

FINAL REPORT

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

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International Atomic Energy Agency

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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 (Assistance Convention) [1] the IAEA has a function, if requested, to assist Member States in preparing emergency arrangements for responding to nuclear accidents and radiological emergencies.

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

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1. INTRODUCTION

1.1. BACKGROUND

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

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

With the intention to address the lessons learned from the nuclear emergency following the East-Japan earthquake and tsunami, the Board of Governors adopted the Action Plan on Nuclear Safety, which encourages Member States to review their emergency preparedness capabilities and to invite corresponding review services offered by the IAEA. In February 2012 the Armenian Nuclear Regulatory Authority (ANRA) submitted a request for an Emergency Preparedness REView (EPREV) mission to assess the prevailing situation in Armenia, with special regard to the country’s declared intention to build a new nuclear power plant. (EPREV is a service the IAEA offers to assess a country’s nuclear and radiological emergency preparedness arrangements vis-à-vis the relevant international standards).

As a result of the request of the Republic of Armenia and following the relevant IAEA guidelines (EPREV Guidelines) a well-defined appraisal procedure was initiated. This included the following steps:

- The IAEA sent a set of specifically designed self-assessment sheets to the counterpart with the request to update the information in them and revert to the IAEA. The sheets contained a questionnaire and information, which had been obtained during the most recent Regional Coordination Meeting on the TC regional project RER/9/100, held in Vienna, Austria, 18-21 April 2011. The previous version of the self-assessment questionnaire had been upgraded to reflect the lessons learned from the Fukushima accident, and the Armenian counterpart was asked to amend the original version accordingly. The updated sheets were returned to the IAEA prior to the conduct of the mission.
- The Terms of Reference (ToR) memorandum was drafted in July 2012 and was finalized in September 2012.
- The mission was implemented from 15 to 25 October 2012.

The overall objectives of this mission were:

1. To provide an assessment of the Member State’s arrangements and capabilities to respond to nuclear or radiological emergencies.

2. To assess the condition in which the Member State resides with regard to international standards for emergency preparedness and response.
3. To assist the Member State in developing arrangements needed to respond promptly to a nuclear or radiological emergency. This will include suggested steps that can be taken immediately to better use existing capabilities.
4. To assist the Member State in providing a basis upon which it can develop a longer term programme to enhance its ability to respond. This would include recommendations in the areas of arrangements, decrees, equipment, staff, and related functional areas.

1.2. SCOPE

The review focused on ability of the Republic of Armenia to respond to a nuclear or radiological emergency and was based on an assessment of existing response provisions and capabilities. The mission was carried out in accordance with the guidelines developed for the EPREV services (EPREV Guidelines). As part of the methodology a Self-Assessment Questionnaire was filled out by the counterpart, addressing the main issues and requirements of GS-R-2 [2].

The review consisted of:

- reviewing and verifying the statements (Performance Indicators) made by the Armenian counterparts in the Self-Assessment Questionnaire;
- determining if the arrangements for preparedness and response for radiation emergencies in the Republic of Armenia are in conformity with international requirements [2];
- proposing methods and means of corrective steps towards meeting international requirements where deviations from the IAEA standards are observed, and identifying good practices whenever such examples are found. The EPR-METHOD 2003 publication [3] and the expertise of the mission team members provided the basis for these suggestions.

The review mission was designed to cover all aspects of the arrangements for emergency preparedness and response and included: on-site (facility), off-site, local and national emergency response and preparedness arrangements for all radiation emergencies that may affect a territory of the Republic of Armenia. When determining scope of the mission, certain limitations had to be taken into consideration (the review part of the mission had to be completed within 5 workdays, which also included some time to be allocated for the visits to different ministries and operators). In order to focus the effort and to provide mission findings that would be generally applicable to the existing preparedness and response system in the Republic of Armenia, the arrangements for dealing with three different types of situations warranting emergency preparedness were examined:

- The capability for responding to an emergency at a facility in threat category I¹. The Republic of Armenia operates a VVER 440 (Model 230) power reactor at the Armenian NPP site.

¹ The different threat categories (I through V) are defined in the IAEA requirements [2] and guidance [3]

- Arrangements to cope with a potential emergency at facilities in threat category III, several major source users (e.g. National Oncology Centre belongs to this category).
- The capability to respond to a radiation emergency that might occur anywhere in the country (threat category IV). These arrangements include local (municipality level), emergency services having the basic ability to recognize a radiation emergency and to take appropriate immediate action, and the ability of national officials to support local response organizations.

The reviews were used to benchmark emergency preparedness arrangements for these three different regulatory and operational environments, and generalized findings were subsequently developed.

The reviews considered the emergency arrangements at local and national levels in the following areas:

- Emergency management
- Emergency preparedness
- Radiation protection
- Law enforcement
- Medical response
- Public information
- National capability to support and provide training to local response teams.

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

The following levels of radiation emergency preparedness were covered 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 I, III, IV and V.

(b) Local and facility response review:

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

The collected data and analysis contained in this report rely on presentations of and discussions with representatives of key response organizations and on personal expert impressions obtained during these discussions. The mission concentrated on those areas that the team viewed as crucial to the establishment and maintaining of a solid interim emergency response capability.

1.3 PROCESS

The general schedule for the mission established in an agreement with the counterparts in the Republic of Armenia is shown in Appendix II. The mission team visited sites of licensees,

local and national authorities and first responding organizations, conducted interviews, reviewed the relevant legal documents and emergency plans.

The mission team interacted with the representatives of the following ministries and organizations of the Republic of Armenia (listed in Appendix III):

Ministry of Emergency Situations (MES)

Rescue Service under MES (RS)

Population Protection and Organization Elimination of the Consequences of Disaster

Department of RS of MES

State Reserves Agency under MES

Crisis Management Center of MES

Ministry of Energy and Natural Resources (MoENR)

Ministry of Health (MoH)

“Research Center of Radiation Medicine and Burns” Closed Joint-Stock Company

“National Oncology Center named after V.A. Fanarjyan” Closed Joint-Stock Company

Ministry of Agriculture (MoA)

Ministry of Defence (MoD),

Ministry of Economy (ME)

Ministry of Transport and Communication (MoTC)

Ministry of Nature Protection

Armenian Nuclear Regulatory Authority (ANRA)

Police under the Government of the Republic of Armenia (Police)

Department of Customs Control Equipment and Communication of the State Revenues

Committee of the Republic of Armenia (Custom Department)

Armavir Marz (Region) municipality

Municipal emergency commissions

“Emergency Channel” Information Centre

Armenian NPP

Republican Veterinary-Sanitary and Phytosanitary Center of Laboratory Services” of State Service for Food Safety

1.4 INPUTS AND GUIDANCE FOR THE ASSESSMENT

The EPREV mission was conducted in accordance with the Terms of Reference (ToR), developed and adopted in September 2012.

The self-assessment sheets provided by the Ministry of Emergency Situations in coordination with the Armenian Nuclear Regulatory Authority facilitated assessment and contributed much to the EPREV process. As a part of the appraisal methodology, the responses in the self-assessment sheets were re-examined and amended during the drafting of the present report. The EPREV team – based on the facts, interviews and documents obtained – made an independent judgment on the prevailing situation in the Republic of Armenia for all appraisal criteria (presented in Appendix IV)

A set of documents (laws, government resolutions, orders of directors of institutions, plans and procedures etc.) were obtained by the EPREV team before and during the mission (a list of the documents is introduced in Appendix V). Most of the documents were available in English or Russian language. The experts were also provided with presentations on the roles and functions of the authorities, involved in the preparedness and response to radiological

emergencies in the Republic of Armenia. The presentations were introduced in Armenian language with the interpretation into Russian and later translation in English language.

According to the IAEA categorization of radiation related threats in Ref. [2], the Republic of Armenia is currently a country with facilities and practices belonging to threat categories I, III, IV and V (no facility is identified which would belong to threat category II). This means that the emergency preparedness arrangements in the Republic of Armenia have to be maintained on the long term, to meet the requirements for a country with facilities and activities in category I and the emergency preparedness, and response conditions in this country have been assessed with this in mind.

2. SUMMARY OF FINDINGS

2.1. INTRODUCTION

The major conclusion made by the EPREV team, after reviewing the materials presented and gaining insights into the national EPR infrastructure of the Republic of Armenia, is that the country has established an operational capability to respond to radiological and nuclear emergencies based on an integrated, all-hazard approach enabling the optimal use of available resources. The EPREV team recognized a high level of knowledge and dedication of the counterparts and very much appreciated their strong commitments to further improve and harmonize the EPR capabilities in the Republic of Armenia with international standards.

The Republic of Armenia operates a nuclear power plant located in the vicinity of Metsamor city. The nuclear facility (belonging to Threat Category I according to the IAEA threat categorisation) has been recognised a major radiation risk in the country. To address the risk connected with operation of the ANPP, the Republic of Armenia succeeded in establishing the necessary planning elements and implemented strong emergency preparedness arrangements, which commensurate with the recognized threat. The existing arrangements on nuclear emergency response have been evaluated as a well prepared and understood system.

Focusing on the risk from Armenian NPP, the national legal framework and planning is well developed for response to emergency at this facility (threat category I). The arrangements for responding to radiological emergencies, which may occur at facilities in threat category III, or for accidents, involving radioactive sources/materials (threat category IV) are not so comprehensive and more attention should be paid to developing preparedness for that type of response. On the basis of the international experience, the EPREV team recommends to develop an integrated emergency plan, which covers all possible types of radiation emergencies at facilities/practices in threat category I and III-V, taking into account all hazards' response system concept.

Further in this and the next Chapter the mission team formulated recommendations and suggestions on the basis of the findings of the mission. The recommendations need to be addressed in order to comply with the IAEA Requirements [2]; these are therefore stated as actions that *must* be implemented (with the specific corresponding paragraph in the IAEA Requirements [2] shown in a separate paragraph entitled 'BASIS'). To help to implement the recommendations, the mission team put forward suggestions for better meeting the IAEA requirements. The team also highlighted good practices, whenever these were recognised and justified.

As a part of the appraisal methodology, the responses in the self-assessment sheets (submitted shortly before the implementation of the mission) were re-examined by the EPREV team. The team – based on the facts, interviews and documents obtained – made an independent judgement on the prevailing situation in the Republic of Armenia, for all appraisal criteria (see Appendix IV).

2.2. SUMMARY RECOMMENDATIONS

In this section below there are the most important steps, which need to be taken in developing a sound emergency response system in the Republic of Armenia that would be in compliance with international requirements. The detailed findings and description of the current situation are given in Chapter 3, which provides more background to the proposed actions.

- MES (RS) should start developing the National Radiation Emergency Plan (NREP) covering all possible types of radiological emergencies, including radiological accidents involving radioactive sources and accidents at the nuclear power plant. The drafting procedure should follow the approach proposed by the relevant IAEA guidance [EPR-METHOD-2003].
- A pre-requisite to drafting the NREP is threat assessment, which provides the scope of emergency planning, i.e. the set of scenarios or initiating events which should be addressed in the NREP. The ANRA and facility operators or source users should conduct a comprehensive threat assessment, taking into account all dangerous radioactive sources in the Armenian territory and all associated practices and activities (e.g. transport routes of radioactive materials; potential for finding a source in scrap metal; national border crossings; and possible terrorist activities such as use of a radiological dispersal device). A facility categorization according to the threat level shall be made in a manner prescribed in Table 1 of the GS-R-2.
- In parallel with the drafting the NREP, in each operating and response organization a screening should be made to identify if the scope of the available procedures matches responsibilities of that particular organization, and to determine if some emergency procedures are still missing. The list of procedures should be included in the respective organization's emergency response plan.
- While drafting the NREP, due attention should be given to 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.
- While drafting the NREP the new IAEA criteria (GSG-2, GSR Part3) are recommended to be implemented, although the EPREV team emphasizes that all intervention levels for urgent protective actions in Armenian legislation are determined in full compliance with current international standards [2].
- The ANRA, in cooperation with the RS of MES, should upgrade their formal requirements for the content, features, and scope of emergency plans and provide operators of facilities/practices in threat category III and IV with detailed instructions or model plans to meet these requirements. The emergency plans should be commensurate with the potential threat and are required to be coordinated with any other plans that may be implemented in an emergency.
- The existing Plan for emergency radiological monitoring should be reconsidered with due account to country wide monitoring capabilities and potential needs regarding decision-making on the efficient protective actions initially and throughout the

emergency. All organizations (laboratories) with capabilities to perform analysis of environmental and biological samples should be specified in the Plan; and arrangements should be made to ensure a sufficient level of their readiness in case of a possible large scale radioactive contamination.

- Effort should be dedicated to equipping and maintaining a competence of first responders (fire and rescue service, police and first medical aid) intervening during a radiological emergency. It should address and cover such aspects as: the availability of necessary equipment, training in radiation protection, personal dosimetry, availability of personal protective equipment, internal monitoring of first responders, etc. Assistance from the IAEA can be considered and used to support this effort (e.g. through the provision of training material, manuals, fellowships etc.).

3. DETAILED FINDINGS

The following sections address the main requirements of the relevant IAEA safety publication GS-R-2 [2] concerning basic responsibilities, assessment of threats, response functions and infrastructure.

3.1 BASIC RESPONSIBILITIES

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

- i. Establish or identify an existing governmental body or organization to act as a national coordinating authority (NCA).
- ii. Clearly assign the functions and responsibilities of users and response organizations and ensure they are understood by all response organizations.
- iii. Establish a regulatory and inspection system that provides reasonable assurance that emergency preparedness and response arrangements are in place for all facilities and practices.
- iv. Establish an appropriate management system and all organizations that may be involved in the response to a nuclear or radiological emergency have adopted appropriate management arrangements to meet the timescales and to ensure an effective and coordinated response throughout the emergency.

3.1.1. Current situation

Ref. to (i): The basic framework for preparedness and response to radiation emergencies in the Republic of Armenia is given by the legislation (see Appendix V), which assigns the main role to state authorities and other organizations, and regulates issues related to the different aspects of emergency preparedness and response (notification, organization and implementation of evacuation, transportation, emergency radiation monitoring, etc.).

Based on Gov. Decree No 531-N of 2008, amended in 2010, the Rescue Service of the Ministry of Emergency Situations of Armenia (RS) is authorized to coordinate the arrangements for preparedness and response to emergencies, including radiological and nuclear emergencies, and therefore the RS of MES should be regarded as the National Coordinating Authority (NCA).

In case of emergencies the RS of MES acts as the national coordinator in organization and implementation of population protection measures. To cope with this task the RS of MES operates the Crisis Management Centre with analytical and information functions, equipped with necessary tools and communication means. The RS of MES is the contact point and the competent authority under the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency.

The Armenian Nuclear Regulatory Authority (ANRA) has a complementary role in planning and supports the RS of MES in case of radiation[†] emergencies. The ANRA is the national advisor in making arrangements for response to radiological or nuclear emergency and also a contact point and a competent authority under the Convention

[†] Term “radiation emergency” covers hereinafter both nuclear and radiological emergencies

on Early Notification of a Nuclear Accident. The ANRA operates its own Emergency Response Centre.

Ref. to (ii): In the Republic of Armenia the ANPP has been considered as the main radiation risk for the country and the adequate administrative and organizational measures have been implemented to address this threat.

A detailed assessment and the assignment of the functions and responsibilities of operator(s), national and local authorities and response organizations, involved in case of emergency at the ANPP, are defined in the National Plan for the Protection of the Population in case of a Nuclear and (or) Radiological Accident at the Armenian NPP (ANPP's off-site Emergency Plan, approved by the Gov. Decree No 2328-N of Dec. 22, 2005, amended in 2008 and 2010, further - Nuclear Plan).

According to the Nuclear Plan, the main actions to be carried out by key organizations in preparedness and response to the ANPP radiation emergencies are:

Ministry of Emergency Situations of the Republic of Armenia:

- a) warning of response organizations and population;
- b) coordination of population protection measures;
- c) organization and conduct of emergency radiological monitoring;
- d) performing rescue action according to the RS of MES emergency plan.

Ministry of Health of the Republic of Armenia:

- a) provision of medical aid to the affected population including treatment of exposed/overexposed persons;
- b) coordination of the evacuation of injured persons from the contaminated zone;
- c) organization of decontamination of the evacuees.

Ministry of Defense of the Republic of Armenia:

- a) conduct of emergency radiological monitoring;
- b) deployment of forces and resources necessary for rescue operations;
- c) deployment of decontamination and special treatment units.

Police under the Government of the Republic of Armenia:

- a) participation in the warning and notification of the population;
- b) protection of the property and assets of the settlements in the contaminated zone;
- c) maintaining public order in settlements, organizations, evacuation points, and transportation routes.

Armenian Nuclear Regulatory Authority (ANRA):

- a) assessment of the situation at the ANPP and in the adjacent territories based on the data received from the ANPP and emergency radiological monitoring results;
- a) prediction of the possible accident development based on the assessment of the situation;
- b) submission of recommendations on implementation of necessary protective measures to the MES for the purposes of protection of population based on the assessment of the situation and prediction;
- c) international notification on nuclear accident in accordance with the Convention on Early Notification;

Ministry of Agriculture of the Republic of Armenia:

- a) support to the regional administrations and local self-governing bodies in the evacuation of live stock and agricultural products from the contaminated zone;
- b) assistance in defining the level of radioactive contamination of agricultural products and feed;
- c) implementation of the continuous monitoring of the agricultural products;

Ministry of Transport and Communication of the Republic of Armenia:

- a) provision of the necessary means of transportation for the evacuation of the population;
- b) provision of communication during the implementation of protective measures.

The responsibilities of local governments (*Shirak, Kotayk, Armavir and Aragatsotn*), on regional and local levels over the territory included in the Precautionary Action Zone (PAZ) or Urgent Protective Action Planning Zone (UPZ), are related to the protection of the public and providing the necessary support. The responsibilities in detail are given in the Nuclear Plan.

The Armenian NPP is responsible for initial classification and notification of emergency situation, bringing the reactor in safe condition and protecting the NPP personnel.

Based on the functions assigned in the Nuclear Plan in case of a general accident at the ANPP the following forces and resources are engaged for population protection activities in the emergency zones (PAZ and UPZ):

- 1) for radiation monitoring - the RS of MES, the Armed Forces of the Republic of Armenia and ANRA .
- 2) for decontamination of people and territory and equipment – the RS of MES, State Committee for Water Management, Radiological, chemical and bacteriological defense forces of the General Staff of the Armed Forces of the Republic of Armenia.

- 3) for first medical aid and transportation of the injured - the specialized medical teams from the Metsamor city hospital of the Ministry of Health of the Republic of Armenia,
- 4) for diagnostics of the patients exposed / overexposed and medical examination - the “Research Center of Radiation Medicine and Burns” Closed Joint-Stock Company;
- 5) for the treatment of the exposed / overexposed patients - the Grigor Lusavorich medical center of the Ministry of Health of the Republic of Armenia,
- 6) for firefighting activities - 2 joint fire units (at least 60 people) with 10 units of AB-40 equipment from the fire brigades of the territorial subdivisions of the RS of MES,
- 7) for property protection in the UPZ zone - relevant subdivisions of the Police,
- 8) for the provision of transportation means for the evacuation activities - the Ministry of Transport and Communication mobilizes at least 699 minibuses and 30 railway coaches for the evacuation purposes (there are also other transportation means envisaged for additional evacuation in case of a rapid change of the situation),
- 9) for the notification and warning of the population - the Ministry of Transport and Communication of the Republic of Armenia,
- 10) for information about the accident - the Ministry of Transport and Communication of the Republic of Armenia and the RS of MES,
- 11) for organization of warning of the population – the RS of MES.

The basic functions and responsibilities of the Governmental Authorities for some particular events involving emergency situations with radioactive materials are defined by Gov. Decree No 553-N of 03.05.2007 “On Approval of the Procedure on finding and regaining control over radioactive materials”, amended 08 January 2009 N 36-N and 08 September 2011, N 1280-N. Decree No 553-N covers malicious acts and such accidental situations as finding orphan (uncontrolled) sources, searching of lost and illicitly removed sources, and detection of illicitly transported radioactive materials at the national border crossings.

Ref. to (iii): The scope of regulatory framework on the use of atomic energy is given by the Law on Atomic Energy, Section 4. The ANRA is the state authority of the executive power implementing the state regulation of safety requirements aimed to ensure the safety of population, personnel and the environment. The licensing and inspection system of the Republic of Armenia provides reasonable assurance that emergency preparedness and response arrangements are in place for all facilities, and most of the necessary resources are available. An emergency plan(s) of a facility or practice is an obligatory part of the required documentation for starting the licensing process that is implemented by the ANRA. The obligation for the users of the sources of ionizing radiation to establish an emergency preparedness capability and have an appropriate response plan is set out in the Law on Licensing HO-193 of 30.05.2001 with supplements as of 16.03.2004 Ho-52N and relevant licensing procedures, approved by the Government of the Republic of Armenia.

The ANRA staff conducts regular inspections of licensees under their regulatory oversight to check that emergency preparedness and response arrangements are in place and the conditions of the license are fulfilled at the facility level. This inspection regime was demonstrated to be in place during interviews with the personnel of the ANRA and some license holders (e.g. the ANPP). The regulatory supervision program covers regular inspection of the ANPP response facilities, as well as the approval of the ANPP emergency response plan and coordination of their annual training and exercise program.

The responsibilities and functions of the off-site response organizations as well as their emergency response plans are coordinated by the RS of MES.

Ref. to (iv): There is an appropriate management system for response regarding any emergency situation at the ANPP. The emergency response actions must be triggered based on the classification and implemented in accordance with on-site/off-site ANPP emergency plans, supplemented with the detailed procedures and instructions on how to act in emergency situations. The response actions are systematically reevaluated and provide for a coordinated response throughout the emergency. Templates for communication and provision of information have been developed and included in the response plans.

The management arrangements for responding to the other potential radiological emergencies, not related to operation of the ANPP, are not clearly defined in legislation or regulations. The above mentioned Gov. Decree No 553-N “On Approval of the Procedure on finding and regaining control over radioactive materials” has not been supplemented with the detailed procedures and therefore may not ensure an effective and coordinated response in multiplicity of possible cases, involving uncontrolled radioactive materials.

It should be noted that the ANRA in cooperation with the RS of MES has initiated activities on improving the situation. These include development of “Public protection plan in case of accidental situations due to radioactive materials” and set up of an appropriate management system, which would cover all types of possible radiological events in the territory of Armenia.

3.1.2. Recommendations

R.1.1: The RS of MES in cooperation with the ANRA should make arrangements to ensure that an appropriate management system will be set up to provide for a timely, effective and coordinated response to all postulated types of radiological emergencies involving radioactive sources or radioactive material in the territory of the Republic of Armenia. These arrangements should be coordinated with the arrangements, identified in the Nuclear Plan and the arrangements for response to conventional emergencies. Further these arrangements should be part of the National Radiological Emergency plan (NREP).

BASIS:

GS-R-2, para. 3.12, states that: *...it is important that an appropriate management system be used. All organizations that may be involved in the response to a nuclear or radiological emergency shall ensure that appropriate management arrangements are adopted*

GS-R-2, para. 3.11, states that: *The national co-ordinating authority and the response organizations shall ensure that the arrangement for response to a nuclear or radiological emergency are co-ordinated with the arrangements for response to conventional emergencies*

R.1.2: The existing arrangements including assignment of responsibilities for all type of radiation emergencies should be reviewed in line with the development of the NREP. The scope of expected responsibilities should follow the international guidance (e.g. EPR-METHOD-2003, chapter 3. Critical tasks) and should respect the existing integrated response system.

BASIS:

GS-R-2, para. 3.2-4, states that: *“It is presumed that the State will have determined in advance the allocation of responsibilities for the management of interventions in emergency exposure situations between the [regulatory body], national and local [response organizations] and [operators]...The coordinating authority shall ensure that the functions and responsibilities of operators and response organizations as specified in these requirements are clearly assigned and are understood by all response organizations, and that arrangements are in place for achieving and enforcing compliance with the requirements.”*

1.3. Suggestion

S.1.1: Being a contact point and the competent authority under the Assistance Convention [1] the RS of MES should develop and test procedures for managing international assistance linked to a nuclear or radiological emergency.

3.2. ASSESSMENT OF THREATS

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

- i. Perform threat assessments for the facilities and activities in the State; and categorize them in accordance with the five threat categories in Table I of Ref. [2].

3.2.1. Current situation

Armenia operates a nuclear power plant, which is located close to the city Metsamor, 28 km from Yerevan. The Armenian NPP design is based on the first generation of V-230 reactors and consists of two WWER-440 type units. Currently only one unit (Unit No 2) is in operation. A Unit No 1 of the ANPP is a permanent shut down mode since 1989. Considering the installed thermal power of the units and according to the criteria in GS-R-2, the ANPP belongs to threat category I. A second nuclear installation, a dry spent fuel storage facility has also been installed in the territory of the ANPP. The manipulation with spent fuel is limited to the area of the ANPP. The risk from nuclear installation of other countries is limited as the closest facility in threat category I is located above 1000 km distance.

The information on radioactive sources and facilities (practices) using radiation sources or radiation (e.g. x-rays) devices are available in an electronic database system operated by the ANRA. The sources are registered in the RASOD database which provides for accounting and control. According to the RASOD there are 1285 sources in Armenia used in different fields like medicine, industry, agriculture, science, etc.: 441 out of 1285 are sealed sources, 3 are unsealed sources, 721 are radiation generators and 120 are associated equipment. The categories and quantity of sealed sources (without smoke detectors) are shown below:

Source Category	Source Quantity
1	4
2	40
3	5
4	83
5	140
Not categorized	170 shall be removed

Gov. Decree № 1489-N of 18.08.2006 “On approval of radiation safety rules” has implemented a national categorization system, which defines separate category groups for radioactive sources, radiation generators and for nuclear (atomic energy) installations.

In line with the regulation, radioactive sources are divided into five categories according to level of radiation risk, associated with the source in case of emergency, including radiological effects:

- a) Category 1 (highest risk) sources
- b) Category 2 (high risk) sources
- c) Category 3 (medium risk) sources
- d) Category 4 (low risk) sources
- e) Category 5 (negligible risk) sources

The facilities, operating sources of ionizing radiation, are divided into separate four categories, based on the following criteria: category of radioactive sources at the facility; type and nature of the activity; risk of the potential radiation impact on people:

- a) Category 1 (highest risk) facility
- b) Category 2 (high risk) facility
- c) Category 3 (medium risk) facility
- d) Category 4 (low risk) facility

The ANPP has been assigned to Category 1 facility, according to the Nuclear Plan.

The described above, adopted in the Republic of Armenia categorization of sources and facilities is in line with the internationally adopted provision on exercising a graded approach for conducting the regulatory functions (licensing, inspections etc.) and

performing emergency preparedness arrangements. However, it is not fully in line with the guideline for categorization of threats, given in Table 1 of international requirements (GS-R-2).

3.2.2 Recommendations

R.2.1: Assessment and categorization of radiological threats at all levels (licensee, local, regional and national) should be reviewed, in order to follow the approach introduced in international requirements (GS-R-2). This includes use of the five threat category definitions and terms, given in Table 1 of GS-R-2.

BASIS:

GS-R-2, para. 3.15, states that: *“The nature and extent of emergency arrangements [for preparedness and response] shall be commensurate with the potential magnitude and nature of the [threat] ... associated with the facility or activity.” (Ref. [10], para. 6.4.) The full range of postulated events shall be considered in the threat assessment.”*

R.2.2: The operators (e.g. medical institutions) and local government units should conduct or review/update the assessment of radiation 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.

BASIS:

GS-R-2, para. 3.17, states that: *“In a threat assessment, facilities, sources, practices, on-site areas, off-site areas and locations shall be identified for which a nuclear or radiological emergency could warrant:*

(a) Precautionary urgent protective action.....

(b) Urgent protective action.....;

(c) Agricultural countermeasures; or

(d) Protection for the workers responding (undertaking an intervention), in accordance with international standards”

R.2.3: 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 teletherapy (external beam therapy) and brachytherapy sources, irradiator facilities, scrap metal yards, national border crossings, and possible terrorist activities such as use of a radiological dispersal device. 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.

BASIS:

GS-R-2, para. 3.19-20, state that: *“Locations at which there is a significant probability of encountering a dangerous source that has been lost, abandoned, illicitly removed or illicitly transported shall also be identified in the threat assessment”*

“Large scrap metal processing facilities, national border crossings and abandoned military or other facilities where large sources may have been used should be considered in the threat assessment”

3.2.3 Suggestions

S.2.1: The ANRA as the licensing authority for both nuclear and radiation facilities (practices) has all the necessary information and should take efforts to facilitate and coordinate a systematic threat assessment according to the GS-R-2 requirements that has not been so far performed in the Republic of Armenia.

The results of the threat assessment should be systematically used by operators and relevant response organizations during the planning process.

S.2.2: It is suggested that the ANRA issues a special guideline on how to perform assessment and categorization of existing radiological threats in line with international standards. The need to review and update the threat assessment results, if and when necessary, should be specified, in order to maintain a relevant up-to-date perception of the potential risks and to make the necessary changes in the emergency plans.

BASIS:

GS-R-2, para. 3.16, states that: *“Operators, the national co-ordinating authority (see para. 3.4) and other appropriate organizations shall periodically conduct a review in order to ensure that all practices or situations that could necessitate an emergency intervention are identified, and shall ensure that an assessment of the threat is conducted for such practices or situations. This review shall be undertaken periodically.....”*

3.3. ESTABLISHING EMERGENCY MANAGEMENT AND OPERATIONS

Regarding the requirements set out in Ref. [2] for establishing emergency management and operations, the following appraisal criteria were investigated:

- i. Make arrangements to coordinate the emergency response of all the off-site response organizations with the on-site response to include a command and control system for the local and national response to any nuclear or radiological emergency.
- ii. Make arrangements for the appraisal of the information necessary for decision making on the allocation of resources throughout the emergency.

3.3.1. Current situation

Ref. to (i): In the Republic of Armenia the legislative framework defines the emergency management system and the responsibilities and functions of the state and local authorities, and also the responsibilities of the nuclear and radiological facilities in case of emergency situations. The emergency management is structured on three levels:

- national (State) level,
- regional (County) and municipal (Local) level, and
- operator level.

Articles II and III of the Law on Public Protection define that the legal basis for providing protection of population are the Constitution of the Republic of Armenia, international agreements of the Republic of Armenia, the Law on Public Protection, and other legislative acts. State and local authorities, enterprises, institutions and organizations are included in population protection system.

According to paragraphs e) and f) of Article 7 of the Law on Atomic Energy “the Republic of Armenia assumes measures to ensure preparedness of the state authorities and enterprises, involved in the national emergency response system, for possible emergency situations at facilities, using atomic energy, and for mitigation of the emergency consequences; and organizes the system of control of radiation situation; determines the procedure of respective activities of the state authorities involved in this system”. The Law on Atomic Energy in its Articles 8, 9 and 10 defines the responsibilities of the state, regional state and local authorities in case of a nuclear or radiological accident.

According to Article XXI of the Law on Public Protection “rescue forces are established to fulfill rescue operations in emergency situations and to provide the population with special assistance in everyday conditions. These forces are in permanent readiness; they include state, public and departmental special rescue formations, which act by centralized management principle in emergency situations, within the scope of justified risk”.

Furthermore, the Law on Atomic Energy, in its Articles 20 and 23, defines the responsibilities of operating organizations and transport companies, exporters and receiving persons for preparedness and response to accidental and other extreme situations occurring at the facilities using atomic energy, or that may emerge during transport or other activities.

The Nuclear Plan provides amongst others the following arrangements:

- the chart of communication arrangement in case of an accident at the ANPP,
- the chart of organization of warning in case of an accident at the ANPP,
- the organizational chart of the planning system for the protection of the population,
- the command and control chart for evacuation of the population in case of an accident at the ANPP.

The Nuclear Plan clearly names and delegates the appropriate set of responsibilities to all state governing bodies, local self-governing bodies and organizations of the Republic of Armenia that play roles in the protection of the population from the dangerous impact of ionizing radiation in case of a nuclear and (or) radiological accident at the ANPP and set up specific requirements for all response organizations.

The legal arrangements listed in the Nuclear Plan (the international agreements, the laws of the Republic of Armenia, Government Decrees, and other legal acts) establish the sound emergency management and operation system of the Republic of Armenia.

The general scheme of national decisional structure on response in case of emergency situations is as following.

In the Precautionary Action Zone (PAZ – 0-5km radius): urgent actions are planned to be implemented before or at the beginning of radioactive release based on the warning received immediately from the ANPP (in accordance with the emergency class at the facility).

Within the territory of the Urgent Protective Action Planning zone (UPZ – 5-10 km radius): decisions on urgent actions are made at State level and communicated to the Regional Emergency Management Committees at the regional level.

Rules on implementation of the protective measures are communicated to the Mayors of the effected municipalities from the Emergency Management Committees of the effected regions. Decisions on the implementation of the received instructions are made by the Mayors of the affected municipalities.

The organizational chart of population protection planning system and the command and control chart for the evacuation of population in case of an accident at the ANPP are attached in Appendix VI and Appendix VII respectively in this Report.

In case of nuclear or radiological accident at the ANPP, the Ministry of Emergency Situations of the Republic of Armenia is the responsible organization for emergency management (at state level), and the following ministries and organizations have the supporting roles: Ministry of Environment Protection, Ministry of Defense, Ministry of Education and Science, Ministry of Transport and Communication, Ministry of Economy, Ministry of Energy and Natural Resources, Ministry of Foreign Affairs, Ministry of Justice, Ministry of Urban Development, Ministry of Agriculture, Ministry of Health, Ministry of Diaspora, State Committee for Water Management of the Ministry of Territorial Administration, National Security Service, State Revenue Committee, General Department of Civil Aviation, Police, Aragatsotn region, Armavir region, Kotayk region, Shirak region, ANRA, “Public TV and Radio Company of Armenia” CJSC.

The local level response is always activated in case of emergencies. The coordination of emergency response actions belongs to the municipal (and local) level when the emergency affects one, two or at the most three municipalities. In such cases, the municipality where the incident or accident occurred is responsible with the activation of the Municipal Emergency Management Commission. The Municipal Emergency Commission is the decisional structure at local level responsible for the management of an imminent or actual emergency situation. This is chaired by the governor of the municipal administration. It is the role of the governor of the municipal administration to appoint in case of emergency a municipal operations commander, who becomes responsible with the incident command at the accident scene.

According to Articles VIII, IX and X of the Law on Public Protection the regional state management and local authorities carry out the displacement, reception and the distribution of the displaced people, sheltering and provision of individual protection for the population.

According to the discussions held during the mission, the common understanding of the EPREV team is that in most cases the incident commander is a representative belonging to the local rescue services or, in the case when more than one rescue

services are involved in the response, the leadership of operations will belong to a representative of the County Rescue Board, which is subordinated to the RS of MES.

According to the existing legislative framework, emergency response plans and procedures are in place at all levels in order to transpose the requirements in practical guidance. After visiting different response organizations (at operator, local and national level) the EPREV team realized that in case of emergency at the ANPP all response organizations were aware of their specific roles and duties, and that arrangements were in place at all levels for a coordinated emergency response.

Ref. to (ii): Arrangements are in place at local and national level for the appraisal of the information necessary for decision making on the allocation of resources throughout the emergency at the ANPP. General requirements are described in the Nuclear Plan.

Decisions on state level are made by the State Committee of Emergency Situations. These are based on the information from the Crisis Management Centre of MES that is located in the headquarters of the MES. This Centre is a newly refurbished, state-of-the-art centre for integrating all in-coming information from responsible bodies (reports on actual and prognosed meteorological conditions, radiation monitoring results, ANRA recommendations on potential protective measures, etc.).

The ANRA operates its own Emergency Response Centre to where the most important technical parameters of the ANPP and meteorological information are transmitted through electronic means.

The ANPP operates its own Crisis Management Centre as well. The Centre is enforced to withstand high level of earthquakes, equipped with separate ventilation and air filtering system and capable to provide working environment for prolonged emergency. The Centre receives technical, meteorological and radiation information from the unit and its environment to be capable for providing technical support both to the operative staff on accident management and mitigation and to ANRA on public protective measures.

The sizes of preplanned protective measure zones are determined by the Nuclear Plan as follows:

<i>Precautionary protective action zone</i>	<i>PAZ; an area within the radius of 5 km around the ANPP.</i>
<i>Urgent protective action zone</i>	<i>UPZ; an area within the radius of 5-10 km around the ANPP.</i>
<i>Long-term protective actions planning zone</i>	<i>LPZ; no concrete size is given in the Nuclear Plan. (For the size of LPZ different numbers were shown, like 50 km or 100 km radius.)</i>

Currently the zone sizes do not strictly follow the IAEA recommendations given for nuclear facilities for the types like ANPP (Ref. [2] and [3]).

3.3.2. Good practices

GP.3.1: To perform independent assessment of the ANPP accident conditions and be more efficient in performing the assigned emergency functions the ANRA staff has elaborated 11 written emergency procedures, which cover: how to determine the status of the reactor core and primary cooling system; the conditions and characteristics of possible release to the environment; how to perform calculations of the projected doses for the public; and how to define measures for protection of the public. A list of procedures is given in Appendix X.

GP.3.2: At the ANPP the staff of Emergency Response Unit elaborated a pocket book containing in short concise, easy to use form the basic responsibilities, tasks and behavioral rules. Multiple copies of this pocket booklet have been then distributed to the ANPP personal.

3.3.3. Suggestions

S.3.1: The Nuclear Plan requires regular update. Changes in the governmental structure, publication of new international documents for consideration, experiences from exercises and also national and international experiences from emergencies have to be considered during the updates. Although lessons from the latest experiences are still being drawn, nevertheless a revision of the Nuclear Plan is to be performed in short term to reflect the actual governmental structure and to assign clear responsibilities

S.3.2: The technical basis for determination of zone sizes around the ANPP are suggested to be updated with due consideration of the results of state-of-the-art severe accident assessments (like results of level 2 Probabilistic Safety Assessment studies), radiation analyses as well as experiences of recent incidents and accidents (at the level of engineering consideration) identified worldwide.

3.4. IDENTIFYING, NOTIFYING AND ACTIVATING

Regarding requirements set out in Ref. [2] for identifying, notifying and activating, the following appraisal criteria were investigated:

- i. Establish 24 hours/day, 7 days/week contact point.
- ii. Make aware of the radiological hazards for on-site managers of facilities (e.g. scrap metal processing facilities) and national border control authorities.
- iii. Ensure first responders are aware of: the symptoms, the appropriate notification and other immediate actions warranted if an emergency is suspected.
- iv. Establish a system for promptly initiating an off-site response in the event of an emergency.
- v. Ensure response organizations have sufficient personnel.
- vi. Make known to the IAEA and other States the State's single warning point of contact responsible for receiving emergency notifications and information from other States and information from the IAEA.
- vii. Perform event classification and countermeasures following the requirements of international standards.

- viii. Make arrangements for the prompt determination of the appropriate emergency class by the operator and of the level of response, as well as for notification and provision of updated information to the off-site notification point.
- ix. Have arrangements in place to provide a response to an emergency for which detailed plans could not be formulated in advance.

3.4.1. Current situation

Ref. to (i): The emergency service 911 is continuously available 24 hours/day and 7 days per week at the Crisis Management Center of the RS of MES, and the earlier dedicated emergency phones of police, ambulance and rescue structures are also in use. The “911” is dedicated for receiving notifications of any type of emergency, including a nuclear or radiological emergency. There are plans for future developments and integration of “911” with ambulance and police services.

Dispatchers of the Crisis Management Center of the MES have general instructions in place for clarification of situations and further responding to rescue emergency events. In case of the incidents/accidents involving radioactive sources (transport accidents, orphan sources) the information is transferred to the RS of MES, Police, National Safety Service and ANRA, who activate the response to the notified event. The dispatchers use general instructions, which do not include specific provisions on how to address a radiological incident not related to the event at the ANPP.

In case of emergency situation at the ANPP the Crisis Management Center of the MES receives information on line from the Crisis Management Center of the ANPP. In parallel the ANPP Crisis Management Center transmits the information in the coded form to the ANRA, MoENR and Armavir regional rescue department of the RS of MES. The Crisis Management Center of MES passes the message to the dedicated governing bodies, which organize work of their emergency commissions and activate their emergency response plans. In case the event is serious, the members of the State Emergency Management Committee of the Republic of Armenia come together for the extraordinary session.

The operative duty officer of Armavir regional rescue department organizes the warning of the members of the standing committee in emergency situations and the evacuation committee of Armavir region. The RS of MES activates monitoring of the emergency zones (PAZ and UPAZ).

The flow chart of notification and exchange of information in case of emergency at the Armenian NPP is presented in Appendix VIII.

Ref. to (ii): In the Republic of Armenia there are several scrap metal collection facilities, which do not melt, but segregate and presumably grind up the recyclable metallic items. It is not clear if the on-site managers of these facilities are aware that the collected items might have radioactive content and the measurements of radioactivity are required in order to protect themselves and their business.

At the borders, the Department of Customs Controls Equipment and Communication of the State Revenues Committee of the Republic of Armenia (further Custom Department) is responsible for the control of goods, which are imported, exported or in transit. The custom’s activities and functions with respect to dealing with radioactive materials are defined in the Procedure on finding and regaining control

over radioactive materials, approved by Gov. Decree No 553-N of 03.05.2007, amended 08 January 2009 N 36-N and 08 September 2011, N 1280-N. These include:

- a) radiation control of shipments on the customs border;
- b) ascertainment of facts upon detection of “radioactivity” signal or registering other indications of radioactivity with relevant devices during custom supervision of goods and vehicles at custom points;
- c) notification of the National Security Service of the Republic of Armenia and the ANRA about the detected radioactive material;
- d) providing for safety and security storage of cargo with radioactive material until the ANRA staff has arrived in the scene.

The Custom Department has benefited from the support of the USA Department of Energy for the endowment of customs points with radiation detection equipment and also for specific training of custom officers. Thus, fixed radiation portal monitors “Yantar” were installed in all five border points (altogether (51 items), and the following dosimetric devices have been received: radiometer-spectrometer MKC-A03 (14 items); radiometer-spectrometer IdentiFinder (3 items); radiometer-spectrometer ICS4000 (3 items); doзимeter Ludlum-192 (9 items); and 99 radio pagers. Currently all custom points have ability to measure dose rate and identify radioisotope, which causes increased radiation. Special instructions on detection of nuclear materials in conducting custom control have been developed and implemented.

During the visit at the Custom Control Point at the Yerevan Airport, the EPREV team realized that the personnel of the Custom Service are aware and trained for performing radiation monitoring of the cargos, vehicles and people who are crossing the border. At the same time the custom quarters are not sufficient, and a separate room for temporary custody of «radioactive» passengers has not been arranged.

Ref. to (iii): The rescue workers, together with the emergency medical staff and police units are the first responders in case of any type of emergency. The rescue workers have basic training in radiation protection, according to their specific qualification. In addition the rescue service units of Armavir and neighboring to Armavir regions have drills and exercises on the immediate actions they have to take in case of a radiation emergency at the ANPP. These units are equipped with several pieces of dosimetric devices, although the individual dosimeters have not been provided.

The Police personnel are aware of radiation protection from the educational course on Civil Defence at the Police Academy. The Police have an annual plan of personnel training in each region of the Republic of Armenia, which includes drills on the dangerous substances.

Nevertheless, as described during the meetings at the Police and the MoH headquarters, nor Police nor emergency medical staff have special training, instructions and radiation detectors to indicate the symptoms of radiation and act in adequate way if an emergency, involving a radioactive source is suspected.

Ref. to (iv): The system for promptly initiating the off-site response in the event of an emergency is established according to the provisions included in the Law on Civil

Defence, the Law on Public Protection and the Nuclear Plan. It is fully operational for the case of radiation emergency at the ANPP. The organizations which are notified in such cases have developed their own response plans, which are coordinated with the ANPP on-site plan (according to the Nuclear Plan).

The facilities or practices in threat category III and IV seem not to have coordinated response plans or clear written procedures to be implemented in the event of accident with radioactive sources or release of radioactive materials.

In case if increased radioactivity is detected at custom border, the custom officers have a special protocol to be completed. The protocol is submitted to the RS of MES, National Security Service and ANRA, which, in accordance with Gov. Decree No 553-N, should provide for further required actions (identification, management, safe transport of detected material to the ANPP storage facility, and decontamination activities, if appropriate).

Ref. to (v): Based on the discussions with the staff of different response organizations, the mission team concluded that the response organizations had qualified personnel available to perform their assigned initial response actions, and the required arrangements were in place. However, for the time being, the available police and medical personnel may not be sufficient in the event of large scale radiological emergency, because of the limited number of protective equipment, personal dosimeters and portable radiation detection equipment.

Ref. to (vi): According to the legislation (the Law on Atomic energy, Article 17, points r-u, and the Nuclear Plan, point 3d and 47) the ANRA is designated to be the Armenian's single warning point of contact responsible for receiving emergency notifications and information from other States and information from the IAEA. During working hours the notifications are received at the specified ANRA e-mail and fax addresses, and 24 hours/day the electronic messages can come to the emergency mobile phones of the responsible assigned staff.

The international organizations and diplomatic missions in the Republic of Armenia are notified by the Ministry of Foreign Affairs of the Republic of Armenia (point 4 and 48 of the Nuclear Plan).

To exchange safety related information, the ANRA has established cooperation agreements with the US NRC, the Russian Federation and Ukraine. In the framework of the IAEA technical cooperation program and the INSC program, the ANRA cooperates with the regulatory authorities and technical support organizations of the Russian Federation, Ukraine, Finland, the Czech Republic, Bulgaria, Lithuania, Belgium, France, the Slovak Republic and other countries. The ANRA is a member of the VVER Forum that joins nuclear regulatory authorities of countries operating VVER NPPs, and it is an observer to WENRA. The ANRA also cooperates with the US DOE in the frame of the international INSEP.

Ref. to (vii): The on-site ANPP Emergency Plan has a guideline "Classification of Emergency Situation at the Armenian NPP", which allows prompt response and effective management and the implementation of emergency operations. The adopted classification system defines three types of nuclear emergencies (alerts, local and

general). The Nuclear Plan refers to these emergency classes as it is shown in Appendix IX of this report.

It should be noted, however, that the maintained classification system was recommended in the earlier IAEA TECDOC-953 and is not in compliance with the latest classification approach recommended in GS-R-2 and EPR-Method 2003.

The emergency classification system for facilities in threat category III and other emergencies (e.g. the situations with uncontrolled sources) has not been considered in Armenian regulations.

Ref. to (viii): The arrangements for the prompt determination of the appropriate emergency class and for notification and provision of updated information to the off-site notification points (Crisis Management Center of MES, ANRA, Armavir regional rescue department and MoENR) are included in the on-site and off-site ANPP emergency plans.

The system includes the emergency action levels (EALs) and defines responsibilities and initial response actions of all response organizations for each class of emergency.

At facilities in threat category III the emergency classes are not defined, as it has been mentioned above. Nevertheless, the procedure for notification and transfer of the emergency information to the Crisis Management Centre of MES and ANRA is included in the on-site plans of all facilities, using or operating sources of ionizing radiation.

Ref. to (ix): The RS of MES and other response organizations in the Republic of Armenia have qualified and skilled personnel which can always rely on the support of the ANRA and ANPP Technical Support Organizations. This provides a high level of assurance that the appropriate level of response will be provided also in those events for which detailed plans could not be formulated in advance. At the same time, the response to the accidents involving dangerous radioactive sources, and especially dangerous uncontrolled sources, may require additional arrangements due to absence of detailed written procedure on taking emergency actions in such situations.

3.4.3. Recommendations

R.4.1: Arrangements should be made to ensure that: (i) all scrap metal facilities are equipped with portal monitors or use portable radiation detection devices for checking the level of radioactivity on the site; (ii) scrap metal workers are trained on immediate actions (how to protect themselves and public) and appropriate notifications (who must be informed), if a radiological emergency is suspected.

R.4.2: Since conventional emergency services may not be staffed with radiologists, the personnel (i.e. first responders: police, first aiders, firefighters, etc.) should be trained and receive basic instructions on how to respond to a radiation emergency. The instructions should include: recognition of the event (e.g. radiation signs, transport codes); identification of whom to call to report the event; guidance on how to secure the site and protect those on-site; the risks associated with radiation; and guidance on how to avoid potential contamination while rendering first aid to injured persons. The IAEA may support training of the first responders of the Republic of Armenia through delivering standard packages of training materials and providing

with the IAEA lecturers /instructors for teaching during national training course (1-2 weeks).

BASIS (for R.4.1. and R.4.2):

GS-R-2, para. 4.17, states that: *“In jurisdictions in which there is a significant probability of a dangerous source being lost, abandoned, illicitly removed or illicitly transported (see para. 3.19), arrangements shall be made to ensure that the on-site managers of operations and the local officials responsible for response are aware of the indicators of a potential emergency and aware of the appropriate notifications and other immediate actions warranted if an emergency is suspected*

R.4.3: Arrangements should be made to reconsider existing emergency classification system which should be in line with international guidance (GS-R-2) for the threat category I facility (NPP) and also cover emergencies at facilities in threat category III and other emergencies. These would enable the use of a common language, regional harmonization and better compliance with the IAEA standards in case of a nuclear or radiological accident in the Armenian territory.

BASIS:

GS-R-2, para. 4.19, states that: *“The operator of a facility or practice in threat category I, II, III or IV shall make arrangements for the prompt identification of an actual or potential nuclear or radiological emergency and determination of the appropriate level of response. This shall include a system for classifying all potential nuclear and radiological emergencies that warrant an emergency intervention to protect workers and the public, in accordance with international standards, which covers emergencies of the following types at facilities (1–4) and other emergencies such as (5) below:...”*

3.4.4 Suggestions

S.4.1: Dispatchers of the Crisis Management Center of MES and of other notification centers (e.g. operated by the Police) are suggested to be provided with clear instructions on how to deal with incoming calls reporting an accident with uncontrolled dangerous radioactive source or contamination.

S.4.2: The ANRA is suggested to initiate issuing a regulation, which will specify the requirements for the radiation monitoring system and training of workers at scrap metal facilities. The regulation should establish a provision that the authorization for conducting scrap metal activity may be issued by the relevant State Authority only in coordination with the ANRA that should oversee the fulfillment of radiation protection requirements.

S.4.3: Although custom officers are regularly trained in radiation protection, it is suggested to include in their internal training programs other personnel which may be involved, according to their job or occasionally, in responding to radiological emergencies at the custom points (border police, security, passport control, etc. officers).

S.4.4: In case of a radiological emergency in threat category IV it cannot be certain that the responders arriving first to the site are equipped with dose and dose rate measurement devices. It is suggested that at least every vehicle which can be used for transporting first responders to the site of an emergency should contain a simple dose rate meter or counter sensitive to elevated levels of radiation and capable of producing a warning signal above a preset reference level. Adequate response procedures shall be also developed in order to achieve first responders will act as they are expected.

S4.5: The ANRA is suggested to organize work of its Emergency Response Centre in such a way, that all information (including notifications by fax received after working hours) will be adequately evaluated by the assigned staff 24 hours/day, 7 days/week.

3.5. TAKING MITIGATORY ACTIONS

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

- i. 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.
- ii. The operator of a practice in threat category IV shall be given basic instruction.
- iii. Make arrangements to initiate a prompt search and issue a warning to the public in the event of the loss of a dangerous source.
- iv. Make arrangements for mitigatory action to prevent an escalation of the threat; to return the facility to a safe and stable state; to reduce the potential for releases of radioactive material or exposures; and to mitigate the consequences of any actual releases or exposures.

3.5.1. Current situation

Ref. to (i): The legislation includes clear provisions that the radiation protection expertise and services in the Republic of Armenia shall be provided promptly by the ANRA that has adequate capabilities and trained staff to provide these services. The responsibilities of the ANRA in this area are established in its Statute (approved by the Gov. Decree No 866-N of 17 July 2008), Law on Atomic Energy (articles 16-17.1) and Gov. Decree No 553-N “On Approval of the Procedure on finding and regaining control over radioactive materials”. The ANRA uses service of the Nuclear and Radiation Safety Scientific Technical Center that is its technical support organization.

In case of emergencies involving practices in Threat Category IV, the ANRA can provide first responders and local officials with on-call advice or send a team of radiological experts to the scene.

Ref. to (ii): The radiation legislation of the Republic of Armenia (Law on Atomic Energy, article 20, Gov. Decree No 1219-N of 18.08.2006 “On approval of radiation safety norms”, Gov. Decree No 1489-N of 18.08.2006 “On approval of radiation safety rules”) obliges the operator of the practice in threat category IV to have basic instructions on mitigating the potential consequences of emergencies and promptly protecting workers and the public in the vicinity.

The relevant arrangements are addressed also in the license 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. Thus, according to the licensing legislation (Gov. Decree No 1751-N of 09.12. 2004 “On approval of the licensing procedure and license form for use of radioactive materials, equipment containing radioactive materials and radiation generation sources”, Guides on the format and content of the package of documents for issuing license), the applicant should introduce the instructions on dealing with radiation sources in emergency situations and a schedule for regular instructing and training of the relevant staff. The operators of high risk radiation practices, which in most cases belong to threat category IV, are required to develop and demonstrate to the ANRA instructions on the emergency response.

Ref. to (iii): Specific arrangements for initiating a prompt search of the lost dangerous source have not been specified in legislation (or regulation) of the Republic of Armenia, although it is clear that the main players in case of this event would be the National Security Service, ANRA, Police, and the RS of MES. The corresponding responsibilities of the listed organizations are set in their statutes, and some of the relevant functions are defined by Gov. Decree No 553-N “On Approval of the Procedure on finding and regaining control over radioactive materials”, that concerns cases of illicitly removed radioactive sources.

Ref. to (iv): According to the Law on Atomic Energy, article 20, the operator 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. All necessary arrangements for taking mitigatory actions are described in the Law on Civil Defense, Law on Public Protection, Law on Atomic Energy and the Nuclear Plan, as well as in the on-site emergency plans of licensees.

There is one facility in threat category I in the country, ANPP, in which beyond design basis (severe accident) accidents are postulated to have severe consequences affecting the public. The current mitigation actions at the ANPP 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 are described in the on-site emergency plan. These include the mitigatory actions which contain/address the safe shut down of the plant (unit); ensure the availability of the emergency cooling systems (ECCS) and water supply; availability of emergency power supply (diesels, back-up lines); enabling the protection of barriers (fuel, primary circuit, containment) and minimizing the radiation consequences of the accident.

The staff of the ANPP is aware, that the mitigatory actions are not fully reflected in emergency operating procedures and severe accident management guides. The gaps are planned to be addressed through the amending the documents by the end of 2013.

The Severe Accident Management Guidelines (SAMG) are being developed for the Armenian NPP based on the approach specified in the IAEA NS-G-2.15 “Severe Accident Management Programmes for Nuclear Power Plants”. In the development

process the *Strategy on severe accidents management and taken measures* will be considered.

Improvement of the Radiological Situation Automatic Control System (increasing the number of detectors measuring radiological situation around the Armenian NPP) enables the persons in charge to make timely decisions and implement mitigatory actions on time.

At the ANPP crisis management center there is a technical group to assist to operating personnel in solving the emergency situations and mitigating the consequences of an accident.

The mitigation actions of the response organizations in case of the accident at the ANPP are clearly settled down in the Nuclear Plan, which specifies jurisdictions of each national organization as well as forces and resources, needed to be allocated to protect the population. According to the Nuclear Plan, in case of the general accident at the ANPP, the heads of state governing and local self-government bodies, and organizations in the administrative territory of Armavir and Aragatsotn regions directly send information of the taken mitigating measures to the relevant Emergency Management Committees, which, in their turn, pass the information to the State Emergency Management Committee of the Republic of Armenia.

For taking fire security mitigatory actions in the settlements of the PAZ and UPZ, stations of the consolidated units of rescue forces and means of the RS of MES are organized. These are placed in the firefighting-rescue divisions of Vagharshapat city and Baghramyan village of Armavir region while the firefighting-rescue detachment of Ashtarak city of Aragatsotn region is assigned as a reserve station.

The forces of the Police provide for the maintenance of public order, protection of top important objects and arrangement of traffic in settlements of the PAZ and UPZ.

The arrangements for mitigatory action at facilities/practices in threat category III and IV seemingly are included in the general emergency plans of the facilities, addressing response to all-hazard potential accidents.

3.5.2. Good practice

GP.5.1: All border crossing points of the Republic of Armenia are well equipped with stationary and handheld detection equipment, operated by adequately trained custom staff. Enhanced regulatory control is realized through the officially established requirements for monitoring procedure and actions to be performed in case of detection of radiation, the adequately developed protocols and registration procedures are in place. In addition, the legislation is specified that all costs for the management of orphan sources or ownerless contaminated materials are covered from the state budgeted.

3.5.3 Recommendations

R.5.1: The RS of MES in coordination with the ANRA is advised to set a special procedure (or procedures), that describes in details the order of interaction and actions of the authorities and organizations in case of a dangerous source has been lost or

illicitly removed or illicitly transported, as well in the other potential accidents with radioactive sources in the territory of the Republic of Armenia. The procedure(s) should among others ensure that, when necessary, the warning to the public is issued in proper way. Furthermore, these procedure(s) should be a part of the National Radiation Emergency Plan (NREP).

BASIS:

GS-R-2, para. 4.38, states that: *“Arrangements shall be made to initiate a prompt search and to issue a warning to the public in the event of a dangerous source being lost or illicitly removed and possibly being in the public domain”.*

R.5.2: The license holder (operator) of the ANPP should take the necessary steps to ensure the effective implementation of the procedures and guides addressing mitigatory actions for the beyond design basis accidents (BDBA). Lessons learned from the Fukushima accident in the relevant consent should be considered when developing the procedures and guides.

BASIS:

GS-R-2, para. 4.39, states that: *“For facilities in threat category I, II, or III.....Arrangements shall include emergency operating procedures and guidance for the operator on mitigatory actions for severe conditions, for the full range of postulated emergencies, including accidents beyond the design basis”*

3.5.4. Suggestions

S.5.1: In order to ensure an effective licensing process a guideline should be developed by the ANRA to outline which mitigatory actions the operators of threat category IV practices should include in their emergency plans or instructions for responding emergency situations

S.5.2: The RS of MES and the ANRA should make arrangements for drafting and issuing basic instruction (guidance) for first responders and the operators for practices in threat category IV based on the IAEA relevant publications, in particular the international standards on the immediate response to transport related emergencies [4] and suspected illicit trafficking. A routine training programme should be established.

S.5.3: The emergency plans of local authorities and first responders should include a procedure (or instruction) on how to obtain expertise and assistance for dealing with different radiological aspects in case of an emergency, including threat category IV accidents.

3.6. TAKING URGENT PROTECTIVE ACTION

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

- i. Adopt national intervention levels for taking urgent protective actions in accordance with international standards.
- ii. Make arrangements for effectively making and implementing decisions on urgent protective actions to be taken off the site.

- iii. Make arrangements to ensure the safety of all persons on the site in the event of a nuclear or radiological emergency.

3.6.1. Current situation

Ref to (i): The generic optimized intervention levels for taking urgent protective actions are established by the Gov. Decree № 1489-N of 18.08.2006 “On approval of Radiation safety rules” and also are included in Nuclear Plan.

Table 1 of Appendix No 12 of the Nuclear Plan contains the generic optimized intervention levels for the implementation of the urgent protective measures (sheltering, evacuation, protection of thyroid gland). Values in this Table comply with those in Paragraphs III-1, III-2 and III-3 in Annex III of GS-R-2.

Table 2 in Appendix No 12 of the Nuclear Plan contains the generic optimized intervention levels for temporary transportation and permanent resettlement. Values in this Table comply with those in Paragraphs III-6 and III-7 in Annex III of GS-R-2.

Table 3 in Appendix No 12 of the Nuclear Plan gives the generic action levels for foodstuffs. Values in this Table comply with those in Table III-1 in Annex III of GS-R-2.

Ref. to (ii): In the Republic of Armenia urgent protective actions are considered only for the case of the emergency (accident) at the ANPP. Requirements and provisions for effectively making and implementing decisions on urgent protective actions are described in the Nuclear Plan.

In case of an emergency at the ANPP it is classified by the Shift Supervisor based on the assessment of the plant conditions. Generic Action Levels (GAL) have been preliminary determined and are included in the emergency response plan of the ANPP. The predetermined system of GALs enables the Shift Supervisor to classify the emergency situation without delay. In case if General Emergency is defined, sirens in the municipalities within the PAZ will be turned on following the order of the Shift Supervisor. Alert of ANPP management and state and regional officials will be in parallel executed according to the notification list in the emergency response plan of the ANPP. Sound of the sirens informs the population on the occurrence of the severe accident at the ANPP and requires them to shelter in the basements of their houses or in predefined common shelters. This means that instruction to the public in the PAZ on sheltering as of the first protective measure takes places “automatically” following the declaration of General Emergency by the ANPP.

Sirens in the effected sectors of the UPZ will be turned on by the decision of the Emergency Management Committee of the effected regions. For providing technical basis for such a decision the ANRA performs independent assessment of the accident conditions considering the actual and the prognosed status of the plant and meteorological conditions. While making its independent assessment the ANRA staff follows written procedures. Proposals of the ANRA will be communicated to the Regional Emergency Management Committees through the Crisis Management Centre of MES. Upon turning on the sound of the sirens instructs the public in the

affected sectors of the UPZ to shelter in the basements of their houses or in predefined common shelters.

Further decisions on population protection measures are made by the State Emergency Management Committee of the Republic of Armenia on the basis of proposals elaborated by the ANRA. For its decision support functions the ANRA receives technical information from the ANPP, meteorological forecast and monitoring results from the Crisis Management Centre of MES. Proposals on population protection measures, elaborated by the ANRA, are forwarded to the State Emergency Management Committee through the Crisis Management Centre of MES. Decisions of the State Committee of MES are communicated to the Emergency Management Committees of the affected regions through the Crisis Management Centre of MES.

Ref. to (iii): The arrangements to ensure the safety of all persons on the site are given in the ANPP on-site emergency plan. Local shelters are foreseen capable to house all those who are not directly involved in response activities. The shelters are enforced to withstand high level of earthquakes, equipped with separate ventilation and air filtering system. Sufficient stocks are available for performing iodine prophylaxis. The personal unnecessary in response activities are evacuated from the site according to the plans. Decisions on urgent protective measures in relation to all persons on the site in the event of a nuclear or radiological emergency are made by the Emergency Management Committee of the ANPP.

For facilities in threat category III the arrangements to ensure safety of all persons on the site are described in the on-site emergency plans or procedures, which are checked by the ANRA during the licensing process and in performing inspections.

3.6.2. Suggestions

S.6.1: The EPREV team emphasizes that national intervention levels for urgent protective actions are determined in Armenian legislation in accordance with those in the international standards [2]. However, for the time being the IAEA introduced new criteria (GSG-2, GSR Part3), which are suggested to be implemented while reconsidering the Nuclear Plan and regulations on taking urgent protective actions in the event of radiation emergency.

S.6.2: According to the discussions held, the EPREV team concluded that decision on evacuation is made by the State Emergency Management Committee of the Republic of Armenia (at State level). There might be situations in which the decision on evacuation of residents has to be made as quick as possible. In such cases, a delayed decision when waiting for the activation of national level decision makers and communication of their decision to regional level might cause unnecessary exposure of the population to high radiation doses. Therefore, it should be considered whether extending decision making responsibilities and capabilities to Regional Emergency Management Committees (at regional level) could accelerate the implementation of the urgent protective actions.

3.7. PROVIDING INFORMATION AND ISSUING INSTRUCTIONS AND WARNINGS TO THE PUBLIC

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

- i. Make arrangements to promptly provide 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.

3.7.1. Current situation

The requirements for public information under emergency conditions are established by the Law on Public Protection, where the responsibilities of Government and the Authorized body are declared (Article 5, 12, 13). Obligations of state bodies and their involvement in warning of the public in case of the accident at the ANPP are described in the Nuclear Plan.

According to this plan the responsibilities for warning rest with:

- a) The Armenian NPP – warning of population in the PAZ. The notification of the population of the communities in the PAZ is done directly (decision at the ANPP) in case the accident is declared as a General Emergency. Within the PAZ the population is warned by signal transmitted through sirens. The instructions for the further actions of the population are given by using the available loudspeaker system, TV and radio set.
- b) The Rescue Service of MES – warning of population in the UPZ, and if necessary also the population of other regions.
- c) The mobile forces and means of the Police and Ministry of Defence of the Republic of Armenia which use their relevant tools to participate in the warning process.

The designated Public TV Company of Armenia and the Public radio of Armenia are obligated to take part in the warning of the population and transferring the instructions related to the implementation of protective measures. The public channels of TV and radio continuously inform the public about the actual developments of the situation.

3.7.2. Suggestions

S.7.1. During the discussions in the municipality of Armavir Marz the EPEV team was informed that notification of the population in the PAZ zone should be done by sirens CS-40, which are not equipped with alternative signal trigger on case of stop of the electricity power. The operational conditions for the sirens should be reviewed, as considering the loss of power off the site under a condition of general emergency at the ANPP. Also the means (sirens) for direct warning of the public from the ANPP should cover the UPZ area.

S.7.2: In order to enhance the existing civil alarm and notification system, the use of a mobile phone system to warn the members of the public and to provide instructions to them if an emergency occurs can be considered.

BASIS:

GS-R-2, para. 4.55 states that: *“Arrangements shall be made for facilities in threat category I or II to provide promptly a warning and instruction to permanent, transient and special population groups or those responsible for them and to special facilities in the precautionary action zone and the urgent protective action planning zone upon declaration of an emergency class“*

3.8. PROTECTING EMERGENCY WORKERS

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

- i. Make arrangements for taking all practicable measures to provide protection for emergency workers and response personnel.
- ii. Have arrangements in place to provide effective large scale radiation protection for workers on sites under severe accident conditions.
- iii. Radiation workers have the information of the risks of radiation exposure and basic training to deal with an emergency in severe accident conditions.

3.8.1. Current situation

Ref. to (i): The legal base for the protection of emergency workers is given in the section “Emergency Exposure situations” of the Radiation Protection Norms, approved by Gov. Decree No 1219-N of 18.08.2006. The adopted provisions are applied *to all persons implementing functions established in the emergency response plans.*

The dose limits for emergency personnel are set up according to the specific tasks: life saving actions; prevention of serious injury; avert a large collective dose; prevent of development of catastrophic conditions; recovery of reactor safety systems; radiation situation monitoring in areas with severe contamination or under conditions with plume; short term recovery actions; urgent protective actions; environmental sampling; longer term recovery operations; works not directly connected with an accident (Table 26 of the Norms).

According to the Radiation Protection Norms, a permission for overexposure twice as much of the effective or equivalent dose limits of up to 100 mSv in a year is given by the coordinator of emergency response measures, and for overexposure four times as much of the effective or equivalent dose limits of up to 200 mSv by the coordinator of emergency response measures with prior approval of the regulatory authority. In case of the life saving actions, the dose limit for the emergency workers might be exceeded only on a voluntary basis.

Table 5 in Appendix No 12 of the Nuclear Plan defines dose levels (summary dose of external exposure to gamma radiation) for the turn-back guidance of the emergency

personnel (removal from area exposed to radiation), which are in line with the international recommendations (introduced in Appendix XI of this report).

According to the Law on Atomic Energy, article 17, the ANRA is responsible to assess the individual doses of those who have been exposed during the emergency and in cooperation with MES to develop a solution to ensure the submission of the assessment results to the medical specialist. There is no written procedure of how the individual dosimetry and dose management is performed for the emergency workers.

The practical arrangements and the relevant instructions for those involved in the emergency team are described in the on-site emergency plans of licensees.

The RS of MES teams are equipped with personal protection equipment, radiation detection instruments and decontamination devices for conducting the response actions in the field.

As for the Police, fire fighters and emergency medical personnel, their training in radiation protection (i.e. on how to protect themselves) may be insufficient and equipping with radiation detectors is in deficiency.

Ref. to (ii): Arrangements to provide effective large scale radiation protection for workers on site under severe accident conditions are set out in the Nuclear Plan. Thus, the State Reserves Agency of MES is obliged on the written request to provide Rescue Service of MES as well as the Armavir and Aragatsotn administrations with personal protection means and other equipment with the aim of assuaging rescuers working in the affected areas.

Ref. to (iii): The protective measurers for the ANNP emergency workers are defined in the ANPP on-site Plan (MA.ATD.41.SCHS-001) and Plan for radiation protection of personnel in case of radiological accident at the ANPP (MA.ATD.12.SCHS-004). Training for emergency response staff, including rescue workers, and medical staff appointed to work in case of severe accident at the ANPP is performed on regular basis. Types and periodicity of trainings and exercises are defined in the national legislation.

3.8.2 Recommendation

R.8.1: The term “emergency personnel” defined in the Radiation Protection Norms is not in full compliance with the concept of “emergency worker”, given in Glossary and para 4.57, 4.58 of GS-R-2. It is recommended that this term will be reconsidered, in order all workers, who may be exposed in excess of occupational dose limits while performing emergency actions, will be designated clearly in regulations as *emergency workers* (these include police, fire fighters, medical personnel, drivers and crews of evacuation vehicles, etc).

BASIS:

GS-R-2, para. 4.58, states that: *“Those called upon to respond at a facility in threat category I, II or III or within the precautionary action zone or the urgent protective action planning zone shall be designated as emergency workers. Such assisting personnel as police, fire fighters, medical personnel and drivers and crews of evacuation vehicles shall be designated as emergency workers. (See Ref. [3], Appendix V, para. V.27, footnote 31.) In addition, the radiation specialists (see para.*

4.35), radiation protection officers and radiological assessors (see para. 4.37) who may respond to emergencies involving practices or other hazards in threat category IV shall be considered emergency workers”.

3.8.3. Suggestions

S.8.1: The ANRA 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).

S.8.2: 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 para. 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.

S.8.3: The first responders, especially the RS of MES and fire brigades should be provided with sufficient number of personal dosimeters and they should wear these devices always when acting in emergency situations, in order to identify radiation hazard.

S.8.4: The regulations (or future NREP) should cover additional issues for emergency workers, including: medical surveillance, training, and appropriate protective equipment (with alarm dosimeters as the minimum requirement), as well as protective clothing and respiratory equipment, if needed (GS-R-2, paras.4.58, 4.62-64).

3.9. ASSESSING THE INITIAL PHASE

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

- i. Establish default operational intervention levels (OILs) for radiation emergencies.
- ii. Ensure the continued availability of radiation monitoring services to make assessments to be used for mitigatory actions, emergency classification, and urgent protective actions on and off the site.

3.9.1. Current situation

Ref to (i): Appendix No12 of the Nuclear Plan introduced the pre-calculated default operational intervention levels (OILs) for implementing the protective actions based on field survey measurements of gamma dose rate (mSv/hour) coursed by radioactive cloud or contaminated soil. The default OILs, called in the English version of the

Nuclear Plan as Intervention Work Levels (IWL), are given in Appendix XII of this report.

Ref to (ii): At the ANPP arrangements are in place to assess promptly the abnormal or emergency conditions, and, based on the status of the technology, to determine the emergency class according to the established system of classification.

The radiation monitoring in case of a nuclear accident on site is performed by the ANPP monitoring systems and emergency monitoring teams. The ANPP carries out gamma dose rate monitoring on site and in the sanitary protection zone (2 km radius), using one mobile monitoring unit. In the area of planning zones eight fixed monitoring stations are in operation measuring the level of radiation.

According to the Nuclear Plan, in the initial and middle phases of the general emergency at the ANPP, the goal of the radiological monitoring is tracking the direction of the radioactive cloud via periodically measuring the dose rate of gamma radiation and measuring contamination in the environment. The required measurements in the emergency zones (PAZ and UPZ) are carried out by the RS of MES, the MoD and ANRA, using its own resources (RS of MES - 5 main teams with 3 persons in each and 10 reserve teams with 3 persons in each; ANRA - 1 team of 3 people; MoD - radiological, chemical and biological protection forces).

The monitoring groups should channel the results of the measurements to the Crisis Management Center of MES and the ANRA for analysis and recommendations on urgent protective actions.

The Nuclear Plan establishes the following time-table for response measures to the general emergency:

- 1) proposals on the immediate protective actions: within 30 minutes;
- 2) decision-making on the immediate protective actions: within 30 minutes;
- 3) monitoring of the PAZ: within 4 hours.

There is a Radiological monitoring plan in case of a nuclear and (or) radiological accident at the ANPP, developed and coordinated by the RS of MES. The Plan defines actions on promptly conducting dose rate measurements, environmental sampling and monitoring of the contaminated people within the emergency zones. However, the Plan is not supplemented with detail procedures (methodologies, check lists, etc.). These procedures are needed to ensure a reliability and sufficiency of the monitoring data throughout the all stages of the emergency situation.

3.9.2. Recommendation

R.9.1: Methodology for recalculation of operational interventional levels in case of nuclear accidents should be developed and included in planning documents.

BASIS:

GS-R-2, para. 4.71, states that: *“For the precautionary action zone and the urgent protective action planning zone, arrangements shall be made for promptly assessing any radioactive contamination, ...in order to decide on or to adapt urgent protective actions to protect workers and the public, including the application of operational*

intervention levels (OILs) with arrangements to revise the OILs as appropriate to take into account the conditions prevailing during the emergency.”

3.9.3. Suggestions

S.9.1: The new criteria introduced by IAEA Safety Guide No. GSG-2 [6] are suggested to be considered and implemented for updating default operational intervention levels (OILs) in frame of the future legal amendment process.

S.9.2: The existing capabilities of monitoring teams should be reviewed and necessity for upgrade of equipment, procedures, and methodology should be considered. Special attention should be given to coordination of the monitoring activities made by different teams, using of standard techniques, and intercomparison of the measurement results.

3.10. MANAGING THE MEDICAL RESPONSE

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

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

3.10.1. Current situation

Ref to (i): Education of medical students in disaster medicine, including medical management of radiation accidents, is conducted during studies at the higher education institutions. Additionally, the corresponding tuition is organized through the Civil Defense education system (Law on Civil Defense). Post-graduated training courses for medical persons are also available. Having this educational base, the emergency medical staff is fully aware of the medical response they have to provide in the event of emergency situation at the ANNP.

However, there are no special arrangements in Armenian polyclinics to maintain the awareness by general practitioners (family doctors) of the medical symptoms of radiation exposure. This awareness is important in cases when people, coming to a general practitioner, are unaware that radiation sources are involved, and are unwittingly exposed to radiation. These cases are mostly related to events in which lost sources of high activity are found in scrap metal, or when one simply finds and picks up such a source, because it is a shiny piece of metal, etc.

Ref to (ii): The National Health Emergency System in the Republic of Armenia is organized at three levels: national, governors and local level. The MoH coordinates public and personal health care organization, activates its operative group, and if necessary, organizes use of the state medical reserve resources according to the laws and regulations. The activities are performed in accordance with the *Plan of the MoH*

on medical provisions and protection of personnel in case of a nuclear and (or) radiological accident at the ANPP, which has been developed according to the General provisions of the Nuclear Plan (article 5, point 2).

In case of a general emergency at the ANPP the following medical forces and resources are engaged in protection of population in the PAZ and UPZ:

- for first medical aid and transportation of the affected persons - the specialized medical teams from the Metsamor city hospital of the Ministry of Health of the Republic of Armenia (4 doctors at least),
- for diagnostics and medical testing of the patients exposed to overirradiation - the “Research Center of Radiation Medicine and Burns” Closed Joint-Stock Company,
- for treatment of the patients exposed to overirradiation - the Grigor Lusavorich medical center of the MoH.

For the purpose of prevention of the proliferation of radioactive contamination, the persons who are diagnosed as externally contaminated will be accommodated in special places. Further, decontamination will be done in the shortest possible period and first of all to those affected persons, who have injuries with relatively high radioactive contamination.

In any accidental situation, the decontamination of persons (injured or not) is mainly the responsibility of rescue service units. The hospitals have no special decontamination units, although there are basic arrangements inside the hospitals where decontamination might take place. The hospitals do not have portable radiation detection equipment for checking patient’s contamination. When it is needed, radiation monitoring will be provided by specialists of RS of MES or by ANRA.

In the Republic of Armenia there is no whole body counters for checking of public on intake of radionuclides in the case of the nuclear or radiological accidents.

The medical staffs of the Research Center of Radiation Medicine and the Grigor Lusavorich medical center of the Ministry of Health of the Republic of Armenia have some experience for the early diagnostic and treatment of overexposed or contaminated people. Nevertheless in any accidental situation involving overexposures or severe radioactive contamination of persons, the authorities of the Republic of Armenia will need international medical assistance.

3.10.2 Good Practice

GP.10.1: The “Research Center of Radiation Medicine and Burns” Closed Joint-Stock Company is WHO collaborating Centre in Armenia, and has good conditions for consultation with foreign medical specialists experienced in treatment of the radiation injuries and severe health effects.

3.10.3. Recommendations

R.10.1: The MoH should take steps to raise awareness among general practitioners (including family doctors) of the medical symptoms of radiation exposure and further

immediate actions, if such symptoms are detected. The IAEA leaflet on recognition of radiation injuries and guidelines from Ref. [5] are advised to be used for this purpose.

BASIS:

GS-R-2, para. 4.77, states that: *Arrangements shall be made for medical personnel, both general practitioners and emergency staff, to be made aware of the medical symptoms of radiation exposure and of the appropriate notification procedures and other immediate actions warranted if a nuclear or radiological emergency is suspected.*

3.10.4. Suggestions

S.10.1: The medical response plan of the MoH, and medical management plan of Metsamor city hospital in particular, is suggested to be complemented with operational criteria (OILs) to support decisions for urgent and longer term medical actions (provision of medical care, need for early detection of radiation induced cancers, counseling to those exposed, etc.). The detailed guidelines on the relevant operation criteria as well as criteria for individual contamination are provided by IAEA Safety Guide No. GSG-2 [6].

BASIS:

GS-R-2, para. 4.79 states that: *Jurisdictions within the emergency zones (see para. 4.48) of a facility in threat category I shall have a medical management plan for performing triage and assigning any highly exposed members of the public to appropriate medical facilities. This plan shall include operational criteria.*

S.10.2 The option of sending a patient with severe radiation injuries for medical treatment abroad should be an advanced planned procedure. The MoH and RS of MES in cooperation with the ANRA should ensure that a corresponding assistance request will be promptly channelled to the IAEA.

S.10.3 The staff of “Research Center of Radiation Medicine and Burns” Closed Joint-Stock Company is knowledgeable and has good experience in managing people, who have been exposed or contaminated. These specialists are proposed to be instructors, lecturers and consultants in training medical emergency staff. Their experience may be also used for designing the appropriate booklets for general medical practitioners.

3.11. KEEPING THE PUBLIC INFORMED

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

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

3.11.1. Current situation

According to the Law on Public protection (article VI) one of the main protection principles in the Republic of Armenia is “Publicity of population protection problem

in emergency situations”. State Government and local authorities are responsible to provide warning and informing the population in emergency situations (article XII, XVI). There is Gov. Decree No 1925 of 03.11.2005 on “Notification of Population about emergency in the territory of the Republic of Armenia”.

MES has obligation to notify the public in the situation arisen as a consequence of a radioactive contamination due to a nuclear accident abroad or a radiological accident occurred in the country. The Information and Public Relation Department of MES is responsible to inform the public about fires, explosions and transport accidents involving radioactive materials and/or radioactive sources.

The appropriate arrangements are included in the Nuclear Plan. According to it, the *Information provision plan in case of a nuclear and (or) radiological accident at the ANPP*, and the functions of the “Public TV company of Armenia” CJSC and “Public radio of Armenia” CJSC are set up.

The ANRA in cooperation with the MES is developing *Plan on cooperation with the media on warning people in emergency situation and on taking appropriate protective measures*. It is planned to create an Interdepartmental Information Center within the MES in order to develop coordinated information on emergencies.

The MES together with the ANRA provides operative messages to mass media. The MES arranges media briefings with participation of interested parties describing situation and possible developments, executed actions and population behavior rules.

The “Emergency Channel” Information Centre, the radio, the newspapers and website are used to enhance the preparedness and awareness of population and public administration and local authorities. The operators and the response organizations on the state, regional and local levels have established procedures on how to inform the public and media and have designated representatives for public relations, who were trained in this sphere. Local elected officials near the ANPP are very well familiar with the national plan and agreed that public messages would come from the MES only.

It should be noted, however, that the importance of permanent communication with the population living in the ANPP area seems to be underestimated: neither special educational centre nor special TV programme to respond the public concern have not been arranged.

3.11.2 Good Practice

GP.11.1: The Crisis Management Center of MES goes channeling the latest emergency information to the MES web site (without delay!). The Center can also provide public and media with reliable information from the highest ranked officials. This is an advantage and also in line with the international practice that the information is provided at one location, where all important persons from the national emergency response organization and the journalists get together.

3.11.3. Suggestions

S.11.1: MES's website and the "Emergency Channel" Information Centre should be more actively used for the dissemination of appropriate information related to public concern in the event of radiological emergencies. This information should include warning to public on orphan sources, disclosure of incorrect information and rumors, as well as educational programmes for various groups of population on risks and behavior in the event of a radiological accident in the territory of Armenia or other State.

S.11.2: A special TV programme and social arrangements addressing special needs of the population living in the vicinity of the NPP are suggested to be considered, developed and implemented using the existing resources.

S.11.3: Templates of press releases for the general information to the public and for the potentially affected population may be prepared in advance in plain language (e.g. for the most credible emergency scenarios: the event of a lost source, large scale contamination, etc).

S.11.4: It seems that written instructions or procedures for public information do not exist, because they were not shown nor mentioned during the mission discussions. In this regard the MES is suggested to make testing of its public information arrangements during exercises or specific drills at all levels, with use of realistic scenarios and press inquiries.

3.12. TAKING AGRICULTURAL COUNTERMEASURES, COUNTERMEASURES AGAINST INGESTION AND LONGER TERM PROTECTIVE ACTIONS

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

- i. Adopt national intervention and action levels for agricultural countermeasures and make arrangements, concentrating on the use of existing capabilities, for taking effective agricultural countermeasures.
- ii. Establish OILS for dose rates due to deposition and deposition densities; timely monitoring for ground contamination; the means for accomplishing temporary relocation and assisting those who have been relocated.

3.12.1. Current situation

Ref. to (i): Optimized national intervention levels for temporary relocation and permanent resettlement, and generic action levels for foodstuffs are established by Gov. Decree № 1489-N of 18.08.2006 "On approval of Radiation safety rules" and are included in the Nuclear Plan. The adopted levels are in full compliance with the earlier IAEA guidelines for intervention levels in emergency exposure situations (Schedule V of Safety Series No 115 [7] and Annex III of GS-R-2 [2]).

In the event of a radioactive release at the ANNP, the decision-making mechanism regarding agricultural countermeasures and food consumption will be based on the

above mentioned intervention levels. The Nuclear Plan assigns major role regarding the conduct of protective measures in agriculture to the Ministry of Agriculture of the Republic of Armenia (MA). The MA is assigned to carry out the following actions:

- a) supporting the regional administrations and local self-governing bodies in the evacuation of live stock and agricultural products from the contaminated zone,
- b) assistance in defining the level of radioactive contamination of agricultural products and fodder with radioactive substances and the validity thereof,
- c) implementation of the continuous monitoring of the radiological, chemical and bacteriological situation,
- d) organization of the protection of the personnel of the ministry and subdivisions,
- d.1) supervision over the quality and validity of food.

The MA has developed a Plan on implementation of veterinary and plant sanitation measures, which describes in detail the response actions relating to protection of livestock and vegetation in case of radiological or nuclear emergency. There are special recommendations and instructions for taking effective agricultural countermeasures relating to livestock, local food production, and gardens.

As for the function of supervision over the validity of food (item 5), d.1) of the Nuclear Plan), it has been transferred to the Republican Veterinary-Sanitary and Phytosanitary Center of Laboratory Services of the State Service for Food Safety. During the visit of the EPREV expert to this Center it became clear that for the time being it was not capable of conducting radioanalysis of samples from agricultural products. The programme for the food, feed and raw materials sampling in case of nuclear or radiological emergency has not been yet finalized and approved.

Ref. to (ii): OILs for dose rates due to deposition and deposition densities, as well as for food concentrations (I-131, Cs-137) are defined in the Radiation Protection Norms (Table № 25) and also included in the Nuclear Plan (Appendix 12, Table 4). A Table with the adopted OILs, named in English versions of Armenian regulations as International Working Levels (IWL), is reproduced in Appendix XII of this report.

According to the Nuclear Plan, the goal of radiological monitoring in the PAZ and UPZ during the final phase of the general accident is to verify:

- 1) the areas exposed to radioactive contamination and the qualitative and quantitative indicators of surface radioactive contamination,
- 2) the qualitative and quantitative indicators of the radioactive contamination in the environment (air, soil, flora, water basins and rivers).

Organization and conduct of emergency radiological monitoring over all emergency period is the responsibility of the RS of MES. In accordance with item 97 of the Nuclear Plan, the surface contamination measurements and environmental sampling in the later phase of the emergency are carried out in the PAZ and UPZ by the same teams, which are specified for this task in earlier phases (see section 3.9.1 of this report).

The ANRA team is responsible for performing control measurements. Besides, the ANRA is assigned to perform spectrometric research on site in the PAZ and UPZ (item 97,3) of the Nuclear Plan); lab examination of the samples taken from the

contaminated areas in the PAZ and the UPZ (item 97, 5) of the Nuclear Plan); and lab examination of the samples of soil, flora, water basins and rivers, and local food collected for the qualitative analysis (item 98, 3) of the Nuclear Plan).

The Ministry of Nature Protection of the Republic of Armenia participates in conducting of radiological monitoring of the environment in the PAZ and the UPZ (item 9, b) of the Nuclear Plan).

The MoH is responsible to organize sampling, investigation and verification of drinking water in the areas contaminated after the accident at the ANPP.

Based on the discussions during the mission, the EPREV team realized that the measuring capabilities for soil and food samples in the Republic of Armenia had been also defined by Gov. Decree N 1064-N of July 29, 2004 “On defining the procedure of the establishment and operation of the system for permanent monitoring of the radiological, chemical and bacteriological situation”. In the Nuclear Plan (item 4, 21)) Decree N 1064-N is mentioned as one of its legal basis; and seemingly, in case of an emergency, the routine monitoring system can be adapted accordingly to the emergency needs and circumstances. However, neither a list of laboratories, equipment, nor a written procedure or a guideline how to make the transition of routine monitoring programme to emergency was presented to the EPREV team.

Next, the responsibility for decision-making and appropriate actions regarding restriction of the consumption, distribution and sale of locally produced foods and agricultural products has not been designed clearly in the national legislative base. Seemingly, the major stakeholders and players in this process are the ANRA, MoH and MA, which should have coordinated written procedures on performing their relevant actions.

The means for accomplishing relocation and arrangements for assisting those persons who have been relocated are clearly described in the relevant articles of the Nuclear Plan.

3.12.2 Good Practice

GP.12.1: The Nuclear Plan (item 107 and others) defines clear arrangements and set operational criteria for monitoring/recording the contamination levels of persons and vehicles moving out of contaminated zones. This contributes to efficiency of control of the spread of contamination and is recognized as good practice.

3.12.3 Recommendations

R.12.1: The existing Plan for radiological emergency monitoring should be reconsidered with due account to country wide monitoring capabilities and potential needs regarding decision-making on the efficient protective actions during the initial emergency phase (see also section 3.9 of this report) and throughout all further period of responding to the emergency. All organizations (laboratories) with capabilities to perform the sample analysis should be specified in the Plan; and the sampling procedures for the environmental monitoring in the event of an emergency should be also integrated into this Plan or the relevant regulation (i.e., where to take soil samples, which crops and where should be sampled, frequency and size of samples, etc.).

BASIS:

GS-R-2, para. 4.71, states that: *For the precautionary action zone and the urgent protective action planning zone, arrangements shall be made for promptly assessing any radioactive contamination.... arrangements shall be made for promptly assessing the results of environmental monitoring*

R.12.2: The existing national capabilities for food and feed monitoring should be carefully evaluated and necessary actions for their possible upgrade should be considered. Based on this, the special guidelines and procedures for determining feed and food concentrations in the event of radiological emergency in Armenian territory and for accidental events abroad (threat category V) should be developed. Further these arrangements as well as procedures for restriction of the consumption, distribution and sale of locally produced and imported foods, other goods should be clearly indicated in the NREP.

BASIS:

GS-R-2, para. 4.89, states that: *.....arrangements shall be made for taking effective agricultural countermeasures, including restriction of the consumption, distribution and sale of locally produced foods and agricultural produce following a release of radioactive material. These arrangements shall includetimely monitoring for ground contamination in the field; the sampling and analysis of food and water; and the means to enforce agricultural countermeasures*

3.12.4. Suggestions

S.12.1: Seeing that the current national intervention and action levels for agricultural countermeasures in the Republic of Armenia have been adopted in line with the earlier international requirements, they are suggested to be reconsidered according to IAEA Safety Guide No. GSG-2 [6].

S.12.2: The regular inter-comparison exercises should be organized by the RS of MES for the laboratory of the ANRA and those belonging to other institutions, involved in the emergency monitoring of deposition densities and food, in order to test the capacity and accuracy of their methodologies. The leading laboratory should be appointed for the coordination of the monitoring activities.

3.13. MITIGATING THE NON-RADIOLOGICAL CONSEQUENCES OF AN EMERGENCY AND ITS RESPONSE

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

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

3.13.1. Current situation

Generally, the task of preparing the public for the correct behavior in emergency situations and consulting those affected by the protective actions is one of the paramount responsibilities of the RS of MES, MoH and the ANRA. No special arrangements have been made in this area in addition to those described in para. 3.11 on keeping the public informed. Therefore, the EPREV team notes that the major concern in this area is panic or unsubstantiated fear due to the circulation of false information, rumors, and non-credible allegations. The best method for managing this risk is monitoring the public response and maintaining proper communication with the public.

In addition to the need for proper communication, other issues include economic losses (loss of income, loss of property), security concerns (in the event of evacuation), the fear of losing loved ones, etc. An untimely or inappropriate response by 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), encompassing a number of relations (cultural, scientific, political, and social). These issues may become quite complex during large scale emergencies.

3.13.2. Suggestions

S.13.1: The RS of MES and the ANRA, in cooperation with other relevant authorities, should make preparations for promptly responding to public concern in the event of a radiological emergency. The preparations should include the development of plain language information explaining any health risks, and the appropriate and inappropriate personal actions for reducing risks. For this purpose broadcasting of “Emergency Channel” Information Center and leaflets and brochures developed by the IAEA may be used.

S.13.2: 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.

S.13.3: In the Republic of Armenia, that is a country with nuclear power program, the mitigation of non-radiological consequences which are related to economical aspects and disruption of normal life should be considered in emergency plans (at least under Section, which covers recovery phase). The financial means, which could be claimed under the “third party liability” also need to be taken into account as financial compensation for the losses incurred. Although it is not possible to cover the whole spectrum of situations and questions during the late phase of the emergency, but measures can be taken to address the most important issues (i.e. 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.).

3.14. REQUIREMENTS FOR INFRASTRUCTURE

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

- i. Develop emergency plans that are consistent with the threats and coordinated with all response organizations.
- ii. Operating and response organizations shall develop the procedures needed to perform their response functions.
- iii. Provide, concentrating on the use of existing capabilities, adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation.
- iv. Identify facilities at which the following will be performed: (a) coordination of on-site response actions; (b) coordination of local off-site response actions (radiological and conventional); (c) coordination of national response actions; (d) coordination of public information; (e) coordination of off-site monitoring and assessment.
- v. Make arrangements, concentrating on the use of existing capabilities, for the selection of personnel and training.
- vi. 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 programmes for threat categories IV and V are tested at suitable intervals.
- vii. Make arrangements to ensure the availability and reliability of all supplies, equipment, communication systems and facilities needed during an emergency.
- viii. Establish mobilization plans to gather human resources in various fields for a prolonged radiation emergency with severe consequences.
- ix. Provide an on-site emergency control centre for threat category I facilities, designed to remain operational for the range of postulated severe accident conditions.
- x. The on-site emergency control centre has enough information available about essential safety related parameters and radiological conditions in the facility and its immediate surroundings.
- xi. Make arrangements to conduct internal monitoring of emergency response workers and to ensure the availability of these services under postulated emergency conditions.

3.14.1 Current situation

Ref. to (i): The EPREV team was informed that a unified and harmonized comprehensive emergency response plan covering response to potential nuclear and/or radiological emergencies at all threat category facilities and activities (NREP) does not exist for the time being at the national level. A good sign is that the ANRA and the RS of MES staff are aware of this gap in the national EPR system and have started efforts to be drafting the NREP in close cooperation with the major response organizations.

The license legislation requires an operator of facilities and practices with radiation sources to ensure safety of licensed activities and to maintain its own emergency response plans. Requirements for the content of the facility level plan are defined by

the ANRA, but they are not in clear correspondence with the type and threat of the facility and not in full compliance with GS-R-2 requirements.

The ANPP on-site and off-site plans were shown to be detailed enough and in compliance with the ANRA requirements. The ANPP plans are coordinated with all off-site response organizations and stakeholders, who have their own plans for performing protection actions in the event of the emergency at the ANPP. Modifications to the Plans have to be agreed by the both ANRA and the RS of MES.

The EPREV team also had opportunity to be familiarized with the emergency response plans, available at some ministries (mostly Civil Defence type plans) and at two medical institutions: the National Oncology Centre of MoH and the Scientific Centre of Radiation Medicine and Burns. The last two, according to the GS-R-2 categorization, should be regarded as operators in threat category III that means that their emergency plans should be commensurate to requirements for this category facilities. However, the both introduced plans were not based on the assessment of threats, although they met the corresponding ANRA requirements.

Ref. to (ii): During the visit at the ANPP, the experts could realize that all procedures, needed to perform response actions described in the ANPP on-site and off-site plan were available. The ANRA staff checked periodically these procedures during their regulatory inspections.

At the other operating organizations the procedures were not always presented, or if they were available (in the sense that the procedure was prepared) they did not get all necessary information, and were not easily accessible for the designated users/personal.

Ref. to (iii): The team's general impression is that suitable equipment, instrumentation and skills exist in the Republic of Armenia to cope with the anticipated spectrum of emergencies.

The required facilities and equipment to response to nuclear emergency at the ANPP are specified in the ANPP on-site and off-site plans. In accordance with the off-site plan the emergency response units are supplied in advance with iodine preparations, individual protection means, individual dosimeters, radiometric devices for monitoring, and are trained every 6 months. The existing capabilities and tools available for conventional emergencies are planned to be used also during nuclear or radiological emergencies (fire fighting equipment and forces, communication tools, etc.).

Nevertheless, it is clear, that in case of some response organizations and first responders the equipment for detection of radiation (dosimeters, spectrometers, laboratory techniques, etc.) is not available as required, or it is obsolete and needs upgrade. Thus, no institution in the country has a whole body counter; in case of the police and medical response teams the tools for the detection of radiation are very limited; the technical level of the existing equipment for the laboratory measurements (food, water, feed control) may not correspond to the scope of the increased activities under emergency conditions. In case of the RS of MES the quality and quantity of the

measuring equipment also may not be sufficient, mainly when considering the important role of the RS of MES in the monitoring activities.

Ref. to (iv): The coordinators of on-site actions, off-site local actions, national response actions, public information provisions and off-site monitoring assessment are identified. They are the following:

- Co-ordination of on-site response actions: Emergency Response Organizations (ERO) which shall be established at the facilities and installations. On-site response actions will be coordinated at the ERO facilities;
- co-ordination of local off-site response actions (radiological and conventional): Municipal Emergency Management Commission, Regional Emergency Management Committees;
- co-ordination of national response actions: State Committee of Emergency Situations, Crisis Management Centre of MES, the ANRA Crisis Management Centre;
- co-ordination of public information: The RS of MES and the ANRA provide operative information to mass media;
- co-ordination of off-site monitoring and assessment: According to the National Plan, in the event of the general emergency at the ANPP the off-site monitoring coordinator is the RS of MES. The assessment of the monitoring results is performed by the ANRA.

Ref. to (v): The training and preparation of state governing and local self-governing bodies, the heads thereof, staff, the personnel of civil defense forces and the population are organized and implemented in accordance with Gov. Decree No.134-N of 30.01.2003 “On approving the procedure of preparation of state governing and local self-governing bodies of the Republic of Armenia and training of the population in the fields of emergency situations and civil defence”. Organizations involved in emergency preparedness and response implement their regular training program on an annual basis. However, in the area of radiation protection these training programmes are oriented mainly to the civil defence issues; they do not provide all scope of skills and knowledge, which are needed to ensure protection of emergency workers (in particular, first responders) and population in case of all possible radiological emergency situations in the territory of the Republic of Armenia.

At the ANPP a systematic approach to training has been elaborated covering the topical area of emergency preparedness and response. Special topics are included in newcomers training adapted to their future functions in the ANPP operation. Refresher courses are organized on an annual basis for the entire personal. Annual training programs including drills and exercises of different levels are agreed beforehand with both ANRA and the RS of MES.

Ref. to (vi): The ANPP runs regular exercise program on annual basis. This programme includes exercises with participation of the other organizations to be involved in case of the emergency according to the ANPP off-site and on-site plans. The exercise program of the past years 2009-2011 at ANPP is given in Appendix XIII.

The organizations concerned conduct their own exercise programmes for testing the response actions, assigned in the ANPP off-site plan. ANRA regularly takes part in international CONVEX exercises that are organized by the IAEA.

The emergency plans on response for radiological accidents at facilities in threat category III, and practices or jurisdictions in threat category IV or V are tested on case by case basis during the large-scale exercises on conventional emergencies.

Ref. to (vii): At present most of the necessary supplies, equipment, communication systems, and facilities recognized for response to radiation emergencies are part of the existing capabilities for conventional emergencies. These facilities are used during intervention to other emergencies (fire, rescue, medical, etc.). Availability and reliability of these capabilities are the responsibility of the relevant organizations as it is clearly defined in the Nuclear Plan.

The quality and functionality of ANPP facilities are checked according to the on-site plans. The RS of MES has internal rules for the checking the availability of facilities for response in emergencies including tools and equipment for radiation response. Communication systems included in emergency communication systems are regularly tested, e.g. sirens in the UPZ are tested once a month. The State Reserves Agency of MES provides for reserves of the measuring and protection equipment, which may be required in emergency situations.

Ref. to (viii): The response to severe accident is described in the ANPP off-site Emergency Response Plan. Specifics related to a mobilization of necessary human resources applicable also in case of prolonged emergency situation with possible severe consequences are expected to be addressed in the future national nuclear emergency plan (NREP).

Ref. to (ix): The on-site emergency control centre of the ANPP is designed to remain operational in case of severe accident conditions (equipped with supply systems, ventilation systems, hermetic tightness, etc.).

Ref. to (x): The on-site emergency control centre of the ANPP is capable of collecting all necessary information about essential safety related parameters and radiological conditions in the facility and its immediate surroundings.

Ref. to (xi): There are no generic requirements on internal monitoring of emergency workers. The ANPP has facilities for internal monitoring, that is planned to be used for the regular control of the ANPP personnel.

3.14.1 Good Practice

GP.14.1: A permanent working group for reviewing radiation emergency legislation, and in particular revising the Nuclear Plan (approved by Gov. Decree No 2328-N of 22.12.2005) and the Procedure on finding and regaining control over radioactive materials (approved by Gov. Decree No 553-N of 03.05.2007, amended 08 January 2009 N 36-N and 08 September 2011, N 1280-N) has been set up on the initiative of the ANRA and the RS of MES by the Ministerial Order No 374 a of 12 Sept. 2012. The principal task of the working group is drafting the integrated National Plan on responding to radiation accidents and emergencies at all threat category facilities and activities (that is NREP, according to the IAEA terminology).

The working group is consisted of the officially nominated representatives of major response organizations, and this is a prerequisite that they will clearly understand and be ready to implement their roles in the future NREP.

GP.14.2: The RS of MES has internal provisions for mandatory weekly testing of all dosimetric instruments, dedicated for radiological monitoring in case of emergency. Such approach increases reliability of the dosimetric devices and improves the dosimetric skill of the monitoring team.

3.14.2. Recommendations

R.14.1: The ANRA, in cooperation with the RS of MES, should upgrade their formal requirements for the content, features, and scope of emergency plans and provide operators of facilities/practices in threat category III and IV with detailed instructions or model plans to meet these requirements. The emergency plans should be commensurate with the potential threat and are required to be coordinated with any other plans that may be implemented in an emergency.

BASIS:

GS-R-2, para. 5.19, states that: *The operating organization [of a facility or practice in threat category I, II, III or IV] shall prepare an emergency plan that covers all activities under its responsibility, to be adhered to in the event of an emergency. This emergency plan shall be co-ordinated with those of all other bodies having responsibilities in an emergency, including public authorities, and shall be submitted to the regulatory body.*”

GS-R-2, para. 5.15, states that: *Plans for emergency response shall be based on the assessment of the threats as described in Section 3*

GS-R-2, para.5.16, states that: *The plans for response to a nuclear or radiological emergency shall be coordinated with any other plans (such as plans for physical security, law enforcement or fire fighting) that may be implemented in an emergency in order to ensure that the simultaneous implementation of the plans would not seriously reduce their effectiveness or cause conflicts.*”

R.14.2: In parallel with the drafting the NREP, in each operating and response organization a screening should be made to identify if the scope of the available procedures matches responsibilities of that particular organization, and to determine if some procedures are still missing. The list of procedures should be included in the respective organization’s emergency response plan.

R.14.3: At the ANPP, the scope of analytical procedures for assessment of the state of the reactor in accidental situation shall be extended, in order to cover accidents at low power, shut down operational states and the accidents at the spent fuel storage.

BASIS (for R.14.2 and R.14.3):

GS-R-2, para. 5.21, states that: *“The operating and response organizations shall develop the necessary procedures, analytical tools and computer programs in order to be able to perform the functions specified to meet the requirements for emergency response”.*

GS-R-2, para. 5.22, states that: *“Procedures, analytical tools and computer programs to be used in performing functions to meet the requirements for emergency response shall be tested under simulated emergency conditions and shall be validated as correct prior to use.”*

R.14.4: The State Service for Food Safety and other organizations (seemingly the Academy of Science), which during an emergency may be designated to perform analysis of the environmental and food samples, should obtain necessary resources for the maintenance and further improving of the existing facilities to ensure the required performance of their function.

BASIS:

GS-R-2, para. 5.28, states that: *“Laboratories shall be designated to make the necessary arrangements to be able to perform appropriate and reliable analyses of environmental and biological samples and measurements of internal contamination for the purposes of an emergency response. It shall be ensured that these facilities would be operational under postulated emergency conditions.”*

R.14.5: An analysis of additional needs for radiation detection equipment for the first responders (rescuers, police and medical emergency units, fire brigades) needs to be carried out, and resources should be allocated for providing the emergency staff with the necessary radiometric devices.

BASIS:

GS-R-2, para. 5.30, states that: *“Arrangements shall be made to obtain appropriate support for logistics and communication, for social welfare and in other areas from the organizations responsible for providing such support in conventional emergencies”*

R.14.6: At the facilities/practices belonging to threat category III and IV an appropriate initial training program for new comers and systematic refresher training program for the personal, who may be involved in response activities, shall be arranged.

R.14.7: The specific training program (or programs) for emergency response staff, in particular for first responders, at national, regional and local levels, needs to be reviewed and supplemented with additional classes on personal radiation protection, on how to indicate the presence of radioactive materials, and on the immediate actions, if a radiological emergency is suspected.

BASIS: (for R.14.6 and R.14.7):

GS-R-2, para. 5.31, states that: *“...The operator and the response organizations shall make arrangements for the selection of personnel and for training to ensure that the personnel have the requisite knowledge, skills, abilities ...to perform their assigned response functions. The arrangements shall include ongoing refresher training on an appropriate schedule and arrangements for ensuring that personnel assigned to positions with responsibilities for emergency response undergo the specified training.”*

GS-R-2, para. 5.32, states that: *For facilities in threat category I, II or III all employees and all other persons on the site shall be instructed in the arrangements*

for them to be notified of an emergency and their actions when notified of an emergency.”

R.14.8: In addition to the ANPP exercise programme, the emergency response capability and organizational interfaces for facilities in threat category III and IV should be tested at suitable intervals, using a suitable realistic scenario. The exercise should be thoroughly analyzed, and lessons learned should be used to improve the emergency response capability.

BASIS:

GS-R-2, para. 5.33, states that: *“ Exercise programmes shall be conducted to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for facilities in threat category I, II or III and the national level programmes for threat category IV or V are tested at suitable intervals. These programmes shall include the participation in some exercises of as many as possible of the organizations concerned. The exercises shall be systematically evaluated and some exercises shall be evaluated by the regulatory body. The programme shall be subject to review and updating in the light of experience gained.*

GS-R-2, para. 5.34, states that: *“ The staff responsible for critical response functions for a facility in threat category I, II or III shall participate in a training exercise or drill at least once every year. For facilities, practices or jurisdictions in threat category IV or V the staff responsible for critical response functions shall participate in training exercises or drills on an appropriate schedule.*

R.14.9: 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.

BASIS:

GS-R-2, para 5.37, states that: *“The operator of a facility, practice or source in threat category I, II, III or IV and the off-site response organizations shall establish a quality assurance program, in accordance with international standards, to ensure a high degree of availability and reliability of all the supplies, equipment, communication systems and facilities necessary to perform the functions specified in Section 4 in an emergency (see para. 5.25). This program shall include arrangements for inventories, resupply, tests and calibrations, made to ensure that these items and facilities are continuously available and functional for use in an emergency. Arrangements shall be made to maintain, review and update emergency plans, procedures and other arrangements and to incorporate lessons learned from research, operating experience (such as the response to emergencies) and emergency drills and exercises (see paras. 3.8, 3.16, 5.33 and 5.39).*

R.14.10: In the Republic of Armenia the arrangements for performing measurements of internal contamination should be considered and implemented for the purposes of emergency response. The availability of these services is important to be ensured under all postulated emergency conditions.

BASIS:

GS-R-2, para. 5.28, states that *“Laboratories shall be designated to make the necessarymeasurements of internal contamination for the purposes of an emergency response. It shall be ensured that these facilities would be operational under postulated emergency conditions.”*

3.14.4. Suggestions

S.14.1: The relevant Action Plans envisaged by Section 1, item 5, of the Nuclear Plan are suggested to be complemented, if appropriate, by description of actions to be taken in the PAZ and UPZ in case *the General emergency is declared by the ANPP in several (or more) hours before the release of radioactive material is expected* (i.e. based on substantial risk of the release in the foreseen time). Such situation may require specific protective actions, which should be adequately specified in the Nuclear Plan

S.14.2: The RS of MES should coordinate drafting of the NREP, using the all hazard planning concept. The methodology for doing so is described thoroughly in [3], also other IAEA publications are recommended [4 - 8]. It is suggested to involve in the drafting the NREP those persons who have attended the relevant IAEA training courses and workshops. In the event of doubt or a lack of guidance, seeking the IAEA advice may be the most efficient way to find adequate solutions.

S.14.3: For effective functioning of emergency response capability, the technical support organizations are vital to provide implementation of specific activities, such as measurements, data processing, source recovery and transportation, etc. Therefore the technical support organizations (e.g. relevant research institutes of the Armenian Academy of Science) should be considered for assigning the relevant roles in the future NREP.

S.14.4: Written procedures should be developed for the notification of the endangered population for installations of threat category III (e.g. National Oncology Centre) and during certain radiation emergencies of threat category IV (e.g. a large transport accident, a fire involving a source, or large scale contamination). Furthermore, they should be included in the NREP, and should also ensure that, when necessary, the population will be provided with instructions based on the radiological assessor’s advice.

S.14.5: With respect to future National Radiological Emergency Plan (NREP), the instruction/procedure for the criminal police, who may be involved in the criminal investigation of the events (emergencies) with radioactive sources, is suggested to be developed and included in the Plan. It is important, because in this situation the criminalists’ actions may directly interfere with the radiation measurements and recovery procedures.

S.14.6: During the familiarization with work of the custom service in the Yerevan international airport, it was noted that the custom premises do not include a separate room for custody of the “radioactive” passengers in the period of the custom investigation. As it is do important, that such people would be isolated, the State Revenues Committee of the Republic of Armenia is suggested to consider this issue.

S.14.7: It is suggested that Armavir local administration in cooperation with the Marz Department of the RS of MES make arrangements for setting up a regional press-centre for warning and communication with public in case of actual or potential emergency at the ANPP. The interactions of this press-centre with the Crisis Management Centre of MES and “Emergency Channel’ Information Centre should be established and planned in advance.

S.14.8: Arrangements should be considered for providing the Metsamor city hospital with portable radiation detection equipment for checking patient’s contamination and with whole body counters for checking the population in the case of the nuclear or radiological accidents.

S.14.9: The Ministry of Health in cooperation with the ANRA, is suggested to request IAEA assistance in organizing the training of national specialists regarding medical response to radiological emergencies, early diagnosis and initial treatment of radiation injuries.

GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

notification:

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

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

nuclear or radiological emergency: An emergency in which there is, or is perceived to be a hazard due to: the energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or radiation exposure.

off-site: Outside the site area.

on-site: Within the site area.

operational intervention level (OIL): A calculated level, measured by instruments or determined by laboratory analysis that corresponds to an intervention level or action level. OILs are typically expressed in terms of dose rates or 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. This includes those who are either directly in control of a facility or an activity during use (such as radiographers or carriers) or, in the case of a source not under control (such as a lost or illicitly removed source or a re-entering satellite), those who were responsible for the source before control over it was lost.

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

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

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

radiation emergency: A nuclear or radiological emergency.

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

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

regulatory body: An authority or a system of authorities designated by the government of a State as having legal authority for conducting the regulatory process, including issuing authorizations, and thereby regulating nuclear, radiation, radioactive waste and transport safety.

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

source: Anything that may cause radiation exposure — such as by emitting ionizing radiation or by releasing radioactive substances or materials — and can be treated as a single entity for

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

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

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

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

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

ABBREVIATIONS

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

ANPP	Armenian Nuclear Power Plant
ANRA	Armenian Nuclear Regulatory Authority
EPR	Emergency Preparedness and Response
EPREV	Emergency Preparedness Review
IAEA	International Atomic Energy Agency
Law on Atomic Energy	Law on Safe Utilization of Atomic Energy for Peaceful Purposes (01.02.1999 HO-285)
Law on Public Protection	Law on Population Protection in case of Emergencies (02.12.1998 HO-265)
MA	Ministry of Agriculture of the Republic of Armenia
MES	Ministry of Emergency Situations of the Republic of Armenia
MoH	Ministry of Health of the Republic of Armenia
NCA	National Coordination Authority
NREP	National Radiation Emergency Plan
Nuclear Plan	National Plan for the Protection of the Population in the Event of a Nuclear and (or) Radiological Accident at the Armenian NPP , approved by Gov. Decree No 2328-N of 22.12.05, amended on 21.08.08 under the Gov. Decree No 1042-N.
OIL	Operational Intervention Level
PAZ	Precautionary Action Zone
RS of MES	Rescue Service of the Ministry of Emergency Situations of the Republic of Armenia
UPZ	Urgent Protective Action Planning Zone

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- [2] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE CO-ORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, Preparedness and Response for a Nuclear or Radiological Emergency, Safety Standards Series No. GS-R-2, IAEA, Vienna (2002).
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- [7] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE CO-ORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115, IAEA, Vienna (1996).
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Appendix I: MISSION TEAM COMPOSITION

Ms Larisa ROZDYALOUSKAYA	IAEA Coordinator
Mr Karol JANKO	Team Member, Slovakia
Mr Albinas MASTAUSKAS	Team Member, Lithuania
Mr Geza MACSUGA	Team Member, Hungary

Appendix II
MISSION SCHEDULE

DATE	SUBJECT
Day 1 15.10.2012 10:00 -19:00	Introductory Meeting at the Ministry of Emergency Situations (a list of the participants is given in Appendix II). 1. IAEA Presentation on the EPREV mission tasks 2. Presentations from the following organizations: <ul style="list-style-type: none"> • Ministry of Emergency Situations of Armenia • Armenian Nuclear Regulatory Authority (ANRA) • Ministry of Energy and Natural Resources • State Revenues Committee of the Republic of Armenia • Ministry of Health of the Republic of Armenia • Ministry of Agriculture of the Republic of Armenia • Ministry of Defence of the Republic of Armenia • Police under the Government of the Republic of Armenia • Ministry of Transport and Communication of the Republic of Armenia • State Revenues Committee of the Republic of Armenia • Ministry of Nature Protection of the Republic of Armenia • Ministry of Economics of the Republic of Armenia • State Reserves Agency of the Ministry of Emergency Situations of the Republic of Armenia 3. Visit in Crisis Management Center of the of the Ministry of Emergency Situations of the Republic of Armenia
Day 2 16.10.2012 9:00 -18:00	1. Meetings at Armenian Nuclear Regulatory Authority 2. Meetings at Ministry of Energy and Natural Resources of the Republic of Armenia 3. Visit to “Research Center of Radiation Medicine and Burns” Closed Joint-Stock Company 4. Visit to “National Oncology Center named after V.A. Fanarjyan” Closed Joint-Stock Company
Day 3 17.10.2012 9:00 -18:00	1. Meetings at Police under the Government of the Republic of Armenia 2. Meetings at Ministry of Health of the Republic of Armenia 3. Meetings at Ministry of Agriculture of the Republic of Armenia 4. Visit to the custom checking point at the Yerevan airport
Day 4 18.10.2012 9:00 -18:00	Visit to Armavir Marz (Region), working meeting with the members of regional Emergency Committee and Government of Armavir region
Day 5 19.10.2012 9:00 -18:00	Visit to the Armenian NPP Visit in “Emergency Channel” Information Centre
Day 6 20.10.2012	Free day

Day 8 22.10.2012 10:00 -18:00	Meeting at the Rescue Service of MES with representatives of the Rescue Service and ANRA Visit in the Republican Veterinary-Sanitary and Phytosanitary Center of Laboratory Services of State Service for Food Safety
Day 9 23.10.2012	Preparation of the EPREV Report
Day 10 24.10.2012	Preparation of the EPREV Report
Day 11 25.10.2012	Exit meeting at the Ministry of Emergency Situations of the Republic of Armenia <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 • Summary meeting of the EPREV team

Appendix III
LIST OF ATTENDEES OF THE EPREV MISSION MEETINGS

No	Name	Position
15 October 2012: Ministry of Emergency Situations		
1	Azaryan, S.	Director of Rescue Service MES
3	Kostandyan, G.	Deputy Director of Rescue Service MES
4	Yemishyan, H.	Head, Department of Population and Territories Protection
5	Nersesyan, V.	Deputy Chairman, ANRA
6	Gevorgyan, A.	Head, Department of AE, Ministry of Energy and Natural Resources
7	Hakobyan, V.	Deputy Head, Department of Health Programs and Quality Control, Ministry of Health
8	Ghamaryan, G.	Head, First Division, Ministry of Agriculture
9	Hovhannisyanyan, S.	Deputy Head, Department of CBRN Forces, Ministry of Defense
10	Atabekyan, V.	Deputy Head, Division of Draft and Civil Protection, Department of Public Order, Police of RA
11	Ohanov, A.	Head, Division of Draft and Civil Protection, Ministry of Transport and Communication
12	Sargsyan, I.	Deputy Head, State Inspection for Nature Protection, Ministry of Nature Protection
13	Torchyan, E.	Head, Department of Military Economical and Draft Programs, Ministry of Economics
14	Khachatryan, A.	Deputy Head, State Reserves Agency of MES Armenia
15	Khangeldyan, H.	Head, Crisis Management Center of MES Armenia
16	Karapetyan, K.	MES of Armenia
17	Janko, K.	IAEA expert
18	Macsga, G.	IAEA expert
19	Mastauskas, A.	IAEA expert
20	Rozdylouskaya, L.	IAEA expert
16 October 2012: Armenian Nuclear Regulatory Authority		
1	Martirosyan, A.	Chairman, ANRA
2	Hovhannisyanyan, A.	First Deputy Chairman
3	Nersesyan, V.	Deputy Chairman, ANRA
4	Amanyan, S.	Head of Administration
5	Melkumyan, A.	Head, Nuclear Information and International Cooperation Section
6	Avetisyan, A.	Head, Radiation Safety Section
7	Khachikyan, K.	Head, Systems and Components Section
8	Grigoryan, V.	Chief specialist-state inspector
9	Amirjanyan, A.	Director of Nuclear and Radiation Safety Center
10	Karapetyan, K.	MES of Armenia
11	Janko, K.	IAEA expert
12	Macsga, G.	IAEA expert
13	Mastauskas, A.	IAEA expert
14	Rozdylouskaya, L.	IAEA expert

No	Name	Position
16 October 2012: Ministry of Energy and Natural Resources		
1	Sahvedyan, L.	Deputy Minister
2	Tsugunyan, G.	Head, Department for Development
3	Gyupumyan, B.	Head, Department of Financial and Economical regulation
4	Grigoryan, Z.	Head, Department of Economical Inspection
5	Balyan, G.	Chief Engineer, Operator Electro-energetic System
6	Arutyunyan, A.	Head, Department of Investment Programs
7	Barsegyan, V.	Head, Section of Modernization
8	Atayan, V.	Head of Section
9	Petrosyan, A.	Head, Section of Coordination with Institutions for Safe Management of Nuclear Energy
10	Janko, K.	IAEA expert
11	Mastauskas, A.	IAEA expert
12	Rozdylouskaya, L.	IAEA expert
16 October 2012: “National Oncology Center named after V.A. Fanarjyan” Closed Joint-Stock Company		
1	Galstyan, A.	Director
2	Karamyan, S.	Head of the Radiological Department
3	Airapetyan, S.	Occupational Safety Engineer
4	Tatevosyan, R.	Head of the group of engineers
5	Janko, K.	IAEA expert
5	Mastauskas, A.	IAEA expert
6	Rozdylouskaya, L.	IAEA expert
16 October 2012: “Research Center of Radiation Medicine and Burns” Closed Joint-Stock Company		
1	Davidyan, N.	Director
2	Hovhanniasyan, N.	Deputy Director
3	Stepanyan, K.	Head, Department of Radiation Safety
4	Janko, K.	IAEA expert
5	Mastauskas, A.	IAEA expert
6	Rozdylouskaya, L.	IAEA expert
17 October 2012: Police under the Government of the Republic of Armenia		
1	Afyan, C.	Deputy Head, Police of Republic of Armenia
2	Megrabyan, K.	Deputy Head, UOOP, Police of RA
3	Nercecyan, K.	Head, Section of Civil Defense, UOOP, Police of RA
4	Karapetyan, K.	MES of Armenia
5	Janko, K.	IAEA expert
6	Macsga, G.	IAEA expert
7	Mastauskas, A.	IAEA expert
8	Rozdylouskaya, L.	IAEA expert
17 October 2012: Ministry of Health		
1	Darbinyan, A.	First Deputy Minister, Ministry of Health
2	Kostanyan, K.	Head, Department of QA and Health Programs
3	Darbseyan, V.	Expert, Emergency Situations and Mobilization Preparedness
4	Pemikyan, A.	Head, Department of Environment and Communal Life

No	Name	Position
5	Oganesyan, S.	Head, Department of Radiation Protection
6	Karapetyan, K.	MES of Armenia
7	Janko, K.	IAEA expert
8	Macsga, G.	IAEA expert
9	Mastauskas, A.	IAEA expert
10	Rozdylouskaya, L.	IAEA expert
17 October 2012: Ministry of Agriculture		
1	Bagyan, G.	First Deputy Minister, Ministry of Agriculture
2	Gameryan, G.	Head, Department
3	Avetyan, V.	Advisor to Director of ARMLES
4	Hagatryan, A.	Representative of the Veterinary Laboratory, Veterinarian
5	Karapetyan, K.	MES of Armenia
6	Janko, K.	IAEA expert
7	Macsga, G.	IAEA expert
8	Mastauskas, A.	IAEA expert
9	Rozdylouskaya, L.	IAEA expert
17 October 2012: International Airport, Yerevan		
1	Talsmyan, A.	Head, Department of Custom Control and Relations
2	Martirosyan, M.	Operator, Custom Officer of Radiation Control Service
3	Tamrazyan, S.	Custom Officer
4	Afrikyan, K.	Deputy Director, OOO "Edessa"
5	Karapetyan, K.	MES of Armenia
6	Janko, K.	IAEA expert
7	Macsga, G.	IAEA expert
8	Mastauskas, A.	IAEA expert
9	Rozdylouskaya, L.	IAEA expert
18 October 2012: Armavir Marz (Regional) Government		
1	Akopyan, G.	Deputy Head, Armavir Regional Police
2	Zakaryan, T.	Senior Inspector, Armavir Regional Police
3	Amirjaniyan, A.	Head, Armavir Regional Rescue Management (ARRM)
4	Karapetyan, A.	Deputy Head, ARRM
5	Barsegyan, D.	Deputy Head, ARRM
6	Epremyan, P.	Head, Section of Public Protection, ARRM
7	Danielyan, K.	Head, Section of Engineer Services, ARRM
8	Kotvazyan, A.	Head, Section of Resc. Services for Plantation and Animals
9	Movsisyan, E.	Representative
10	Grigoryan, Z.	Representative of Arshaluys
11	Ayrapetyan, N.	Representative of Ferik
12	Misakyan, G.	Representative
13	Aslanyan, T.	Head, Section for Communication, City of Armavir
14	Mkrtschyan, H.	Head of Operations, City of Armavir
15	Grigoryan, C.	Head, Department for Health Management and Social Provisions, City of Armavir
16	Mkrtschyan, V.	Head, Financial Management, City of Armavir

No	Name	Position
17	Grigoryan, T.	Representative of Metsamor
18	Kartashyan, M.	Head, Marzpet
19	Karanetyan, P.	Head, Section of Marzpet
20	Muradyan, L.	Deputy Gubernator
21	Karapetyan, K.	MES of Armenia
22	Janko, K.	IAEA expert
23	Macsga, G.	IAEA expert
24	Mastauskas, A.	IAEA expert
25	Rozdalouskaya, L.	IAEA expert
19 October 2012: Armenian Nuclear Power Plant		
1	Arustamyan, M.	Head, Emergency Services and Civil Defense Section, ANPP
2	Sergsyan, A.	Leading Engineer for Training, ESCD Section, ANPP
3	Aniesnyan, M.	Shift Supervisor, ANPP
4	Karapetyan, K.	MES of Armenia
5	Avetisyan, Aida	Head, Radiation Safety Section
6	Janko, K.	IAEA expert
7	Macsga, G.	IAEA expert
19 October 2012: “Emergency Channel” Information Centre (Ministry of Emergency situations)		
1	Grigoryan, N.	Deputy Head, Rescue Service Department, MES, Head of “Emergency Chanel” Information Center
2	Baghdasaryan, G.	Chief Specialist, Information and PR Department
3	Mastauskas, A.	Director, Lithuanian Radiation Protection Center
4	Rozdalouskaya, L.	IAEA expert
22 October 2012: Rescue Service Department of Ministry of Emergency Situations		
1	Kostandyan, Gagik	Deputy Director of Rescue Service MES
2	Yemishyan, Hovhannes	Head, Department of Population and Territories Protection
3	Nersesyan, Vanik	Deputy Chairman, ANRA
4	Gevorgiyan, Martun	Expert in Emergency Planning
5	Janko, K.	IAEA expert
6	Macsga, G.	IAEA expert
7	Mastauskas, A.	IAEA expert
8	Rozdalouskaya, L.	IAEA expert
22 October 2012: Republican Veterinary-Sanitary and Phytosanitary Center of Laboratory Services of State Service for Food Safety		
1	Gevorgyan, H.	Head of Staff of State Service for Food Safety
2	Gevorgyan, A.	Director of “Republican Veterinary, Sanitary and Phytosanitary Center of Laboratory Services” of State Service for Food Safety
3	Baghiyan, V.	Colonel, Head of CBRN monitoring division of the RS of MES
4	Mastauskas, A.	IAEA expert

Appendix IV

ASSESSMENT SHEETS

Country Profile - Radiation Emergency Preparedness and Response Capabilities

Country: Republic of Armenia

Year: 2012

Work element	Appraisal Criteria	Findings	Performance Indicator (0,1,2,3) [‡]
01. Basic responsibilities	1.1. Establish a governmental body or organization (or identify an existing one) to act as a national coordinating authority (NCA)	<p>Based on Governmental decree No 531-N of 2008 the Rescue Service of the Ministry of Emergency Situations of Armenia (RS of MES) is authorized to coordinate the arrangements for preparedness and response to emergencies, including radiological and nuclear emergencies, and therefore the RS of MES should be regarded as the National Coordinating Authority (NCA).</p> <p>The ANRA is the national advisor in response organization and also the contact point under the Convention on Early Notification about Nuclear Accident.</p>	3 (3)
	1.2. Clearly assign the functions and responsibilities of operators and response organizations and ensure they are understood by all response organizations	<p>The allocation of responsibilities between the national and local authorities and response organizations involved in case of emergencies at the Armenian NPP is defined in the National Plan for the Protection of the Population in the Event of a Nuclear and (or) Radiological Emergency at the Armenian NPP, (ANPP's off-site plan), approved under the RA Gov. Decree No 2328-N of 22.12.05 and amended on 21.08.08 under the RA Government Decree N 1042-N.</p> <p>The basic functions and responsibilities of the Authorities in case of some</p>	2 (3)

[‡] The left figure in bold font introduces PI specified by the EPREV experts; the right figure in brackets is the PIs specified by the Armenian counterpart

02. Assessment of threats	<p>1.3. Establish a regulatory and inspection system that provides reasonable assurance that emergency preparedness and response arrangements are in place for all facilities/practices in line with the requirements of the international standards.</p>	<p>specified events involving emergency situations with radioactive sources/materials are defined by Gov. Decree No 553-N of 03.05.2007 “On Approval of the Procedure on finding and regaining control over radioactive materials”.</p>	3 (3)
	<p>1.4. Establish an appropriate management system and all organizations that may be involved in the response to a nuclear or radiological emergency have adopted appropriate management arrangements to meet the timescales and to ensure an effective and coordinated response throughout the emergency.</p>	<p>The scope of regulatory framework on the use of atomic energy is given by the Law on Atomic Energy, Section 4. The ANRA is the state authority of the executive power implementing the state regulation of safety requirements. The licensing and inspection system of the Republic of Armenia provides reasonable assurance that emergency preparedness and response arrangements are in place for all facilities, and most of the necessary resources are available.</p>	
	<p>2.1. Perform threat assessments of the facilities and activities in the State, categorizing them in accordance with the five threat categories in Table I of GS-R-2</p>	<p>There is an appropriate management system for response regarding any emergency situation at the ANPP. The emergency response actions must be triggered based on the classification and implemented in accordance with on-site/off-site ANPP emergency plans, supplemented with the detailed procedures and instructions on how to act in emergency situations. The management arrangements for responding to the other potential radiological emergencies, not related to operation of the ANPP, are not clearly defined in legislation or regulations</p>	
		<p>Gov. Decree № 1489-N of 18.08.2006 “On approval of radiation safety rules” has set up a national categorization system, which defines separate category groups for radioactive sources, radiation generators and for nuclear (atomic energy) installations. The adopted categorization is in line with the internationally adopted provision on exercising a graded approach for conducting the regulatory functions (licensing, inspections etc.) and performing emergency preparedness arrangements. However, it is not fully in line with the guideline for categorization of threats, given in Table 1 of international requirements (GS-R-2).</p>	2 (2)

03. Establishing emergency management and operations	3.1. Make arrangements to coordinate the emergency responses of all the off-site response organizations with the on-site response to include a command and control system for the local and national response to any nuclear or radiological emergency	<p>The ANPP off- site plan clearly names and delegates the appropriate set of responsibilities to all state governing bodies, local self-governing bodies and organizations of the Republic of Armenia that play roles in the protection of the population from the dangerous impact of ionizing radiation in case of a nuclear and (or) radiological accident at the ANPP and set up specific requirements for all response organizations.</p>	2 (2)
	<p>In case of nuclear or radiological accident the Ministry of Emergency Situations is the responsible organization for emergency management at state level.</p> <p>The regional or local level response is coordinated accordingly by the County or Municipal Emergency Management Commission chaired by the governor of the county/municipal administration.</p>		
04. Identifying, notifying and activating	3.2. Make arrangements for the appraisal of the information necessary for decision making on the allocation of resources throughout the emergency.	<p>Arrangements are in place at local and national level for the appraisal of the information necessary for decision making on the allocation of resources throughout the emergency at the ANPP. General requirements are described in the ANPP off-site plan.</p>	2 (2)
	4.1. Establish a contact point operating 24 hours/day and 7 days/ week	<p>Decisions on state level are made by the State Committee of Emergency Situations. These are based on the information from the Crisis Management Centre of Ministry of Emergency situations. The ANRA operates its own Emergency Response Centre to where the most important technical parameters of the ANPP and meteorological information are transmitted through electronic means. The ANPP operates its own Crisis Management Centre as well.</p>	
	4.2. Ensure that on-site managers of scrap metal processing facilities and responsible officials at national borders are aware of indicators of radiation emergency and are able	<p>The emergency service 911 is continuously available 24 hours/day and 7 days per week at the Crisis Management Center of the RS of MES, and the earlier dedicated emergency phones of police, ambulance and rescue structures are also in use. The “911” is dedicated for receiving notifications of any type of emergency, including a nuclear or radiological emergency.</p> <p>In the Republic of Armenia there are several scrap metal collection facilities, which on-site managers may not be aware of the possibility that the items collected might have radioactive content and therefore the measurements of radioactivity are required.</p> <p>At the borders, all custom points have ability to measure dose rate and identify radioisotope caused increased radiation. Special instructions on</p>	

to take immediate actions

custom control for the detection of nuclear materials have been developed and implemented. The personnel of the Custom Service are trained for performing radiation monitoring of the cargos, vehicles and people who are crossing the border.

4.3. Ensure that first responders are aware of the indicators of a radiation emergency and they are familiar with the appropriate notification procedures and other immediate actions warranted if an emergency is suspected

The rescue workers and medical emergency staff have basic training in radiation protection, according to their specific qualification. The Police personnel are aware of radiation protection from the educational course on Civil Defence at the Police Academy. Nevertheless, the Police and the medical staff need special training, instructions and radiation detectors to indicate the symptoms of radiation and act in adequate way if an emergency, involving a radioactive source is suspected.

2 (3)

4.4. Establish a system for promptly initiating an appropriate level of coordinated and pre-planned on and offsite response in the event of an emergency

The system for promptly initiating the off-site response in the event of an emergency is established according to the provisions of the Law on Civil Defence, the Law on Public Protection and the ANPP off-site plan. For the case of radiation emergency at the ANPP the system is fully operational.

The facilities or practices in threat category III and IV seem not to have coordinated response plans or clear written procedures to be implemented in the event of accident with radioactive sources or release of radioactive materials.

2 (3)

4.5. Ensure response organizations to have sufficient number of qualified personnel available at all times to perform assigned initial response actions.

The sufficient number of trained personnel is available in all response organizations.

2 (3)

4.6. Make known to the IAEA and to other States the country's single warning point of contact responsible for receiving emergency notifications and information from other States and information from the IAEA

The ANRA's emergency response centre is the warning point, having direct contact with the IAEA (24/7).

The related procedures for the notification are available (EMERCON procedures).

3 (3)

	<p>4.7. Perform the event classification and countermeasures following the requirements of international standards.</p>	<p>The adopted classification system defines three types of nuclear emergencies (alerts, local and general), as it was recommended in the earlier IAEA TECDOC-953 for all types of nuclear emergencies. It is slightly different from the classification, recommended in later IAEA publications (GS-R-2 and EPR-Method 2003).</p>	<p>2 (2)</p>
	<p>4.8. Make arrangements for the prompt determination of the appropriate emergency class by the operator and of the level of response, as well as for notification and provision of updated information to the offsite notification point.</p>	<p>The emergency classification system for facilities in threat category III and other emergencies (e.g. the situations with uncontrolled sources) has not been considered in Armenian regulations</p> <p>The arrangements for the prompt determination of the appropriate emergency class and for notification and provision of updated information to the off-site notification points (Crisis Management Center of MES, ANRA, Armavir regional rescue department and MoENR) are included in the on-site and off-site ANPP emergency plans.</p>	<p>3 (3)</p>
	<p>4.9. Have arrangements in place to provide a response to an emergency for which detailed plans could not be formulated in advance.</p>	<p>At facilities in threat category III the emergency classes are not defined, however the procedure for notification and transfer of the emergency information to the Crisis Management Centre of MES and ANRA is included in the on-site plans of all facilities, using or operating sources of ionizing radiation.</p>	<p>2 (3)</p>
<p>05. Taking mitigatory actions</p>	<p>5.1. 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</p>	<p>The RS of MES and other response organizations in the Republic of Armenia have qualified and skilled personnel which can always rely on the support of the ANRA and ANPP Technical Support Organizations. This provides a high level of assurance that the appropriate level of response will be provided also in those events for which detailed plans could not be formulated in advance. At the same time, the response to the accidents involving dangerous radioactive sources, and especially dangerous uncontrolled sources, may require additional arrangements due to absence of detailed written procedure on taking emergency actions in such situations.</p> <p>The legislation includes clear provisions that the radiation protection expertise and services in the Republic of Armenia shall be provided promptly by the ANRA that has adequate capabilities and trained staff to provide these services.</p>	<p>3 (3)</p>

category IV

5.2. Ensure that the operator of a practice in threat category IV is given basic instruction to be able to mitigate the consequences of the emergency situation

Availability of basic instructions is one of the conditions for getting an authorization from the ANRA to perform a practice in threat category IV. The appropriate requirements are determined by the Guides for the format and content of the documents to be included in an application for authorization.

3 (3)

5.3. Make arrangements to initiate a prompt search and to issue a warning to the public in the event of the loss of a dangerous source

Specific arrangements for initiating a prompt search of the lost dangerous source have not been specified in legislation (or regulation) of the Republic of Armenia, although it is clear that the main players in case of this event would be the National Security Service, ANRA, Police, and the RS of MES. The corresponding responsibilities of the listed organizations are set in their statutes, and some of the relevant functions are defined by Gov. Decree No 553-N "On Approval of the Procedure on finding and regaining control over radioactive materials", that concerns cases of illicitly removed dangerous sources.

2 (2)

5.4. Make arrangements for mitigatory actions to prevent the 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

The necessary arrangements for taking mitigatory actions are described in the Law on Civil Defense, Law on Public Protection, Law on Atomic Energy and the Nuclear Plan, as well as in the on-site emergency plans of licensees.

2 (2)

5.5. The operators of facilities have in place the necessary plans and procedures and guidance for the operator on mitigatory actions for severe conditions, for the full range of

There is one facility in threat category I in the country, ANPP, in which beyond design basis (severe accident) accidents are postulated to have severe consequences affecting the public. The current mitigation actions in case of emergency at the ANPP are clearly described in the ANPP on-site and off-site emergency plans

2 (2)

	<p>postulated emergencies including accidents beyond the design basis.</p>		
06. Taking urgent protective action	<p>6.1. Adopt national intervention levels for taking urgent protective actions in accordance with the relevant international standards</p>	<p>The national intervention levels for taking urgent protective actions are established by the Gov. Decree № 1489-N of 18.08.2006 “On Approval of Radiation safety rules”. The levels are in accordance with GS-R-2 requirements.</p>	3 (3)
	<p>6.2. Make arrangements for effectively making and implementing decisions on urgent protective actions to be taken off the site</p>	<p>Requirements and provisions for effectively making and implementing decisions on urgent protective actions in case of the emergency (accident) at the ANPP are clearly described in the ANPP off-site plan.</p>	3 (3)
	<p>6.3. Make arrangements to ensure the safety of all persons on the site in the event of a nuclear or radiological emergency</p>	<p>The arrangements to ensure safety of all persons on the site are implemented accordingly to the ANPP on-site emergency plan. For facilities in threat category III the relevant arrangements are described in the facility on-site emergency plans or procedures, which are checked by the ANRA during the licensing process and in performing inspections.</p>	3 (3)
07. Providing information and issuing instructions and warnings to the public	<p>7.1. 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</p>	<p>Obligations of state bodies and their involvement in warning of the public in case of the accident at the ANPP are described in the in the ANPP’ off-site plan. Warning of population is conducted by calling siren from the ANPP and by operative actions of Police, the RS of MES and mobile forces of the Ministry of Defence. The instructions to population are provided by means of TV, radio and mobile loud-speakers.</p>	2 (2)

08. Protecting emergency workers	8.1. Make arrangements for taking all practicable measures to provide protection for: 1) emergency workers in threat category I, II or III or within the precautionary action zone or the urgent protective action planning zone; 2) radiation specialists, radiation protection officers, emergency team of radiological assessors and medical personnel who may respond to radiation emergencies	<p>The legal base for the protection of emergency workers is given in the section “Emergency Exposure situations” of the Radiation Protection Norms, approved by Gov. Decree No 1219-N of 18.08.2006. The Norms define dose limits for emergency workers in line with international requirements.</p> <p>The RS of MES teams are trained in radiation protection and equipped with personal protection equipment, radiation detection instruments and decontamination devices for conducting the response actions in the field.</p> <p>As for the Police, fire fighters and emergency medical personnel, their training in radiation protection (i.e. on how to protect themselves) may be insufficient and equipping with radiation detectors is in deficiency.</p>	2 (2)
	8.2. Have arrangements in place to provide effective large scale radiation protection for workers on sites under severe accident conditions.	<p>Arrangements to provide effective large scale radiation protection for workers on site under severe accident conditions are set out in the ANPP on-site and off-site plans. The State Reserves Agency of MES is obliged on to provide the RS of MES as well as the Armavir and Aragatsohn administrations with personal protection means and other equipment, on their request, with the aim of assuaging rescuers working in affected areas.</p>	2 (2)
	8.3. Radiation workers have the information of the risks of radiation exposure and basic training to deal with an emergency in severe accident conditions.	<p>Training and information of the risks are provided according to the ANPP on-site Plan (MA.ATD.41.SCHS-001) and Plan on Radiation protection of personnel in case of radiological accident at the ANPP (MA.ATD.12.SCHS-004). Types and periodicity of trainings and exercises are defined in the national legislation.</p>	2 (2)
09. Assessing the initial phase	9.1. Establish default operational intervention levels (OILs) for radiological emergencies	<p>The default operational intervention levels (OILs) for implementing the protective actions based on field survey measurements of gamma dose rate (mSv/hour) coursed by radioactive cloud or contaminated soil are defined in Appendix 12 of the ANPP off-site plan.</p>	3 (3)
	9.2. Ensure the continued availability of radiation monitoring services to make assessments to be used for mitigatory actions, emergency	<p>At the ANPP arrangements are in place to assess promptly the abnormal or emergency conditions, and, based on the status of the technology, to determine the emergency class according to the established system of classification. The required measurements in the emergency zones (PAZ and UPZ) are carried out by the RS of MES, the Ministry of Defence and ANRA, using its own resources. There is Radiological monitoring plan that</p>	2 (2)

10. Managing the medical response	classification, and urgent protective actions on and off the site.	defines actions on promptly conducting dose rate measurements, environmental sampling and monitoring of the contaminated people within the emergency zones. However, the detailed monitoring procedures (methodologies, check lists, etc.), are not available	
	10.1. Make arrangements for general practitioners and emergency staff to be made aware of the medical symptoms of radiation exposure and of the appropriate notification procedures if a nuclear or radiological emergency are suspected	The emergency medical staff is well educated and fully aware about the medical response they have to provide in the event of emergency situation at the ANNP. But there are no special arrangements in place to maintain the awareness by general practitioners (family doctors) of the medical symptoms of radiation exposure.	2 (2)
11. Keeping the public informed	10.2. Make arrangements, at the national level, to provide initial treatment of people who have been exposed or contaminated	Initial treatment of exposed or contaminated people in case of emergency at the ANNP is conducted in accordance with the plans developed by the Ministry of Health and Regional medical services. First medical aid is provided by medical staff of the ANPP and of 11 medical points, located in the PAZ. Forces of other medical organizations (urgent pre-medical and medical aid, doctors and nurses brigades of ambulance centers of Armavir region) are to be joined. There are arrangements for transportation and treatment of contaminated people in special areas.	2 (2)
	11.1. Make arrangements for providing useful, timely, truthful, and consistent information to the public, responding to incorrect information and rumours and responding to requests for information from the public and from news and information media	MES has obligation to notify the public in the situation arisen as a consequence of a radioactive contamination due a nuclear accident abroad or a radiological accident occurred in the country. The appropriate arrangements are included in the ANPP off-site plan. The MES together with the ANRA arranges media briefings with participation of interested parties describing situation and possible developments, executed actions and population behavior rules.	2 (2)
		The operators and the response organizations at all levels have established procedures on how to inform the public and media and have designated representatives for public relations, who were trained in this sphere. Local elected officials near the ANPP are very well familiar with the national plan and agreed that public messages would come from the MES only.	

12. Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions	12.1. Adopt national intervention levels and action levels for agricultural countermeasures and putting restriction on consumption, distribution and sale of locally produced and agricultural produce following a release of radioactive material.	National intervention levels for temporary relocation and permanent resettlement, and also generic action levels for foodstuffs are established by Gov. Decree № 1489-N of 18.08.2006 “On approval of “Radiation safety rules” and are included in the ANPP off-site plan. The adopted levels are in full compliance with the earlier IAEA guidelines for intervention levels in emergency exposure situations (Schedule V of Safety Series No 115 and Annex III of GS-R-2).	3 (2)
	12.2. Establish OILs for dose rates due to deposition and deposition densities, timely monitoring for ground contamination for temporary relocation and means for accomplishing and assisting those who have been relocated.	Organization and conduct of emergency radiological monitoring over all emergency period is the responsibility of the RS of MES. In accordance with item 97 of the ANPP off-site plan, the surface contamination measurements and environmental sampling are carried out in the PAZ and UPZ by the RS of MES, the Ministry of Defence and ANRA, using its own resources. The means for accomplishing relocation and arrangements for assisting those persons who have been relocated are clearly described in the relevant articles of the ANPP off-site plan	2 (2)
13. Mitigating the non-radiological consequences of the emergency and the response	13.1. Make arrangements for responding to public concern in an actual or potential nuclear or radiological emergency	To respond to the public concern the appropriate information is regularly broadcasted by Public TV of Armenia and Public Radio in television and radio guide titled “Special programs”.	2 (2)
	14.1. Develop emergency plans that are consistent with the threat and coordinated with all response organizations	The license legislation requires an operator of facilities and practices with radiation sources to maintain emergency response plans. Requirements for the content of the facility level plan are defined by the ANRA, but they are not in clear correspondence with the type and threat of the facility and not in full compliance with GS-R-2 requirements. The ANPP has on-site and off-site plans that are consistent with the threat and coordinated with all off-site response organizations and stakeholders. The last have their own plans for performing the assigned functions and protection actions in the event of the emergency at the ANPP.	2 (3)
14. Requirements for infrastructure	14.2. Ensure that operating and response organizations develop the procedures needed to perform their response functions	The procedures are in place, needed to perform response actions described in the ANPP’s on-site and off-site plan. The other operators (e.g. in threat category III) also have developed procedures to implement their emergency response plans, but in many	2 (3)

<p>14.3. Provide, concentrating on the use of existing capabilities, adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation</p>	<p>cases these procedures include insufficient information and should be reviewed/updated.</p> <p>In accordance with the ANNP off-site plan the emergency response units are supplied in advance with iodine preparations, individual protection means, individual dosimeters, radiometric devices for monitoring, and are trained every 6 months. The existing capabilities and tools available for conventional emergencies are planned to be used also during nuclear or radiological emergencies (fire fighting equipment and forces, communication tools, etc.). In case of some response organizations and first responders the equipment for detection of radiation (dosimeters, spectrometers, laboratory techniques, etc.) is not available as required, or it is obsolete and needs upgrade.</p>	<p>2 (3)</p>
<p>14.4. Identify facilities at which the following will be performed: coordination of on-site response actions; coordination of local off-site response actions (radiological and conventional); coordination of national response actions; coordination of public information; and coordination of off-site monitoring and assessment</p>	<ul style="list-style-type: none"> • Co-ordination of on-site response actions: Emergency Response Organizations (ERO) which shall be established at the facilities and installations. On-site response actions will be coordinated at the ERO facilities • co-ordination of local off-site response actions (radiological and conventional): Municipal Emergency Management Commission, Regional Emergency Management Committees • co-ordination of national response actions: State Committee of Emergency Situations, Crisis Management Centre of MES, the ANRA Crisis Management Centre • co-ordination of public information: The RS of MES and the ANRA provide operative information to mass media. • co-ordination of off-site monitoring and assessment: According to the National Plan, in the event of the general emergency at the ANPP the off-site monitoring coordinator is the RS of MES. The assessment of the monitoring results is performed by the ANRA. 	<p>3 (3)</p>

14.5. Make arrangements, concentrating on the use of existing capabilities, for the selection of personnel and training

The training and preparation of state governing and local self-governing bodies, the heads thereof, staff, the personnel of civil defense forces and the population are organized and implemented in accordance with Gov. Decree No. 134-N of 30.01. 2003 "On Approval of the Procedure of preparation of state governing and local self-governing bodies of the Republic of Armenia and training of the population in the fields of emergency situations and civil defense". Organizations involved in emergency preparedness and response implement their regular training program, which in radiation protection are oriented mainly to the civil defence issues.

2 (2)

At the ANPP a systematic approach to training has been elaborated covering the topical area of emergency preparedness and response.

**14.6.
a) Conduct exercises and drills to ensure that all specified functions required to be performed for emergency response and all organizational interfaces for facilities in threat category I, II or III and the national level programs for threat category IV or V are tested at suitable intervals.**

The ANPP runs regular exercise program on annual basis. This program includes exercises with participation of the other organizations to be involved in case of the emergency according to the ANPP off-site and on-site plans.

2 (3)

The organizations concerned conduct their own exercise programmes for testing the response actions, assigned in the ANPP off-site plan. ANRA regularly takes part in international CONVEX exercises that are organized by the IAEA.

b) Conduct exercises and drills for onsite workers and external responders considering severe accident scenario.

The emergency plans on response for radiological accidents at facilities in threat category III, and practices or jurisdictions in threat category IV or V are tested on case by case basis during the large-scale exercises on conventional emergencies.

14.7. Make arrangements to ensure the availability and reliability of all supplies, equipment, communication systems and facilities needed during an emergency including emergencies with severe consequences.

At present most of the necessary supplies, equipment, communication systems, and facilities recognized for response to radiation emergencies are part of the existing capabilities for conventional emergencies. These facilities are used during intervention to other emergencies (fire, rescue, medical, etc.). Availability and reliability of these capabilities are the responsibility of the relevant organizations as it is clearly defined in the ANPP off-site plan.

2 (3)

14.8. Establish mobilization plans to gather human resources in various fields for a prolonged radiation emergency with severe consequences.

All mobilization procedures needed for performing response actions in case of emergency at the ANNP are specified in the ANPP's off-site plan

3 (3)

14.9. The onsite Emergency control centre in threat category-I facilities, designed to remain operational for the range of postulated severe accident conditions.

The on-site emergency control centre of the ANPP is designed to remain operational in case of severe accident conditions (equipped with supply systems, ventilation systems, hermetic tightness, etc.)

3 (2)

14.10. The onsite emergency control centre have available enough information about essential safety related parameters and radiological conditions in the facility and its immediate surroundings.

The on-site emergency control centre of the ANPP is capable of collecting all necessary information about essential safety related parameters and radiological conditions in the facility and its immediate surroundings

2 (2)

14.11. Make arrangements to conduct internal monitoring of emergency response workers and to ensure the availability of these services under postulated emergency conditions.

There are no generic requirements on internal monitoring of emergency workers. The ANPP has facilities for internal monitoring, that is planned to be used for the regular control of the ANPP personnel.

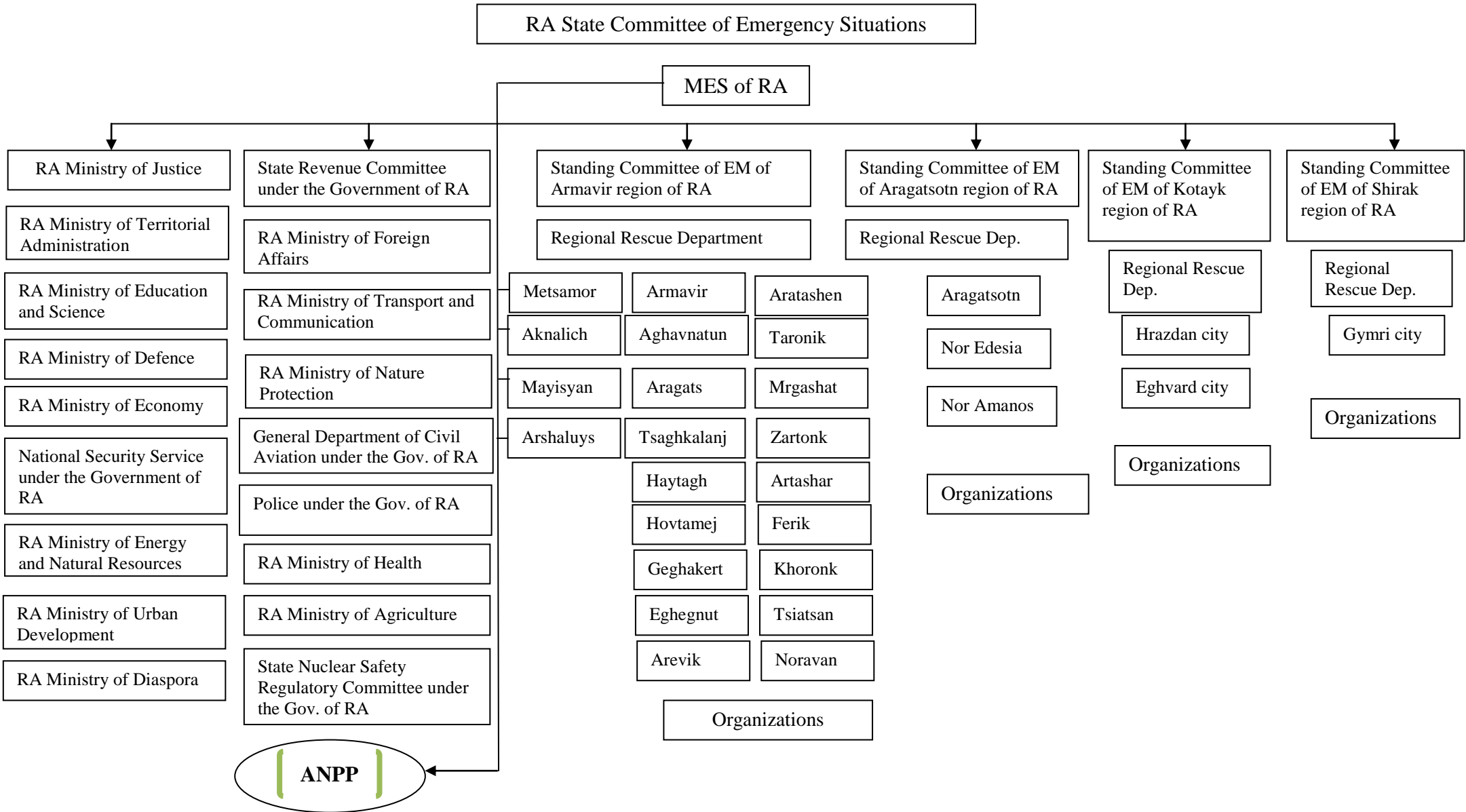
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Appendix V

LIST OF THE DOCUMENTS, AVAILABLE TO THE EPREV TEAM

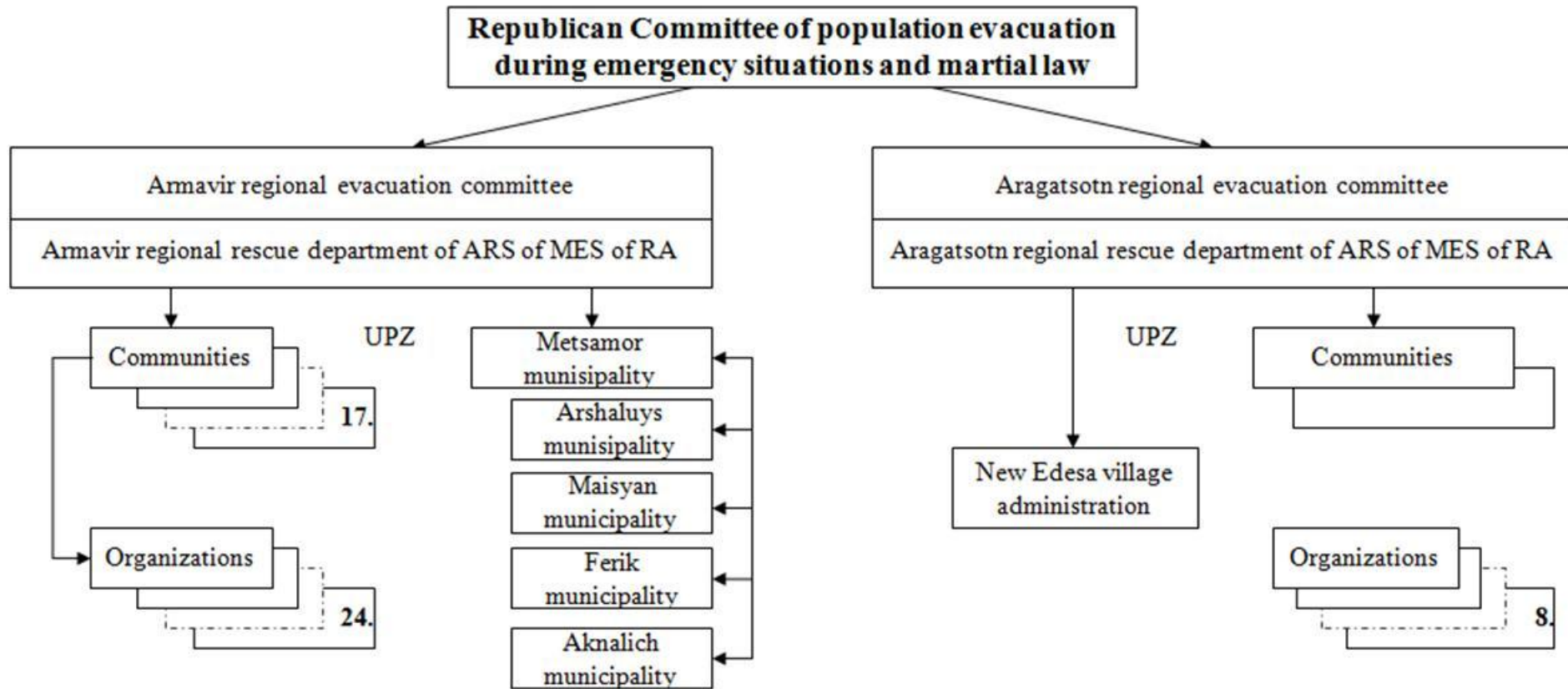
1. Law on Safe Utilization of Atomic Energy for Peaceful Purposes (01.02.1999 HO-285)
2. Law on Population Protection in case of Emergencies (02.12.1998 HO-265)
3. Law on Licensing No-193 of 30.05.2001, with supplements as of 16.03.2004 Ho-52N
4. Law on the Republic of Armenia on Civil Defense, of 05.03.2002
5. Ordinance of RA President No 121-N "On reorganization of Armenian Nuclear Regulatory Authority (ANRA) under Ministry for Nature Protection of RA into State Committee on Nuclear Safety Regulation under Government of RA" of 20.02.2008
6. Government Decree No 573 "On establishment of the state authority under the government of the RA on regulation of nuclear and radiation safety for atomic energy utilization (Armenian Nuclear Regulatory Authority) of 16.11.1993
7. Government Decree No 346-N "On approval of the licensing procedure, license and application forms for import and export of special materials, equipment and technologies" of 24.03.2005
8. Government Decree No 1219-N "On approval of radiation safety norms" of 18.08.2006
Government Decree No 1489-N "On approval of radiation safety rules" of 18.08.2006
9. Government decree No 866-N of 17 July 2008 on approval of the ANRA statute
10. The National Plan for the Protection of the Population in the Event of a Nuclear and (or) Radiological Emergency at the Armenian NPP, approved by Gov. Decree No 2328-N 22.12.05 and amended Gov. Decree N 1042-N of 21.08.08.
11. Governmental Decree No 553-N "On Approval of the Procedure on finding and regaining control over radioactive materials", of 03.05.2007, amended 08 January 2009 N 36-N and 08 September 2011N 1280-N
12. Governmental Decree No 1925 "On Notification of Population about emergency in the territory of the Republic of Armenia", of 03.11.2005
13. Governmental Decree No. 134-N "On approving the procedure of preparation of state governing and local self-governing bodies of the Republic of Armenia and training of the population in the fields of emergency situations and civil defense" of 30.01. 2003
14. Draft "Basic Requirements on Planning and Implementation of Response Actions in the event of Nuclear or Radiological Emergency

Appendix VI
THE ORGANIZATIONAL CHART OF POPULATION PROTECTION PLANNING SYSTEM



Appendix VII

THE COMMAND AND CONTROL CHART FOR THE EVACUATION OF POPULATION IN CASE OF AN ACCIDENT AT THE ANPP



Appendix IX

CLASSIFICATION OF EMERGENCY SITUATIONS AT THE ANPP ACCORDING TO THE NUCLEAR PLAN

N	Description of the Situation	Emergency Class	Code
1.	An unplanned accident took place in the ANPP	General Emergency	Atom-1
2.	The threat of an unplanned accident at the ANPP is real (caused by a technological breakdown or incorrect actions of the personnel)		Atom-2
3.	The threat of an unplanned accident at the ANPP is real (caused by external impact or impossibility for the personnel in the control room to act)		Atom-3
4.	A planned accident took place in the ANPP	Site-Area Emergency	Atom-4
5.	The threat of a planned accident at the ANPP is real (caused by a technological breakdown or incorrect actions of the personnel)		Atom-5
6.	The threat of a planned accident at the ANPP is (caused by external impact or impossibility for the personnel in the control room to act)		Atom-6
7.	The technological parameters of the ANPP have gone beyond the limits of safe operation	Alert	Atom-7
8.	A non-technological accident threatening the technological processes took place (fire, explosion, etc.) or there is a threat of a dangerous external impact on the ANPP	Alert	Atom-8

Appendix X

LIST OF THE EMERGENCY PROCEDURES OF THE ANRA CRISIS MANAGEMENT CENTRE

1. EP-CC-01 on Communication Means of the Emergency Response Centre
2. EP-EO-01 on Organization of the Emergency Response Centre
3. EP-EO-03 on Activities of the Group for Public Relation and Information: Notification of the IAEA and Other Organizations
4. EP-EO-04 on Registration of Events and Actions in the ERC
5. EP-RS-01 on Determination of Integrity Status of the Primary Circuit
6. EP-RS-02 on Determination of Integrity Status of the Reactor Core
7. EP-RS-03 on Determination of Release Conditions
8. EP-ST-01 on Determination of Release Characteristics
9. EP-RP-01 on Calculation of Public Exposure Doses
10. EP-RP-02 on Determination of Protective Measures
11. EP-RP-04 on Preliminary Evaluation of Doses

Appendix XI

PERMISSIBLE DOSE (SUMMARY DOSE OF EXTERNAL EXPOSURE TO GAMMA RADIATION) FOR THE RETURN OF THE EMERGENCY PERSONNEL FROM AREA EXPOSED TO RADIATION

Activities	Permissible dose of radiation exposure of the emergency personnel (mSv)
First type: <ul style="list-style-type: none"> • Rescuing people; • Prevention of damage to the nuclear reactor active zone and/or large discharges. 	$50 < D \leq 250$; a) b)
Second type: <ul style="list-style-type: none"> • Prevention of severe exposure of people to radiation; • Prevention of high collective doses; • Prevention of disaster situations; • Rehabilitation of reactor safety system; • Monitoring of radiological situation in severely contaminated areas or in conditions of radioactive cloud. 	$25 < D \leq 50$; a)
Third type: <ul style="list-style-type: none"> • Short-term rehabilitation work; • Urgent protective measures; • Collection of samples from external facilities. 	$20 < D \leq 25$; a)
Fourth type: <ul style="list-style-type: none"> • Long-term rehabilitation work; • Works not immediately related to the accident. 	Equivalent to the norms established for occupational exposure.

a) It is supposed that thyroid gland protection has been done prior to exposure. Otherwise, it is necessary to diminish the permissible dose for 5 times. If respiratory organs are protected or the radioactive discharge is ruled out then the permissible dose must be doubled. Emergency personnel must be trained in anti-radiation protection and be advised about the expected doses.

b) In case of serious reasoning, these doses can exceed the above levels.

Appendix XII

DEFAULT OPERATIONAL INTERVENTION LEVELS (OILS) FOR IMPLEMENTING THE PROTECTIVE ACTIONS BASED ON FIELD SURVEY MEASUREMENTS (Intervention Work Levels (IWL), as it is extracted from Appendix 12 of the Nuclear Plan)[§]

	Pre-calculated level (equivalent dose)	The decision to be made and prerequisites for the preliminary IWL calculation
IWL-1	1 mSv/hour	<p>To evacuate or efficiently shelter the population based on the value of equivalent dose caused by the radioactive cloud. When calculating the equivalent dose the following prerequisites were assumed:</p> <ul style="list-style-type: none"> • The discharge was not diminished. • The mixture of discharged radioactive isotopes is characteristic of the active zone melt down of the nuclear reactor. • The dose from air inhalation is 10 times higher than the external radiation dose. • The exposure from the radioactive cloud is 4 hours. • Prevented dose is 50 mSv.
IWL-2	0.1mSv/hour	<p>To protect the thyroid gland and perform temporary sheltering based on the value of equivalent dose caused by the radioactive cloud. When calculating the equivalent dose the following prerequisites were assumed:</p> <ul style="list-style-type: none"> • The discharge was not diminished. • The mixture of discharged radioactive isotopes is characteristic of the active zone melt down of the nuclear reactor. • The dose received by the thyroid gland from radioactive iodine through inhaled air is 200 times more than the external radiation dose. • The exposure from the radioactive cloud is 4 hours. • Prevented dose of the thyroid gland is 100 mGr.
IWL-3	1 mSv/hour	<p>To evacuate the population based on the value of equivalent dose caused by the soil contaminated by radioactive precipitation. When calculating the equivalent dose the following prerequisites were assumed:</p> <ul style="list-style-type: none"> • Prevented dose is 50 mSv; • Exposure to radiation is 1 week; • Due to radioactive isotopes decay, the dose of radioactive exposure decreased by approximately 75%;

		<ul style="list-style-type: none"> • People are sheltered. 	
IWL-4	0.2mSv/hour	<p>To temporarily evacuate the population based on the value of equivalent dose caused by the soil contaminated by radioactive precipitation. When calculating the equivalent dose the following prerequisites were assumed:</p> <ul style="list-style-type: none"> • Prevented dose is 30 mSv; • Exposure to radiation is 30 days; • The mixture of discharged radioactive isotopes is characteristic of the active zone melt down of the nuclear reactor, 4 days after the event. • Due to radioactive isotopes decay and weathering the dose of radioactive exposure decreased by approximately 50%; • Is applied for 2-7 days after the reactor has been shut down. 	
IWL-5	1mSv/hour	<p>To restrict the consumption of drinking water and locally produced milk and food, based on the value of equivalent dose caused by the soil contaminated by radioactive precipitation. To assume that in any area where the equivalent dose caused by the soil contaminated by radioactive precipitation is equal to or more than the levels of regulating control liberation dose, the radioactive contamination of food can exceed the working levels of intervention for food.</p>	
IWL	Preliminary calculated level (surface soil contamination)	<p>The decision to be made and prerequisites for the preliminary IWL calculation</p>	
	General staple food	Milk and drinking water	
IWL-6	10 kBq/m ²	2 kBq/m ²	<p>To restrict consumption of drinking water, locally produced milk and food in the areas where I-131 radioactive isotope contamination has been found in the surface soil. When re-calculating, to use general optimal levels of emergency intervention. The following conditions were taken into account when calculating:</p> <ul style="list-style-type: none"> • I-131 prevails in the radioactive isotopes detected in the surface contamination of soil which is characteristic of the first 15 days after a melt down of the reactor active zone. • Food is contaminated superficially and can be used without preliminary washing.
IWL-7	2 kBq/m ²	10 kBq/m ²	<p>To restrict consumption of drinking water, locally produced milk and food in the areas where Cs-137 radioactive isotope contamination</p>

			<p>has been found in the surface soil. When re-calculating, to use general optimal levels of emergency intervention. The following condition was taken into account when calculating:</p> <p>Food is contaminated superficially and can be used without preliminary washing.</p>
IWL-8	1 kBq/kg	0.1 kBq/kg	<p>To restrict consumption of drinking water, locally produced milk and food due to the content of J-131 radioactive isotope in them. The following condition was taken into account when calculating:</p> <ul style="list-style-type: none"> • J-131 radioactive isotope is prevalent which is characteristic of the first 15 days after a melt down of the reactor active zone. • Food is contaminated superficially and can be used without preliminary washing. <p>IWL-8 is recommended to use in the first 30 days after the accident when the short-life isotopes will be decayed.</p>
IWL-9	0.2 kBq/kg	0.3 kBq/kg	<p>To restrict consumption of drinking water, locally produced milk and food due to the content of Cs-137 radioactive isotope in them. The following condition was taken into account when calculating:</p> <ul style="list-style-type: none"> • Food is contaminated superficially and can be used without preliminary washing. <p>IWL-9 to be used in the first 30 days after the accident.</p>

Appendix XIII

THE EXERCISE PROGRAM OF 2009-2011 AT ARMENIAN NPP

Dates	Topic	Participants
17.06.2009	Table-top exercise on LOCA accident (pipeline of diameter 100 mm) and break-down of Make-up Water System.	Management staff of ERO
12.08.2009	Table-top exercise on LOCA accident (pipeline of diameter 100 mm) and break-down of Make-up Water System.	Deputy management staff of ERO
29.10.2009	General training on LOCA accident (pipeline of diameter 100 mm).	Management staff and personal of ERO
08.12.2009	General training on LOCA accident (pipeline of diameter 100 mm).	Deputy management staff and personal of ERO
20.08.2010	General training on Station Black-out with LOCA accident (pipeline of equivalent diameter 100 mm).	Management staff and personal of ERO
23.12.2010	General training on Station Black-out with LOCA accident (pipeline of equivalent diameter 100 mm).	Deputy management staff and personal of ERO
14.04.2011	General training on fire at turbine-generator No 3 and break of heat-exchanger tubes in Steam-generator No 5.	Personal of ERO
19.12.2011	General training on earthquake in the territory of PAZ with Station Black-out.	Personal of ERO