH, RB, (see Chapter 3.3) and summarized in (two) documents describing:

- a) assessment of radiation emergencies in connection to transboundary accident
- b) assessment of radiation emergencies in connection to domestic accident.

Considering the emergency risk assessment performed for radiation emergencies, the MI has prepared the nREP, which had been approved by the Government in August 2011. This plan appoints and delegates executive power

to coordinate the response to the RB and specifies the coordination between the rescue command system and crisis management committees (see Appendix VII). This plan follows the requirements specified in the Emergency Act (paragraph 7) and takes into account the existing risk assessment for radiation emergencies. The nREP has addressed mainly the allocation of responsibilities for the management of radiological emergencies.

The license holders in the case of high risk radiation practices have the obligation to perform a risk assessment and to prepare an emergency plan on the basis of the Radiation Act (paragraph 30 & 71).

The structure of the emergency response plan required for radiation practices involving high risk should cover:

- Short description of radiation practice;
- Possible emergency situations and their consequences;
- Preventive measures;
- Instructions to workers;
- Resources;
- Name and contact data of responsible person;
- Communication with other organization

During the mission the AS ALARA radioactive waste storage facility, the brachytherapy unit located in the North Estonia Medical Centre (Tallinn) and Co60 Irradiator (ENKO) were visited by the EPREV team. In all cases, on-site emergency plans were available and meet the legal requirements.

In the case of the Co60 Irradiator, a high level of coordination between on-site and local government emergency plans was demonstrated. Emergency plans and procedures were developed through implementing the last international practices and following international standards. The quality system of the facility ensures that all applicable standards are strictly followed. These are ISO 9001/2000 (basic Q/A rules), ISO 13485 (special Q/A rules for the medical industry, EN 552 (rules for irradiation), EN 556 (definition of the term sterility) and ISO 11137 (rules for a/o validation of products). A high level of physical protection and radiation monitoring has been implemented by the design of the irradiator and additionally from cooperation of the US. The staff is regularly trained and could be fully involved in response activities to radiation emergencies.

However, the AS ALARA company's emergency plan has not been coordinated with the local government units and therefore, the example of Co60 irradiator (ENCO) should be recommended as a good practice to be followed. The visited brachytherapy unit, which operates an Ir-192 radioactive source in category 2, has modern equipment and facilities. The unit has high level physical protection and radiation monitoring systems which have been considered in the design phase of the new places of work where the radiation practice is performed. A radiation emergency plan, working procedures, emergency procedures and a well established quality system are in place. In case of a radiation emergency, the operators notify the Radiation Safety Department of the EB and the German company which is the manufacturer of the brachytherapy equipment. The first emergency actions the operator must carry out are written and posted on the wall and are tested twice every year.

Ref. to (ii): Detailed procedures and / or instructions are available at the level of the operators, and also at the level of public authorities, and they have been presented to the mission team during visits. For example, detailed procedures in electronic form (installed on notebooks) and/or printed were presented during the visits at the CBRN unit of the Rescue Board and the Co60 Irradiator facility.

Ref. to (iii): The Emergency Act promotes the integrated emergency management approach. Available tools and equipment for conventional emergencies can be used. In addition to these arrangements, in case of a radiation emergency the response organizations with the necessary equipment and expertise in radiation should play an

important role. Radiation detection equipment is available at some first responder teams, mainly in the case of rescue teams (Rescue Board) located in more populated areas. In several possible accidents, the police and/or medical first aid could be the first responders arriving first at the scene, the equipment and necessary training needs should also be analyzed for these teams. Specialized measurements are planned to be carried out by the response organization that has expertise and the necessary equipment (CBRN unit of the RB and possibly EB if so instructed by RB) in this area. Coordination and use of equipment should follow the response according to the nREP.

Ref. to (iv): With respect to nREP, the RB incident command system and available on-site emergency plans, all facilities needed for response to radiation emergencies have a clear allocation of roles and responsibilities.

- (a) coordination of on-site response actions: according to on-site emergency plans
- (b) coordination of local off-site response actions (both radiological and conventional): local government emergency plan and Rescue Board ICP
- (c) coordination of national response actions: government level plan, RB ICP
- (d) coordination of public information: RB
- (e) coordination of off-site monitoring and assessment: EB.

Ref. to (v): According to the risk assessment the available rescue organization and professional bodies responsible for radiation related area (the EB, HB, VFB and AS ALARA) have a key role in the response coordination. The staff of the EB and AS ALARA is highly qualified and have great experience in response and assessment of radiation situations and have an obligation to participate in response activities.

Regarding the HB and medical responders, some gaps were identified in this area. The Health Board should have improved response capabilities, mainly related to the health aspects. Training of medical personnel for a radiation emergency is not sufficient and needs to be improved. The level of training necessary for the VFB staff should be reviewed.

An important role in response to radiological emergencies is assigned to the RB. The RB, as a professional body in the rescue field, has a professional qualification system for staff also covering radiation aspects. The practical application of this knowledge is maintained only at rescue units having chemical service capabilities (6 units). The specialized team (CBRN unit of the RB) has a high level of training for field operation and is capable of performing gamma monitoring in a wide range (background – 10Sv/h), in addition to alpha, beta monitoring and to perform field spectrometry for identification of the most critical radioisotopes.

Ref. to (vi): Both the Emergency Act and the Radiation Act stipulate conditions and requirements on exercises. Facility on site emergency plans should be exercised, at a minimum, once a year, national emergency response exercises shall be conducted at least once in every four years. The plan for exercises at regional/local level should be approved by the regional/local crisis management committee. The content of the exercises and the frequency of organizing regional and local government exercises should be prepared according to the guidelines established by a regulation of the MI.

Following the legal requirements, emergency training and exercises are organized at licensed radiation practices involving a high radiation risk. Several exercise events were organized during the last year. Joint exercises took place at Koidula and Narva Border Point in 2008 to increase the awareness at border points. Before the exercises, an intensive training for custom officers was organized. The lessons learned (e.g. problems with information exchange) were used for the further development of emergency response conditions.

A complex large scope integrated emergency exercise, CREMEX2011, involving radiation and chemical emergency scenarios was held in May 2011. The radiological emergency part covered the source accident,

radiological accident involving dispersion (fire, RDD) and enabled the testing and verification of operational procedures for response to these events including recovery, simulation of decontamination and evacuation.

Ref. to (vii): Most of the necessary supplies, equipment, communication systems, and facilities recognized for response to radiation emergencies are part of the equipment for conventional emergencies. Availability and reliability of this equipment is regularly tested and some equipment (fire response, rescue at transport accident) is used daily in different response activities. Special equipment for the detection of radiation and radiation measurements are used in common work (laboratory measurements) or tested in exercises or drills.

Based on the nREP, the RB has a duty to prepare an overview of the resources of itself and other institutions and persons involved in responding to an emergency. This resource catalogue should contain an overview of the technical resources of the relevant institutions and persons together with the contact details of personnel. The resource catalogue should be updated at least once a year. From the point of further development planning, this overview could be a part of a complex quality assurance program for a high degree of availability and reliability of all the supplies, equipment, communication systems and facilities necessary to perform response to radiological emergencies.

3.15.2. Good Practices

3.15.2.1 A high level of coordination between facility (on-site) and local government unit, demonstrated by the Co60 Irradiator (ENKO) has been recognized as a good practice in the area of emergency management that deserves to be an example for other facilities in Estonia and abroad.

3.15.3. Findings

3.15.3.1 With respect to international guidance [EPR-METHOD-2003] the structure and scope of the nREP should be reviewed and supplemented with additional parts (e.g. planning basis, emergency preparedness process, logistics), which gives a complex framework for the emergency preparedness and response activities. The methodology for doing so is described thoroughly in [EPR-METHOD-2003], also, other IAEA publications are recommended. A pre-requisite to revising the nREP is the threat assessment and categorization of facilities and practices in Estonia that is to be performed in accordance with the recommendations in section 3.2. of this Report.

3.15.3.2 The revised nREP should clearly specify the requirements on lower level planning (paragraph 7 of the Emergency Act). All emergency response organizations, identified in the nREP, should develop or review their plans and procedures harmonized with their tasks, which should then be included into the nREP. 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 of ordering implementation of the task), the need for special equipment (protective clothing, radiation detectors, etc.), training requirements, and other emergency related requirements. The EPR-METHOD [3] and IAEA assistance, as well as cooperation with neighboring countries, can be used to facilitate writing the procedures.

3.15.3.3 Responsibilities for decision making regarding agricultural countermeasures and food consumption in the event of an emergency should be clearly addressed in the revised nREP, including the roles of all organizations which may take part in this process.

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

identified and listed in the nREP. In the process of the nREP revision, a thorough analysis should be performed to determine whether the available resources (e.g. radiation detectors) meet the needs of rescue teams and other first responder teams (medical, police).

3.15.3.5 The revised nREP should contain a package of written procedures for the notification of the endangered population in the vicinity of threat category III facilities (e.g. emergency at the facility) and during certain radiological emergencies of threat category IV (e.g. a large transport accident, a fire involving a source, or large scale contamination). The information pathways should be described, outlining which media broadcaster the information should be sent to, by which means (facsimile, e-mail, telephone).

3.15.3.6 The revised nREP should have attachments with arrangements and procedures for agricultural countermeasures in areas with threat category V. These procedures may include rules for restriction of the consumption, distribution, and trade of imported or locally produced foods following radioactive contamination of agricultural areas (e.g. due to a fire involving radioactive material, Radiological Dispersal Device (RDD), or an accident at a nuclear facilities abroad).

3.15.3.7 Sampling procedures for food, crops, and agricultural soil in the event of an emergency should be included in the revised 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). The IAEA-TECDOC-1092 “Generic Procedures for Monitoring in a Nuclear or Radiological Emergency” and IAEA assistance (training course, fellowships) can be used to facilitate writing and testing procedures.

3.15.3.8 It is suggested in revising the nREP to involve those persons who have attended the relevant IAEA courses. In the event of doubt or lack of guidance, seeking IAEA advice may be the most efficient way to find adequate solutions.

3.15.3.9 Analysis of additional needs for radiation detection equipment for the first responder teams (rescue, medical, police) should be carried out.

3.15.3.10 Basic training on radiation protection issues and practical exercise to verify knowledge should be included in the program of training for rescue teams at all levels.

3.15.3.11 Considering the possible radiological impacts of a transboundary emergency, the monitoring capabilities should be reviewed (including the Early Warning System, mobile laboratories and reference laboratories) to ensure a sufficient level of readiness.

3.15.3.12 The selected emergency exercises of license holders shall be overseen by specialists of the EB and inspectors of EI.

3.15.3.13 The RB should consider organizing a national training course for all first responders groups, based on the IAEA First Responders Training materials with the IAEA support.

3.15.3.14 Rescue teams equipped with equipment for the detection of radiation have received basic training, but considering the low appearance of radiological events, written instructions that are practicable for use during field operations should be developed and distributed to these units.

3.15.3.15 The guidance on establishment and maintenance of a quality assurance program should be developed and integrated in the national radiological emergency plan, in accordance with paragraphs 5.37 -5.39 of GS-R-2. The program will ensure a high degree of availability of all supplies and equipment necessary to perform an effective response. The maintenance of the existing resource catalogue could be an integral part of this program.

Appendix I
MISSION SCHEDULE

Date	Subject
Day 1 26.09.2011	<p>Entrance Meeting at the Ministry of Environment with representatives of national organizations involved in emergency preparedness and response in Estonia (a list of the participants is given in Appendix IV).</p> <p>IAEA Presentations on the EPREV mission tasks, followed by presentations from the following organisations:</p> <ul style="list-style-type: none"> • Ministry of Environment • Environmental Board (Radiation Safety Department) • Environmental Inspectorate • Ministry of Interior • Rescue Board • Police and Border Board • Health Board • Veterinary and Food Board • Tax and Customs Board • AS ALARA <p>Briefings conducted and the institutions to be considered for reviewing were determined.</p>
Day 2 27.09.2011	<p>Visit to the Environmental Board, Department of Radiation Safety and Environmental Inspectorate</p> <ul style="list-style-type: none"> • Review of the radiation protection legislation, licensing and inspection system, register and control of radiation sources, environmental monitoring, early warning, duty officers 24/7, adviser to decision makers, public information. <p>Visit to the laboratory for environmental monitoring</p>
Day 3 28.09.2011	<p>Visit to the Ministry of Interior, Rescue Board</p> <ul style="list-style-type: none"> • Review of emergency legislation and organizational structure. Acquaintance with Rescue Units and CBRN emergency preparedness and response capabilities. Discussion on communication in case of an emergency, training of first responders and exercises; availability of plans and procedures. <p>Visit to the Tallinn downtown Rescue Station</p>
Day 4 29.09.2011	<p>Visit to the Radioactive waste management organization AS ALARA</p> <ul style="list-style-type: none"> • Discussion with the facility management on their emergency response functions and emergency plan review. Walking tour of the facility

Day 5 30.09.2011	Visit to the North Estonia Medical Centre (NEMC) <ul style="list-style-type: none">• Coordination of health care services in emergency• NEMC emergency preparedness, diagnostics
Day 6 01.10.2011	EPREV team work on drafting the EPREV report
Day 7 02.10.2011	EPREV team work on drafting the EPREV report
Day 8 03.10.2011	EPREV team work on drafting the EPREV report <ul style="list-style-type: none">• Distribute draft report (by e-mail) to counterpart for preliminary comments
Day 9 05.10.2011	Final meeting at the Ministry of Environment <ul style="list-style-type: none">• Introduction of preliminary EPREV mission findings and recommendations. Introduction of feedback from the response organizations. Discussions with participants of the meeting — fact findings, arrangements in place, good practices, deficiencies, comments, recommendations and proposals for improvements
	EPREV summary team meeting

APPENDIX II
MISSION TEAM COMPOSITION

Ms. Larisa ROZDYALOUSKAYA	Team Leader, IAEA
Mr. Karol JANKO	Team Member, Slovakia
Ms. Adriana Celestina BACIU	Team Member, Romania
Mr. Yusuf GULAY	Team Member, Turkey

HOST:

Environmental Board, Radiation Safety Department
<http://www.keskkonnaamet.ee/eng/acivities/radiation/>

Address: Kopli Str 76, 10416 Tallinn. Estonia

Contact: Mihkel Visnapuu
Tel: +372 66 44 927
e-mail: mihkel.visnapuu@keskkonnaamet.ee

Contact: Toomas Kööp
Tel: +372 66 44 907
e-mail: toomas.koop@keskkonnaamet.ee

Appendix III

ASSESSMENT SHEET PREPARED BY THE EPREV TEAM IN COOPERATION WITH THE REQUESTING STATE.

The following table provides a key of the performance indicators (PI) that were used in the assessment check list.

Table 1. Performance indicators for the self-assessment check list

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 get an interim basic response capability. The numbers in parenthesis reference those in the appendix of this self-assessment check list. If the item applies to a specific threat category, this is noted.

Reference [2] provides guidance that may be helpful in assessing if an item is being met.

Task No.	Brief description	Possible IAEA Input			PI	Self-assessed status
		Doc ²	WS ³	Other ⁴		Comments
1	Basic responsibilities	●	●	●		
	(1) Identify a national coordinating authority				3	The Emergency Act issued in 2009 provides the legal basis for the crisis management system covering preparedness for and response to emergencies in the country and designates the Ministry of Interior (MI) to act as a national coordination authority, whose function, among others, is to coordinate the arrangements for preparedness and response to radiological emergencies. The Rescue Board (RB) belonging to the Ministry of Interior is the professional organization responsible for the coordination of any kind of emergency in the Estonian territory, which directs the response to an emergency and performs rescue works.
	(2) Clearly assign functions and responsibilities				3	The Radiation Act (amended in 2009) defines the Ministry of Environment (ME) as a national competent authority in the area of radiation protection and safety. ME executes these radiation protection functions

² Documents: TECDOC, Safety Standards, etc.

³ Workshops and training.

⁴ Expert mission, scientific visit, equipment, etc.

Task No.	Brief description	Possible IAEA Input				PI	Self-assessed status
		Doc ²	WS ³	Other ⁴	Comments		
							<p>through the Environmental Inspectorate (EI) and the Environmental Board (EB).</p> <p>The EB acts as an adviser and response organization in the area of radiation protection; it reports to the MoE. The EB is also responsible for providing environmental and individual radiation monitoring in the Estonian territory.</p> <p>The functions and responsibilities of all state authorities and response organizations to be involved in response to radiological emergency are summarized in the national Radiological Emergency Response Plan (nREP), approved by the Government on the 4th of August 2011 and draft Regulation on the Intervention in the Situation of Accidental or Lasting Exposure. These two documents define duties for: EB, Rescue Board (RB), Health Board (HB), Police and Border Guard Board (PBGB), Veterinary and Food Board (VFB), local government units, health service providers, Institute of Physics of the University of Tartu, the providers of vital services and the national administrator of a radioactive waste management facility (AS ALARA Company).</p> <p>The responsibility of operators to prevent or reduce the release of radioactive material and exposure of workers and the public is defined by the Radiation Act and subordinated regulations.</p>
	(3) Establish a regulatory and inspection system				2		<p>The regulatory and inspection system is in place. The Environmental Board has the responsibility for issuing license for radiation practices. The EI is responsible for the inspection system according to the Environmental Supervision Act (RTI 2001, 56, 337). It provides that all facilities/practices must make arrangements to prevent or reduce the release of radioactive material and exposure of workers and the public. Practices with high risk (where an effective dose for workers may exceed 6 mSv per year) have to prepare risk assessment and emergency response plan.</p> <p>The compliance with the requirements is checked during the authorization procedure (made by the EB) and also during regulatory inspections, conducted by inspectors of the EI, often in cooperation with the specialists of Radiation Safety Department of the EB. A written guidance on how to perform an inspection of the existing radiation practices, including inspection of emergency response plans is not available.</p>

Task No.	Brief description	Possible IAEA Input			PI	Self-assessed status
		Doc ²	WS ³	Other ⁴		Comments
2	Assessment of threats	●	●	●		
	Perform national threat assessments				2	<p>In general the existing legislation and assessments of the radiological risks provide a good basis for implementing international (GSR-2) requirements, in order to get a harmonized graded approach to establishing arrangements for preparedness and response to radiological emergencies.</p> <p>The National Register of Sources and Practices have been completed and continuously maintained. Radiation practices of threat categories III, IV and V (the IAEA categorization) have been recognized.</p> <p>Radiation practices are divided into 3 risk categories (low, moderate, high) depending on the value of effective dose, which may be received in emergency situation. Operators of practices with high risk (where effective dose exceeding 6 mSv in a year) are prescribed to make a risk assessment and emergency response plan according to the Radiation Act. High risk categories include: industrial radiography, radiotherapy, irradiation facility; radioactive waste management facility.</p>
3	Establishing emergency management	●	●	●		
	Make arrangements to coordinate the emergency responses of all the off-site response organizations with the on-site response				2	<p>The available infrastructure, established by the Emergency Act on the basis of an all-hazard concept is used for any type of emergency.</p> <p>Coordination of the emergency response of the off-site response organizations with the on-site response organizations is to be implemented by the Crisis Management Committees, which are functioning at the facility, local, regional and national level. The Committee forms a crisis management team, whose responsibility is to coordinate the exchange of information, use of resources and cooperation between different response organizations as well as to analyse the situation and organize training.</p> <p>Rescue Board has leadership in responding to a radiation emergency according to the nREP provisions.</p> <p>Nevertheless, further improvements in coordination of response to transboundary accidents should be achieved and reflected in the nREP.</p>

Task No.	Brief description	Possible IAEA Input			PI	Self-assessed status
		Doc ²	WS ³	Other ⁴		Comments
4	Identifying, notifying and activating	●	●	●		
	(1) Establish 24/7 notification points				3	<p>The emergency line 112, belonging to the RB, under the MI is continuously available 24 hours/day and 7 days per week and dedicated for receiving notifications of any type of emergency, including a radiological emergency.</p> <p>A notification point 24 hours/day and 7 days/week is also functioning at the Radiation Safety Department of the EB and at the EI under the MoE.</p>
	(2) Make aware on-site managers of operations and the local officials responsible for response at the scrap metal processing facilities, national border crossings, etc. of the indicators of a potential emergency, appropriate notifications and other immediate actions				2	<p>In Estonia there are a few scrap metal facilities which collect and one that grinds the recyclable metallic materials, but there are no melting facilities. The scrap metal is exported abroad, usually to Finland and Sweden.</p> <p>Scrap metal companies and the main border ports (railway, airport, road) are equipped with fixed radiation monitoring systems.</p> <p>However, there is no evident information, if the on-site scrap metal managers have clear idea of what to do in case the radioactivity levels are detected above the normal natural background.</p> <p>The Tax and Custom Board (TCB) as well as scrap metal companies have mobile radiation detectors.</p> <p>The TCB is in direct contact to the Radiation Safety Department of the EB for cases where radiation exceeds a specified level.</p> <p>The Statutes of the TCB provides for curbing unlawful handling of goods. There is no specified obligation for the detection of radioactive materials on border crossing points.</p> <p>TCB has internal guidance for response in case of the detection at a border of illegal radioactive material.</p>
	(3) Ensure awareness of first responders on immediate actions and notification procedure				2	<p>When an emergency event is notified at the emergency line 112, the dispatcher establishes the emergency priority and activates the most appropriate Rescue Unit for responding to the respective event. The Rescue Unit which is closest to the location of the event is notified immediately after receiving the notification.</p> <p>The rescue workers, together with the emergency medical staff and police units are the first responders in case of any type of emergency. Rescue workers have basic training in radiation protection, according to their specific qualification. Mainly, the basic training includes the recognition of the</p>

Task No.	Brief description	Possible IAEA Input			PI	Self-assessed status
		Doc ²	WS ³	Other ⁴		Comments
						<p>“radiation sign”, the different marking signs of dangerous materials, and basic information about ionizing radiation types. As part of the instruction manual (2009), all Rescue workers have received instructions on the immediate actions they have to take in case of a radiation related emergency. Some of the Rescue Units are provided with pagers which give a basic indication of radioactivity presence.</p> <p>When the accidental event involves a radiological threat, the CBRN Unit of the Rescue Board is notified and activated immediately in order to support the local Rescue Unit in the field.</p> <p>The first responders still need to receive training and relevant instructions. Efforts are being made to improve the situation.</p>
	(4) Establish a system for promptly initiate an offsite response in the event of an emergency				3	<p>Upon receiving information on an accident involving radiation sources, the Rescue Board can independently initiate an off-site response. The RB and the Radiation Safety Department of the EB are on a common information line and the RSD acts as adviser and as a response organization.</p> <p>The Estonian Early Warning System, operated by the Ministry of Environment through the EB, consists of 10 environmental gamma radiation monitoring stations. In case the emergency in Estonia or neighboring countries which may result in radioactive contamination of the Estonian territory, the EB submits the information to the MIA, which notifies the Crisis Management Committee of the Government. The Committee initiates the response to the actual or potential emergency according to the Emergency Act (2009).</p>
	(5) Ensure response organizations have sufficient personnel to perform initial response actions				2	<p>The response organizations have qualified personnel available to perform their assigned initial response actions. However, the police and medical personnel involved in radiological emergency response are not sufficient at present for performing their duties.</p> <p>There is also a lack of well-qualified and trained personnel in the field of Radiation Protection.</p> <p>The “National Radiation Safety Development Plan 2008 – 2017” (NRSDP) which provides for a ten year programme on developing and enhancing radiation safety in Estonia, specifies arrangements needed to improve the situation.</p>

Task No.	Brief description	Possible IAEA Input			PI	Self-assessed status Comments
		Doc ²	WS ³	Other ⁴		
	(6) Make known to the IAEA and to other States the national single warning point of contact				3	The Radiation Safety Department of the EB is the national warning point of contact responsible for receiving information from other States and from the IAEA, with respect to ECURIE and CONVEX exercises. The RB is the contact point for NATO, UN, and the EC.
5	Taking mitigatory actions	●	●	●		
	(1) Make arrangements for on-call advice and support teams to assist first responders and local officials				3	Radiation protection expertise and services are available from the Radiation Safety Department of the EB, CBRN unit of RB and other organizations.
	(2) Provide instruction to operators of threat category IV practices				2	The "Radiation Act", paragraph 30, requires the operator of the practice in Threat Category IV to provide training and safety instructions to workers dealing with radiation. The availability of the relevant instructions is one of the basic conditions for issuing a license (instructions for recognizing an emergency, taking actions to protect people nearby, mitigate the emergency, inform off-site officials of the risk). Nevertheless, a brief guidance for operators of threat category IV may be needed, to outline what mitigatory actions should be included in their official instructions
	(3) Make arrangements for search and public warning if dangerous source is lost or stolen				2	The emergency response plan of the high risk facilities and operator's instructions are supposed to describe actions for prompt search of the lost/stolen source. The licensees have the responsibility to promptly notify the Emergency Centre of RB and EB Radiation Safety Department, which in turn have the obligation to activate a search and issue a warning to the public. However, there is no official written procedure on how the organisations involved in responding to such event (operator, RB, EB, Police, Environmental Inspectorate) will act and interact.

Task No.	Brief description	Possible IAEA Input			Self-assessed status	
		Doc ²	WS ³	Other ⁴	PI	Comments
	(4) Make arrangements for mitigatory action in threat category I, II or III				3	All necessary rectifying actions will be performed in accordance with the Emergency Act and the Radiation Act. The operator of a practice with high risk has to undertake necessary actions to alleviate the emergency consequences; these must be included in an emergency response plan.
6	Taking urgent protective actions	●	●	●	●	
	(1) Establish intervention levels for urgent protective actions				3	Regulation no. 93/2004: "Intervention and action levels and emergency exposure limits in a radiological emergency" specifies Generic Intervention Levels (GILs) for urgent (sheltering, evacuation, thyroid blocking) and late (temporary relocation, returning, permanent resettlement) protective actions and prescribes action levels for foodstuffs, which are consistent with the internationally recommended values.
	(2) Make arrangements for effective implementation of off-site urgent protective actions for category I and II				2	Estonia does not have facilities in threat categories I or II, and the number of facilities of threat category III is still to be confirmed by the threat assessment. So, there are neither facilities nor practices that would warrant urgent protective action off-site.
	(3) Ensure safety of those on site at category I, II or III				3	The appropriate on-site emergency management is a part of the operating procedures (safety requirements and emergency handling), which are a prerequisite of issuing a license for commissioning of the facility. The operator of a threat category III practice with high risk has to make necessary arrangements and put the appropriate actions in the on-site emergency response plan.
7	Providing information and issuing instructions and warnings to the public	●	●	●		
	Make arrangements to provide prompt warning and instruction to the permanent, transient and special population groups				2	In Estonia this requirement may be applicable only to some exclusive radiological emergencies (e.g. a large transport accident, a fire involving a source, or large scale contamination due to an accident at a NPP abroad). Nevertheless, arrangements are in place, and it is the obligation of the EB and RB to issue warnings and instructions to the public upon receiving notification from the licensee of an incident / accident on the site. According to the national Radiation Emergency Plan, chapter 7, the EB shall notify the public of an impending risk of a

Task No.	Brief description	Possible IAEA Input			PI	Self-assessed status
		Doc ²	WS ³	Other ⁴		Comments
						<p>radiological emergency occurrence and a rescue institution (RB) shall notify the public of the response to a radiological emergency.</p> <p>The RB has developed two specific Communication Plans (CP), one for accidents abroad and one for accidents inside the country, which describe the framework and basic information to the public in case of radiological emergencies.</p>
	Protecting emergency workers	●	●	●		
	Arrange for protection of emergency workers and response personnel				2	<p>The legal basis for the protection of emergency workers is outlined in Regulation no. 93/2004: "Intervention and action levels and emergency exposure limits in a radiological emergency". According to this regulation, a dose limit of 100 mSv effective dose per event is established. This dose limit might be exceeded only on a voluntary basis.</p> <p>The volunteers participating in intervention operations and other persons in the area of accidental exposure shall be subject to individual monitoring, provided by the EB Radiation Safety Department.</p> <p>There is no clear description of how the individual dosimetry and dose management will be performed for emergency workers.</p>
9	Assessing the initial phase	●	●	●		
	Establish default OILs for radiological emergencies				2	<p>OILs are only adopted in the recently approved (2011) Radiological Emergency Response Plan. In Annex 1 of the Plan, OILs, expressed as gamma dose rates (microSv/h), alpha contamination (Bq/cm²) and beta contamination (Bq/cm²), are adopted in order to set up the approximate radius of the inner cordoned area in radiological emergencies.</p> <p>There is a need for additional default OILs for introducing protective actions to the population.</p>
10	Managing the medical response	●	●	●		
	(1) Make medical practitioners aware of the medical symptoms of radiation exposure and of the appropriate notification procedures				1	<p>No special arrangements are in place.</p> <p>The medical staff have not been provided in recent years with specific training concerning the medical response of radiation emergencies. The general training of medical doctors and residents does not include a chapter on medical response in radiation emergencies. Therefore, with few exceptions (a few experts that have benefitted from training more than ten years ago), medical personnel are not aware of the medical symptoms of radiation exposure.</p>

Task No.	Brief description	Possible IAEA Input			Self-assessed status	
		Doc ²	WS ³	Other ⁴	PI	Comments
	(2) Establish national capability to initially treat exposed and contaminated people				1	The medical services in any emergency are provided by hospitals, under coordination of the Health Board. As a practical rule, the treatment of patients in case of a radiological emergency (the in-patient care) will be provided in the regional hospitals, which have departments of hematology: Tartu University Hospital (Tartu), North Estonia Medical Centre (Tallinn), Children's Hospital (Tallinn). Outpatient care will be provided by family doctors, under guidance of the Health Board experts. The hospitals have no special decontamination units for radiation emergencies.
	(3) Make arrangements to obtain international assistance in treatment if required				2	The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency was adopted in Estonia in 1994. The Competent Authority is the Environmental Board. Bilateral agreements on assistance have been concluded between Estonia and Finland, Sweden and Latvia. The Estonian Competent Authority for these agreements is the Rescue Board.
11	Keeping the public informed	●	●	●		
	(1) Make arrangements for providing useful, timely, truthful, and consistent information to the public in the event of a nuclear or radiological emergency				2	There is a specific Governmental Regulation No 92 (2010), titled: "Procedure for notification of public of impending risk of occurrence of emergency, of emergency and of response to emergency and requirements for information to be communicated". The Regulation includes detailed responsibilities of the different authorities concerned with public notification of an impending risk, of the emergency occurrence and of the response to an emergency, in conformity with their domain of activities. According to the Emergency Act provisions, the information on a radiation hazard is transmitted to members of the public by television, radio and other means of mass communication in accordance with the Crisis Management Committee's decision. The content of respective messages will be prepared by the Committee's Management Group and transmitted by the Management Group's Press Centre. Content of the group's messages follows the guidelines for radiological emergencies prepared by the EB.

	(2) Make arrangements for responding to incorrect information and rumours; and for responding to requests for information from the public and from news and information media				2	Guidance for responding to public requests and media is in place (guidance of the EB). Provisions are included in the above mentioned Regulation 92/2010. In chapter 3 of the “Emergency Act” the duties of the mass media in emergency situations are established. The owners of mass media shall present to the public, in unaltered form and free of charge, the information received from the authorities. No specific procedure is in place for responding to incorrect information and rumours.
12	Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions	●		●		
	(1) Establish intervention/action levels for agricultural countermeasures that are in accordance with international standards				2	National intervention and action levels have been adopted in compliance with the international recommendations. Regulation no. 93/2004: “Intervention and action levels and emergency exposure limits in a radiological emergency” includes Generic Action Levels for foodstuff. Additional operational intervention levels are needed.
	(2) Taking agricultural countermeasures in areas with activities in threat category V				2	The appropriate arrangements (restriction of consumption, distribution and sale of locally produced foods, timely monitoring, etc.) are defined in the national Radiation Emergency Plan (2011). It assigns responsibilities mainly to the Veterinary and Food Board, Environmental Board and Health Board. The Radiation Safety Department of the EB is responsible for organizing environmental radiation monitoring and environmental sample analysis. A strategy for taking effective agricultural countermeasures through the whole food chain, including product processing and use of contaminated land is still missing.
13	Mitigating the non-radiological consequences of the emergency and the response	●	●	●		

<p>Make arrangements for responding to public concern in an actual or potential nuclear or radiological emergency</p>	<p>2</p>	<p>The appropriate arrangements (consulting the affected people, countering non-credible allegations, preventing spontaneous evacuation, the hoarding of food, etc.) are defined in the national Radiation Emergency Plan (2011). In addition, a special paragraph 11 “Organisation of psychological defence” is included in chapter 3 of the “Emergency Act”. According to the Act, the Psychological Defence Plan shall be developed by the State Chancellery and approved by an Order of the Government of the Republic. This Plan is not yet in place.</p>
<p>14 Requirements for infrastructure ● ● ●</p>		
<p>(1) Develop emergency plans for</p> <ul style="list-style-type: none"> ▪ On – and off- site response at category I, II and III and ▪ The national response all categories 	<p>2</p>	<p>The national Radiological Emergency Plan (nREP) is in force since August 2011. This plan appoints and delegates the executive power to coordinate the response to the RB and specifies the coordination between the rescue command system and crisis management committees.</p> <p>The license holders in the case of high risk radiation practices have the obligation to perform a risk assessment and to prepare an emergency plan on the basis of the Radiation Act (paragraphs 30 & 71).</p>
<p>(2) Develop response procedures for:</p> <ul style="list-style-type: none"> ▪ On- and off site response at category I, II and III ▪ National response ▪ First responders’ response to radiological emergencies 	<p>2</p>	<p>A series of procedures and Emergency Manuals have been prepared, but certain procedures have not been implemented yet. Efforts are being made to improve the situation.</p>
<p>(3) Provide adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation for performing response functions</p>	<p>2</p>	<p>The Emergency Act promotes the integrated emergency management approach. Available tools and equipment for conventional emergencies can be used. Radiation detection equipment is available at some first responders teams, mainly in case of the rescue teams (Rescue Board) located in more populated areas.</p> <p>The NRSDP 2008 - 2017 includes provisions for their upgrade. In particular, this concerns an early warning system and equipment for radiation monitoring in different response organizations.</p>
<p>(4) Identify emergency facilities for category I and II</p>	<p>N/A</p>	

(5) Make arrangements for training of responders	2	<p>The RB, as a professional body in the rescue field, has a professional qualification system for staff that also covers radiation aspects. The specialized team (CBRN unit of the RB) has a high level of training for field operations and is capable of performing gamma monitoring in a wide range (background – 10Sv/h), in addition to alpha and beta monitoring, and performing field spectrometry for identification of the most critical radioisotopes.</p> <p>However, there is a need for additional training of the RB local units and personnel of the other first response organizations (police, medical, etc.)</p>
(6) Conduct: <ul style="list-style-type: none"> ▪ National table top exercise ▪ Exercise for threat category I, II or III ▪ Drill for first responders 	2	<p>There is a detailed training and exercise plan on emergencies at different levels (Emergency Act). However, there is no separate training on radiological emergencies.</p> <p>The RSD of the EB has regularly taken part in regional (Baltic area) exercises and also in the domestic exercises.</p> <p>A complex large scope integrated emergency exercise CREMEX2011 involving radiation and chemical emergency scenarios was held in May 2011. The radiological emergency part covered a source accident, radiological accident involving dispersion (fire, RDD) and tested to check operational procedures for response to these events including: recovery, simulation of decontamination and evacuation of people.</p>
(7) Make arrangements for availability, re-supply, tests and calibrations of supplies and equipment and updating plans and procedures	2	<p>Most of the necessary supplies, equipment, communication systems, and facilities recognized for response to radiation emergencies are part of the equipment for conventional emergencies. Availability and reliability of this equipment is regularly tested and some equipment (fire response, rescue at transport accident) is used daily in different response activities.</p> <p>Special equipment for the detection of radiation and measurement of radiation are used in common work (laboratory measurements) or tested during exercises or drills.</p> <p>The Rescue Board has a duty to prepare an overview of its resources and those of the other institutions and persons involved in response to any emergency. This resource catalogue should contain an overview of the technical resources of the relevant institutions and persons together with the contact details of personnel. The resource catalogue should be updated at least once a year.</p>

Appendix IV
LIST OF PARTICIPANTS of the IAEA EPREV MISSION BRIEFING

Day 1, 26.09.2011**Ministry of Environment**

No.	Name	Organization, Position
1.	Allan Gromov	Ministry of Environment
2.	Evelyn Pesur	Ministry of Environment
3.	Ergo Pärn	Ministry of Environment
4.	Reelika Runnel	Ministry of Environment
5.	Ilmar Puskar	Environmental Board
6.	Toomas Kõöp	Environmental Board
7.	Mihkel Visnapuu	Environmental Board
8.	Teet Koitjärv	Environmental Board
9.	Pavel Ojava	Environmental Inspectorate
10.	Himot Maran	Environmental Inspectorate
11.	Marily Jaska	Environmental Inspectorate
12.	Lauri Luht	Ministry of the Interior
13.	Kady Danilas	Rescue Board
14.	Stella Polikarpus	Rescue Board
15.	Igor Liev	Rescue Board
16.	Priit Saar	Police and Border Guard Board
17.	Mihkel Tamme	Health Board
18.	Dagmar Undrits	Veterinary and Food Board
19.	Kaja Sepper	Veterinary and Food Board
20.	Piret Tinkus	Estonian Tax and Customs Board
21.	Mart Varvas	Radioactive waste management organization: AS ALARA
22.	Sergei Nazarenko	North Estonia Medical Centre

Day 2, 27.09.2011**Environmental Board**

No.	Name	Organization, Position
1.	Toomas Kõöp	Environmental Board
2.	Pavel Ojava	Environmental Inspectorate
3.	Marily Jaska	Environmental Inspectorate
4.	Eia Jakobson	Environmental Board, Head of Laboratory of Radiation Monitoring Bureau

Ministry of Environment

No.	Name	Organization, Position
1.	Evelyn Pesur	Ministry of Environment
2.	Reelika Runnel	Ministry of Environment

Day 3, 28.09.2011**Rescue Board**

No.	Name	Organization, Position
1.	Lauri Luht	Ministry of the Interior
2.	Igor Liiv	Rescue Board
3.	Stella Polikarpus	Rescue Board

No.	Name	Organization, Position
4.	Kady Danilas	Rescue Board
5.	Martin Vallimäe	Rescue Board
6.	Jaan Tross	Rescue Board
7.	Eva Rinne	Rescue Board

Tallinn downtown Rescue Station

No.	Name	Organization, Position
1.	Toomas Kääparin	Tallinn downtown Rescue Station
2.	Andres Mumma	Tallinn downtown Rescue Station
3.	Aleksander Smirnov	Tallinn downtown Rescue Station
4.	Stella Polikarpus	Rescue Board
5.	Kady Danilas	Rescue Board

Day 4, 29.09.2011

AS ALARA (Radioactive Waste Management Organization)

No.	Name	Organization, Position
1.	Joel Valge	Radioactive waste management organization: AS ALARA, Head
2.	Mart Varvas	Radioactive waste management organization: AS ALARA
3.	Valeri Badyrkhandv	Radioactive waste management organization: AS ALARA, Radiation protection adviser

Day 5, 30.09.2011

North Estonia Medical Centre

No.	Name	Organization, Position
1.	Mihkel Tamme	Health Board
2.	Sergei Nazarenko	North Estonia Medical Centre
3.	Edward Laane	North Estonia Medical Centre,
4.	Vasilli Novak	North Estonia Medical Centre
5.	Andrus Remmelgas	North Estonia Medical Centre
6.	Ain Suik	North Estonia Medical Centre
7.	Eduard Gershkevitch,	North Estonia Medical Centre
8.	Margit Valgma	North Estonia Medical Centre
9.	Vladimir Sterbascar,	North Estonia Medical Centre
10.	Ilona Muoni	North Estonia Medical Centre

Scandinavian Clinics Estonia (STERI)

No.	Name	Organization, Position
1.	Lembit Abileid	STERI
2.	Valentin Timofejev	AS ENKO (owner)

Day 9, 05.10.2011

Ministry of Environment

No.	Name	Organization, Position
1.	Ergo Pärn	Ministry of Environment
2.	Reelika Runnel	Ministry of Environment
3.	Ilmar Puskar	Environmental Board
4.	Toomas Kööp	Environmental Board
5.	Mihkel Visnapuu	Environmental Board

No.	Name	Organization, Position
6.	Teet Koitj�r	Environmental Board
7.	Pavel Ojava	Environmental Inspectorate
8.	Himot Maran	Environmental Inspectorate
9.	Kady Danilas	Rescue Board
10.	Stella Polikarpus	Rescue Board
11.	Dagmar Undrits	Veterinary and Food Board
12.	Kaja Sepper	Veterinary and Food Board
13.	Piret Tinkus	Estonian Tax and Customs Board
14.	Mart Varvas	Radioactive waste management organization: AS ALARA

Appendix V

THE NATIONAL SYSTEM FOR THE MANAGEMENT OF RADIOLOGICAL EMERGENCIES KEY ORGANIZATIONS, ROLES AND RESPONSIBILITIES

The following roles and responsibilities are included in the national *Radiological Emergency Response Plan* (nREP).

According to provisions in chapter 3, *Organisation of response to radiological emergency*: "in a radiological emergency the **Rescue Board** or a rescue centre (hereinafter referred to jointly as **rescue institution**) shall direct the response to the emergency".

It is the responsibility of the **rescue institution**, chapter 4, *Management structure of response to emergency*: "to form a management structure for the organisation of directing the response to an emergency depending on the extent of the existing or possible consequences of the emergency" at the site of the event, in the extent of the area of activity of the rescue institution and/or nationally.

In chapter 5, *Duties of institutions and persons participating in response to radiological emergency* of the nREP, the specific roles and responsibilities of different key organizations are described.

According to the nREP (paragraph 5.1), the **Rescue Board** or a **rescue institution** shall:

- direct the response to an emergency and perform rescue work;
- comply with the intervention and operating thresholds established by regulations of the Minister of the Environment in responding to a radiological emergency;
- designate the danger area and the restricted area in the case of a radiological emergency in accordance with the Annex and organize the delimiting or the marking of the perimeter thereof;
- designate, in addition to the danger area, the prohibited area and the warning area in the case of a radiological emergency;
- perform the decontamination of persons and items at the site of the event;
- form the management structure of the response to an emergency and decide the involvement of other institutions and persons;
- determine the organisation of the management structure of the response to an emergency and ensure the functioning of the management structure, including the communications schemes and means of communication necessary for the purpose;
- coordinate the activities of the institutions and persons participating in or related to the response to an emergency;
- coordinate the engagement and use of the resources necessary for responding to an emergency, including ensuring logistical support at the site of the event (catering, sanitary facilities, hygiene and other necessities);
- gather and analyse information necessary for responding to an emergency;
- monitor and analyse the development of events related to the response to an emergency;
- gather, in cooperation with other institutions and legal persons, assessments on the impact of an emergency at vital services;
- organise the exchange of information between the institutions and persons participating in or related to the response to an emergency, including organizing communication at the site of the event;
- organize cooperation with the organizations of foreign countries and international organizations in matters related to the response to an emergency;

- organize cooperation with local government units in responding to an emergency;
- advise local government units in organizing the protection of members of the public;
- organize the evacuation of members of the public;
- issue guidelines and inform the public of the response to an emergency;
- have an overview of the resources of itself and other institutions and persons used in responding to an emergency, by preparing a relevant resource catalogue for the purpose, which contains an overview of the technical resources of the relevant institutions and persons together with the contact details of personnel, and update the resource catalogue at least once a year.

In paragraph 5.2 of nREP the responsibilities of the **Environmental Board** are declared, in its duty as the competent authority in radiation protection. Thus, the **Environmental Board** shall:

- organize the monitoring of the radioactivity of air and soil and prepare radiological analyzes for rescue institutions;
- organize the assessment of the spread of a possible radioactive substance in time and space and the possible radiation effect, and advise rescue institutions and other institutions and persons participating in the response to a radiological emergency depending on the extent of the radiological emergency;
- ensure the identification of the area(s) of radioactive contamination and advise rescue institutions in designating and delimiting the danger area and the protected area;
- develop, for rescue institutions, the necessary recommendations for the implementation of emergency response measures in the case of radioactive contamination;
- advise rescue institutions in the removal of radioactive contamination from persons and items, as well as carry out measurements and give assessments on the radioactive contamination criteria being exceeded or not exceeded;
- organize the assessment and documentation of the radiation doses of persons who have stayed in an area of increased radiation levels and the forwarding of the data to the head of rescue operations or a healthcare worker performing health checks at the site of the event appointed by the head of rescue works;
- ensure, if necessary, the assessment of individual doses of emergency exposure and, in cooperation with the Health Board, develop a solution to ensure the submission of the assessment results to the medical specialist performing health checks;
- enter the data concerning the doses of radiological employees in the course of responding to an emergency into the national exposure dose register of radiological employees.

The responsibilities of police units during radiological emergencies are included in paragraph 5.3 of the NREP. According to nREP provisions, a **police institution** shall:

- prevent, determine, control and eliminate risks endangering public order in responding to an emergency;
- organize the maintenance of records on people affected by a radiological emergency;
- regulate the traffic;
- protect property, which is located at the site of the event and belongs to people related to a radiological emergency;
- participate in carrying out the notification, warning and evacuation of people in a warning area;
- ensure the activity of the gathering points for non-casualties, fatalities, evacuees and property;
- ensure the operation of the access road, control checkpoint, technical equipment gathering point, exit road, transport exchange point and aircraft landing point at the site of the event.

As the competent authority in the medical field, the **Health Board** subordinated to the Ministry of Social Affairs, shall (paragraph 5.4 of the nREP):

- organise the monitoring of the radioactivity of drinking water and the radiological analysis of drinking water in cooperation with the Environmental Board;

- develop, in cooperation with the Veterinary and Food Board and the Environmental Board, guidelines for the members of the public on the restriction of the use of drinking water and foodstuffs;
- coordinate the provision of healthcare services to casualties in a radiological emergency;
- coordinate the development of guidelines for the members of the public and the providers of healthcare services.

In chapter 5.5 of the nREP the responsibilities of the Veterinary and Food Board are described, in relation with their specific activities:

- to organize the monitoring of the radioactive contamination of foodstuffs and the radiological analysis of foodstuffs in cooperation with the Environmental Board;
- to develop, in cooperation with the Health Board and the Environmental Board, guidelines for the members of the public on the restriction of the use of drinking water and foodstuffs.

The responsibilities in radiological emergencies of the national administrator of a radioactive waste management facility (AS ALARA) are described in chapter 5.6 of the nREP:

- to organize the management, transport and storage of radioactive waste;
- to organize decontamination in an area of radioactive contamination to a level of radiation, which does not cause the general public exposure limits to be exceeded.

Provisions are included in the nREP (paragraph 5.7) concerning the roles and duties of the local governmental authorities. Thus, a local government unit shall:

- advise rescue institutions in regard to local conditions;
- assist rescue institutions in responding to an emergency;
- participate in performing an evacuation;
- ensure the transport and relocation of evacuees, including living conditions and catering;
- gather and regularly issue to rescue institutions information on the status of the continuous operation of the vital services stipulated in subsection 34(9) of the Emergency Act in its administrative territory.

Other responsibilities are included in the nREP for different organizations / institutions with a supporting role in case of a radiological emergency:

- paragraph 5.8: Healthcare service providers shall ensure the provision of the necessary healthcare services to casualties.
- paragraph 5.9: The Institute of Physics of the University of Tartu shall assist the Environmental Board in preparing radiological analyses and radiation safety assessments, if necessary.
- paragraph 5.10: The providers of vital services shall implement measures to alleviate a partial or full interruption in the services and to restore the continuous operation of vital services in the case of a partial or full interruption in the provision of the services, following the plan for the continuous operation of services.
- paragraph 5.11: The competences and authorisations of state and local government institutions and persons stipulated in other legal acts shall also apply upon responding to an emergency.

Appendix VI

GSR-2: TABLE I. FIVE CATEGORIES OF NUCLEAR AND RADIATION RELATED THREATS FOR THE PURPOSES OF THE REQUIREMENTS

Threat category	Description
I	Facilities, such as nuclear power plants, for which on-site events ^a (including very low probability events) are postulated that could give rise to severe deterministic health effects ^b off the site, or for which such events have occurred in similar facilities.
II	Facilities, such as some types of research reactors, for which on-site events are postulated that could give rise to doses to people off the site that warrant urgent protective action in accordance with international standards ^c , or for which such events have occurred in similar facilities. Threat category II (as opposed to threat category I) does not include facilities for which on-site events (including very low probability events) are postulated that could give rise to severe deterministic health effects off the site, or for which such events have occurred in similar facilities.
III	Facilities, such as industrial irradiation facilities, for which on-site events are postulated that could give rise to doses that warrant or contamination that warrants urgent protective action on the site, or for which such events have occurred in similar facilities. Threat category III (as opposed to threat category II) does not include facilities for which events are postulated that could warrant urgent protective action off the site, or for which such events have occurred in similar facilities.
IV	Activities that could give rise to a nuclear or radiological emergency that could warrant urgent protective action in 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, nuclear powered satellites or radiothermal generators. Threat category IV represents the minimum level of threat, which is assumed to apply for all States and jurisdictions.
V	Activities not normally involving sources of ionizing radiation, but which yield products with a significant likelihood ^d of becoming contaminated as a result of events at facilities in threat category I or II, including such facilities in other States, to levels necessitating prompt restrictions on products in accordance with international standards.

a. Involving an atmospheric or aquatic release of radioactive material or external exposure (such as due to loss of shielding or a criticality event) that originates from a location on the site.

b. Doses in excess of those for which intervention is expected to be undertaken under any circumstances, see Schedule IV of Ref. [3], reproduced in Annex II. See the Glossary under 'deterministic effect'.

c. Schedule V of Ref. [3] is reproduced in Annex III.

d. Conditional on the occurrence of a significant release of radioactive material from a facility in threat category I or II.

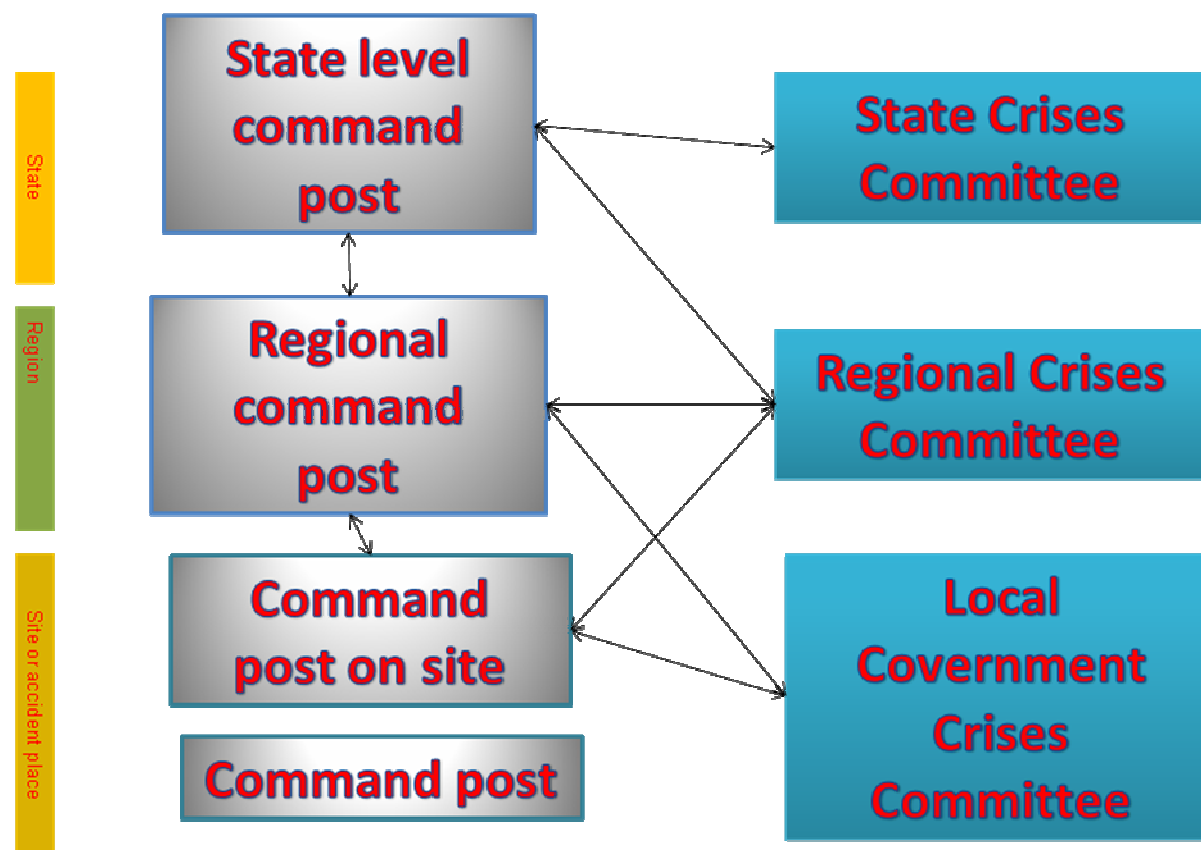
Appendix VII

**NATIONAL SYSTEM FOR EMERGENCY MANAGEMENT
CRISIS COMMITTEES AND RESCUE BOARD EXECUTIVE STRUCTURES**

Two distinct types of structure are defined in the current legislation for the management of emergencies: the crisis management committees, as advising and support structures, and the Rescue Board Command Posts, as executive structures acting in the field.

The two distinct structures and the interaction between them are presented in **Figure 1**.

Figure 1. Executive (Rescue Board) and advisory (Crisis Management Committees) structures, and the interaction between them in case of an emergency.



The crisis management committees are defined in the “*Emergency Act*” and the responsibilities are described for all levels committees: national, regional and local. In § 3 “*Crisis management committee of the Government of the Republic*” the responsibilities of the national Crisis Management Committee are included:

- monitor and analyze the national crisis management system, including the preparation for emergencies, responding to emergencies and ensuring the continuous operation of vital services;
- analyze the probability of the occurrence of emergencies and make proposals to the Government of the Republic and competent agencies in respect of preparing for emergencies, responding to emergencies and organising the continuous operation of vital services;

- assist agencies responding to national emergencies or those of a particular severity, in the organization of exchange of information and the coordination of the response to the emergency;
- assist the emergency situation response coordinator in the coordination of the response to the emergency due to which the emergency situation was declared, if necessary, and perform other duties assigned by the emergency situation response coordinator;
- provide an opinion on the guidelines for preparing emergency risk assessments;
- provide an opinion on the guidelines for preparing continuous operation risk assessments;
- provide an opinion on the guidelines for preparing emergency response plans;
- provide an opinion on the guidelines for preparing continuous operation plans;
- approve the risk assessment summaries of emergencies;
- provide an opinion on the need to declare or terminate an emergency situation to the Government of the Republic;
- make proposals to the Government of the Republic and the emergency situation response coordinator to implement measures established in legal acts during emergency, if necessary;
- make a proposal to the Government of the Republic to apply for international assistance for responding to an emergency, if necessary;
- inform the public of the emergency on the basis and in accordance with the procedure established by the Government of the Republic;
- fulfil other duties arising from the law and the statutes.

According to the same legislative act, “the minister of the Interior is the chairman of the crisis management committee of the Government of the Republic”.

In chapter § 4 “*Regional crisis management committee*” of the “*Emergency Act*”, the responsibilities of the regional crisis committees are defined:

- monitor and analyze the crisis management system, including the preparation for emergencies, responding to emergencies and ensuring the continuous operation of vital services in the region;
- analyze the probability of the occurrence of emergencies and make proposals to the crisis management committee of the Government of the Republic and competent agencies in respect of preparing for emergencies, responding to emergencies and organising the continuous operation of vital services in the region;
- review the part of the emergency risk assessment concerning the area of activity of the crisis management committee;
- assist the emergency situation response coordinator in the coordination of the response to the emergency due to which the emergency situation was declared, if necessary, and perform other duties assigned by the emergency situation response coordinator;
- assist agencies responding to emergencies with regional effect in the organisation of exchange of information and the coordination of the response to the emergency;
- decide the organization of regional crisis management exercises;
- inform the public of the emergency on the basis and in accordance with the procedure established by the Government of the Republic;
- form a territorial crisis management committee, if necessary, appointing its chairman, approving its statutes and staff;
- perform other tasks arising from the law and the statutes.

The head of the local rescue service agency is the chairman of the regional crisis management committee.

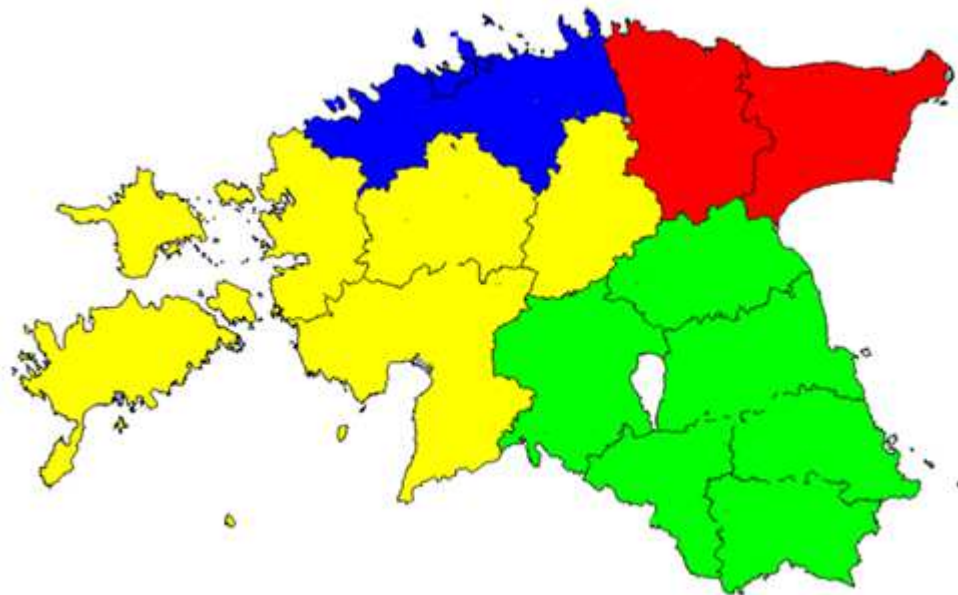
The role of local government crisis management committees is defined in chapter § 5 “*Crisis management committee of the local government*” of the “*Emergency Act*”:

- monitor and analyze the crisis management system, including the preparation for emergencies, responding to emergencies and ensuring the continuous operation of vital services and the functioning of the duties and competences established in section 6 of the Local Government Organisation Act for emergencies in the local government unit;
- analyze the probability of the occurrence of emergencies and make proposals to the crisis management committee of the Government of the Republic, the regional crisis management committee and competent agencies in respect of preparing for emergencies, responding to emergencies and organising the continuous operation of vital services in the local government unit;
- review the part of the emergency risk assessment concerning the area of activity of the crisis management committee;
- assist the emergency situation response coordinator in the coordination of the response to the emergency due to which the emergency situation was declared, if necessary, and perform other duties assigned by the emergency situation response coordinator;
- assist agencies responding to emergencies in the organisation of exchange of information and the coordination of the response to the emergency, if necessary;
- decide the organization of local government crisis management exercises;
- inform the public of the emergency on the basis and in accordance with the procedure established by the Government of the Republic;
- perform other tasks arising from the law and the statutes.

The County municipality mayors or city mayors are chairmen of the crisis management committees of local governments.

The operational intervention in case of any type of emergency is performed by the Estonian Rescue Services, as professional emergency services, organized in four Regional Rescue Centres (**Figure 2**).

Figure 2. The four Regional Rescue Centers of the Estonian Rescue Services.

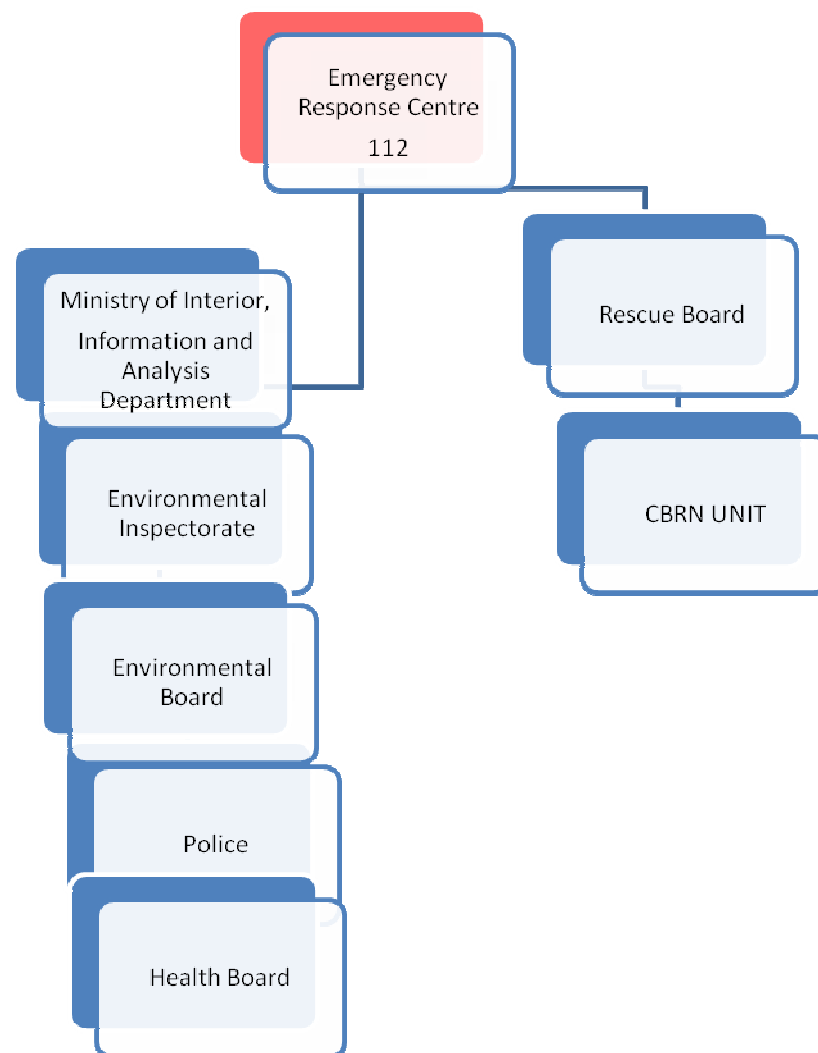


In total, in 2011 the system included:

- 81 state owned rescue stations
- 87 volunteer rescue stations
- 6 rescue stations with chemical diving and first decontamination capabilities and pagers for measuring radiation (Kesklinn, Lilleküla, Tartu, Sillamäe, Kohtla-Järve, Pärnu)
- 1 Special CBRN unit inside an EOD (Explosive Ordnance Disposal) and 4 EOD stations.

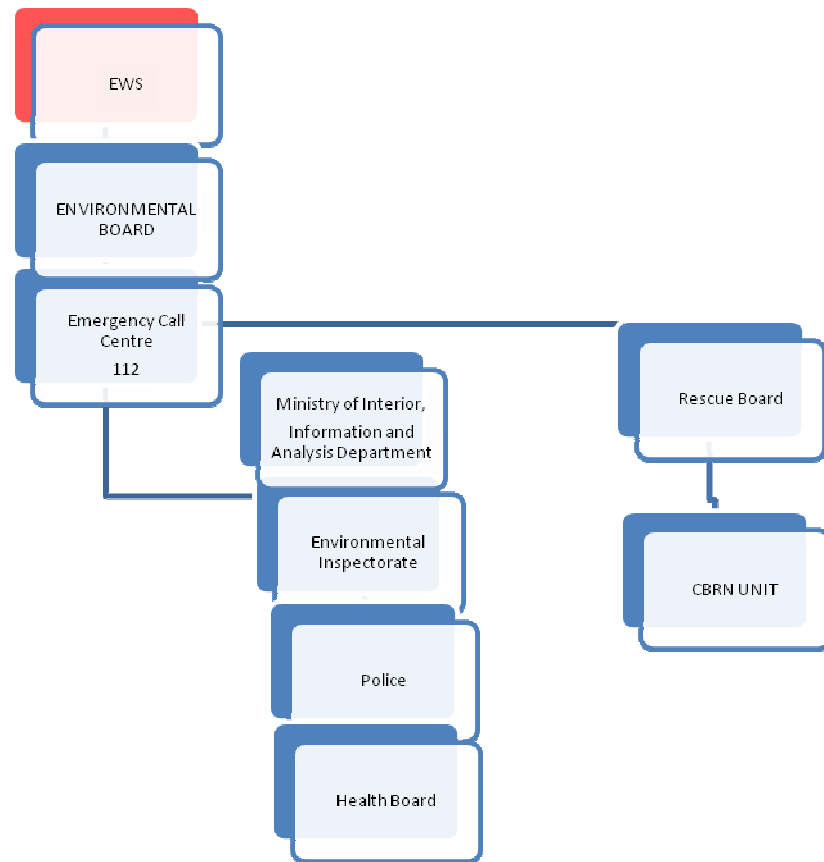
Appendix VIII

THE NOTIFICATION SCHEME IN CASE OF RADIOLOGICAL EMERGENCIES



Appendix IX

**SCHEME OF NOTIFICATION IN CASE THE EARLY WARNING SYSTEM (EWS)
GIVES SIGNAL ABOVE THE ALARM LEVEL**



Appendix X
LIST AND PHOTOS OF EQUIPMENT OF CBRN UNIT

The equipment used by the CBRN unit for radiation survey and monitoring in radiological emergencies is presented in **Table 1** and in **Figures 1** and **2**.

Table 1. List of equipment for radiation survey and monitoring in case of radiological emergencies, belonging to the CBRN unit of the Rescue Board.

Instrument	Quantity
Pager	13
Pager-S	5
Dose meter RAD 60S	31
Ludlum 2241-3RK	1
Ludlum	5
Explonarium GR-135	3
Explonarium GR-130	1
Eberline FH-40G-L	3
ICS-4000	4
DGM 1500	2
SRV 2000	2
RedEye PRD	1
Automess 6150AD and detector 150AD-K	1

Figure 1. Photo of the mobile intervention unit.



Figure 2. Photos of the portable radiation survey equipment.



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- [8] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Medical Response During a Nuclear or Radiological Emergency, EPR-MEDICAL 2005, IAEA, Vienna (2005).
- [9] INTERNATIONAL ATOMIC ENERGY AGENCY, Manual for First Responders to a Radiological Emergency, EPR-FIRST RESPONDER 2006, IAEA, Vienna (2006).
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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.

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 plan. A description of the objectives, policy and concept of operations for the response to an emergency and of 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 actions that will effectively mitigate the consequences of an emergency for human health and safety, quality of life, property and the environment.

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

emergency response. The performance of actions to mitigate the consequences of an emergency for 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 fighters 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.

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.

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 promptly to a national or international authority providing details of an emergency or potential emergency, for example as required by the Convention on Early Notification 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 emergency response 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 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: (a) the energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or (b) 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 of 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. It 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.

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.

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 an emergency response.

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 radiodiagnosis; a nuclear power facility 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.

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: (a) those events and the associated areas for which protective actions and emergency countermeasures may be required within the state; and (b) the actions that would be effective in mitigating the consequences of such events.

ACRONYMS AND ABBREVIATIONS

The abbreviations listed below are for the purpose of this report only.

CBRN (unit)	Chemical, Biological, Radiological and Nuclear (unit)
EB	Environmental Board
EPR	Emergency Preparedness and Response
EPREV	Emergency Preparedness Review
HB	Health Board
IAEA	International Atomic Energy Agency
ME	Ministry of Environment of Estonia
MI	Ministry of Interior of Estonia
nREP	Estonian national Radiation Emergency Plan (2011)
NREP	National Radiation Emergency Plan (IAEA acronym)
OIL	Operational Intervention Level
PBGB	Police and Border Guard Board
RB	Rescue Board
RDD	Radiological Dispersal Device
VFB	Veterinary and Food Board