

REPUBLIC OF ARMENIA

**JOINT CONVENTION
ON THE SAFETY OF SPENT FUEL
MANAGEMENT AND ON THE
SAFETY OF RADIOACTIVE WASTE
MANAGEMENT**

**22 OCTOBER 2014
REPUBLIC OF ARMENIA**

JOINT CONVENTION
ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE
SAFETY OF RADIOACTIVE WASTE MANAGEMENT

FIRST NATIONAL REPORT OF REPUBLIC OF ARMENIA

in accordance with Article 32 of the Joint Convention

22-10-2014

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List of Abbreviations

ANPP	Armenian Nuclear Power Plant
ALARA	As Low As Reasonably Achievable
AMD	Armenian Dram
AMP	Administrative Management Program
ANRA	Armenian Nuclear Regulatory Authority
ARS	Armenian Resque Service
BNRA	Bulgarian Nuclear Regulatory Authority
CA	Controlled Area
CJSC	Closed Joint Stock Company
CJSC “RHRW”	Rendering Harmless of Radioactive Waste CJSC
CMC	Crisis Management Center
DEF	Deep Evaporation Facility
DEVCO	Development And Cooperation
DSC	Dry Shielded Canister
DSNFS	Dry Spent Nuclear Fuel Storage
DSNFSF	Dry Spent Nuclear Fuel Storage Facility
EC	European Commission
ECT	Evaporator Concentrate Tank
EIA	Enviromental Impact Assesment
ERC	Emergency Response Centre
GRS	Gesellschaft Für Anlagen- Und Reaktorsicherheit
HL LW	High Level Liquid waste
HL ST	High Level Sorbent Tank
HL SW	High Level Solid Waste
HLW	High Level Waste
HSM	Horizontal Storage Module
I&C	Instrumentation and Control
IAEA	International Atomic Energy Agency
IL LW	Intermediate Level Liquid Waste
IL SW	Intermediate Level Solid Waste
ILW	Intermediate Level Waste
INSC	Instrument for Nuclear Safety Cooperation
IRSN	Institute De Radioprotection et de Sûreté Nucléaire
ISO	International Standardization Organization

LL ST	Low Level Sorbent Tank
LL SW	Low Level Solid Waste
LLW	Low Level Waste
LRW	Liquid Radioactive Wastes
MDE-8	Maximum Design Earthquake
ME&NR RA	Ministry of Energy and Natural Resources of Republic of Armenia
MES	Ministry of Emergency Situation
MSK-64	Medvedev – Sponheuer – Karnik Scale
NPP	Nuclear Power Plant
NRI Řež	Nuclear Research Institute Řežplc
NRSC	Nuclear and Radiation Safety Center
OSART	Operational Safety Review Team
PGA	Peak Ground Acceleration
QA	Quality Assurance
QAP	Quality Assurance Program
QMS	Quality Management System
RA	Republic of Armenia
RCC	Regional Crisis Center
RD	Reactor Department
RHRW	Rendering Harmless of Radioactive Waste
RW	Radioactive Waste
SAR	Safety Analysis Report
SFA	Spent Fuel Assembly
SNF	Spent Nuclear Fuel
SRS	Sealed Radionuclide Sources
SRW	Solid Radioactive Wastes
STUK	Radiation and Nuclear Safety Authority of Finland
SUJB	State Office For Nuclear Safety
TSO	Technical Support Organization
UJD SR	Slovak Nuclear Regulatory Authority
US DOE	U.S. Department Of Energy
US NRC	U.S. Nuclear Regulatory Commission
WANO	World Association of Nuclear Operators
WMDD	Waste Management and Decontamination Department
WWER	Water-Water Energy Reactor

SECTION A. INTRODUCTION

The National Parliament of the Republic of Armenia has ratified the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (hereinafter the Joint Convention) on 21 March 2013. The Joint Convention was entry into force in August 2013.

This is the first report of the Republic of Armenia; it presents the achievements and contributions to enhance the safe management of spent fuel and radioactive waste in country.

This report is prepared to meet the obligation for reporting under Article 32 of the Convention. It is structured in accordance with IAEA guidelines INFCIRC/604, Rev3. In order to provide fluent reading, certain information is provided in the form of attachments and referred to in the text. The information provided in the report presents the status at the 1 January 2014.

In the following sections, the fulfillment of each of Articles 3 to 32 of the Convention is evaluated separately.

SECTION B. POLICIES AND PRACTICES

Each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party shall also address its:

B1. , B3. Spent fuel and Radioactive waste management policy;

B2. Spent fuel management practices;

B4. Radioactive waste management practices;

B5. Definition, categorization and classification of radioactive waste.

B1., B3. Spent fuel and radioactive waste management policy

The RA Government protocol decree №43 as of 4 November 2010 on approval of the concept on safe management of radioactive waste and spent nuclear fuel in RA settles the objectives of the National Policy for safe management of radioactive waste and spent fuel in the Republic of Armenia.

During the development of the Policy document all the topics/typical elements highlighted in the IAEA Nuclear Energy Series No.NW-G-1.1 document on “Policies and strategies for radioactive waste management” and as well others specific to the circumstances of the Republic of Armenia were taken into consideration.

The National Policy represents the views of all of the stakeholders involved in spent fuel and radioactive waste management and reflects the official attitude of the Government towards spent fuel and radioactive waste management in the country. In order to implement the Policy and to specify the ways for achieving the goals identified in the Policy, the activities on development of SF and RW management strategy document were initiated in 2011. And, within the frame of EC Development and Cooperation (DEVCO) Programme, the development of “National Strategy on Radioactive Waste and Spent Fuel Management” started in September 2013 and is expected to be finalized at the end of 2015.

B2. Spent fuel management practices

The source of spent fuel is the Armenian NPP. When its service life is expired, during refueling of the reactor core, fuel assembly is discharged from the reactor core and placed in cell of the Unit № 2 storage pool. Refueling is performed once in a year, when the reactor is shut down,

depressurized and cooled down. Following discharge of spent fuel assembly from the reactor core it is tested for leak tightness. In case it is tight, a spent fuel assembly is placed in a cell of the storage pool. In case failed assemblies are detected they are placed in tight casings and stored in them.

Following the required storage time (3-5 years), spent fuel assemblies are relocated into the spent fuel storage pool of Unit № 1, where they are stored until reaching the parameters required for their transferring to Dry Spent Nuclear Fuel Storage (DSNFS) facility.

B4. Radioactive waste management practices

In Armenia the main producer of radioactive waste is the Armenian NPP. There are also other organizations (medical, industrial, etc.) which produce radioactive waste.

Armenian NPP

Radioactive waste at the Armenian NPP are generated during daily cleaning and decontamination of rooms in the controlled area, during decontamination and repair of equipment, implementation of repair works in the controlled area, etc. RW include also parts of process equipment not subject to decontamination or irradiated in the reactor, I&C, pipelines or safety valves, protective clothes and personnel protection equipment contaminated above the permissible values, filters of ventilation systems, selected sources of ionizing irradiation, instruments, waters from laundry, hatches, showers, etc.

According to the aggregate state radioactive wastes are divided into solid radioactive wastes (SRW) and liquid radioactive wastes (LRW) which in turn are classified according their activity to low level, intermediate level and high level radioactive waste.

Solid radioactive waste before transfer for storage to the storage systems undergoes preliminary treatment, including:

1. Collection;
2. Classification according to activity;
3. Fragmentation (if needed);
4. Packaging;
5. Placement in interim SRW containers;
6. Transportation and placement of SRW in corresponding storage systems.

Solid radioactive wastes are not processed at the Armenian NPP.

Liquid radioactive waste at the Armenian NPP are processed at the deep evaporation facility (DEF), the originated product (“salt cake”) is packed in metal containers (drums), where it is solidified (crystallized) and placed for temporary storage in the solid intermediate level waste storage system and on the roof of auxiliary building under the metallic shelter.

Rendering Harmless of Radioactive Waste

Some radioactive waste (institutional waste), mainly spent sealed sources and radioactive waste from medical, industry, research activities are also generated in Armenia, but the volume of such waste are much lower than that generated at Armenian NPP. This type of waste is stored in near surface radioactive waste storage facility (Radon type facility).

Radioactive waste before transfer to the near surface storage facility have to be packed in appropriate way and transferred to storage facility in special equipped truck to satisfy the transportation requirements established by Government Decree N 931 N as of 27.06.2002.

B5. Definition, categorization and classification of radioactive waste

The Article 3 of the Law on Safe Utilization of Atomic Energy for Peaceful Purposes provides the definition of radioactive waste as a radioactive material or as a surface contaminated radioactive material for which no further use is foreseen and which is subject to isolation from environment.

The Government Decree № 1489 as of 18.08.2006 on approval of Radiation Safety Rules includes the categorization of radioactive waste based on the following criteria:

- Aggregate state (Solid, Liquid, Gaseous)
- Radiation type (Alpha, Beta, Gamma)
- Activity content (LLW, ILW, HLW)
- Half-lives of the radionuclides contained in the waste (short-lived and long-lived).

The definitions of the different type of radioactive waste regarding its aggregate state are the followings:

Gaseous radioactive waste are radioactive gases and aerosols generated during industrial processes the specific activity of which exceed the permissible levels of specific activities specified in the Radiation Safety Norms.

Liquid radioactive wastes are organic and non-organic liquids, pulps and sludge for which no further use is foreseen and the specific activity of radioactive isotopes in case of interaction with water exceed the intervention levels specified by the Radiation Safety Norms for more than 10 times.

Solid radioactive wastes are radioactive isotope sources with expired lifetime, materials, goods, equipment, industrial objects, soil, as well as solidified liquid radioactive wastes for which no further use is foreseen and the specific activity of contained radioactive isotopes is above the clearance levels specified in the Radiation Safety Norms, and in case of indefinite composition of radioactive isotopes the specific activity exceeds:

- 100 Bq/g for beta radiation,
- 10 Bq/g for alpha radiation,
- 1,0 Bq/g for transuranium radioactive isotopes.

Based on the activity concentration of beta, alpha and transuranium isotopes in solid and liquid radioactive wastes, those are divided into 3 classes: low level activity, intermediate level activity and high level activity waste (see Table 1).

Table 1

Radioactive waste classification according to specific activity

Waste class	Specific activity of beta emitting radionuclides (Bq/g)	Specific activity of alpha emitting radionuclides (except for transuranium) (Bq/g)	Specific activity of transuranium radionuclides (Bq/g)
low level activity	Less than 10^3	Less than 10^2	Less than 10^1
Intermediate level activity	10^3 - 10^7	10^2 - 10^6	10^1 - 10^5
High level activity	$>10^7$	$>10^6$	$>10^5$

In addition, regarding operational practices, radioactive waste can also be classified according to dose rate (see Table 2) and surface contamination (see Table 3).

Table 2.**Radioactive waste classification according to dose rate**

Waste class	Dose rate (mSv/h)
Low Level Activity	0.001-0.3
Intermediate Level Activity	0.3-10
High Level Activity	>10

Table 3**Radioactive waste classification according to surface contamination**

Waste class	Activity Concentration of beta-emitting radionuclides (count/(cm ² × min))	Activity Concentration of alpha-emitting radionuclides (except for transuranium) (count/(cm ² × min))	Activity Concentration of transuranium radionuclides (count/(cm ² × min))
Low level activity	500-10 ⁴	50-10 ³	5-10 ²
Intermediate level activity	10 ⁴ – 10 ⁷	10 ³ – 10 ⁶	10 ² – 10 ⁵
High level activity	>10 ⁷	>10 ⁶	>10 ⁵

The RW classification is currently reviewed by the ANRA in order to harmonize with the IAEA proposed one stated in General Safety Guide No. GSG-1 “Classification of Radioactive Waste”. The below listed legislation sets the criteria for decision making on whether a material containing radioactive isotopes is not required to be under radiological regulatory control:

- The Section XI of Government Decree № 1489 as of 18.08.2006 on approval of Radiation Safety Rules describes the conditions of exemption/clearance of materials and specifies the radiological criteria used for the development of the exemption levels that is not to exceed an annual effective dose of 10µSv and the annual collective effective dose of 1 man*Sv, due to the use of materials containing radioactive isotopes in industrial practices. Such dose criteria are associated to a specific activity, and therefore are implemented as an additional dose due to natural radiation. That means that these dose criteria shall be applied as an increment to the dose due to the background radiation.
- The Government Decree № 1219 as of 18.08.2006 on approval of Radiation Safety Norms includes the levels for exemption/clearance of moderate amounts of radioactive materials and as amended by Government Decree № 1552 as of 25.11.2010 establishes the levels for exemption/clearance of bulk amounts of radioactive materials.

There are two approaches based on the knowledge about material radionuclides composition:

Approach 1. In case of indefinite composition of containing radionuclides.

There is no limitation on those used in practice solid materials, raw materials and goods which contain radioactive isotopes the specific activity of which does not exceed 0,3 kBq/kg. In agreement with the regulatory authority there may be specified higher levels of specific activities for specific beta radiation isotopes contained in materials, raw materials and goods useful for use without any limitation.

Under authorization of the regulatory authority materials, raw materials and goods containing radioactive isotopes with specific beta activity 0,3 -100 kBq/kg or specific alpha activity 0,3 - 10 kBq/kg or transuranium radioactive isotopes with specific activity 0,3 –1,0 kBq/kg may be used in limited amounts for specific purposes. These materials are subject to the mandatory radiation control.

Approach 2. In case of definite composition of containing radionuclides:

- Moderate amounts (less than 1 ton) of materials can be cleared from regulatory control if the values of specific activity and activity of artificial radioactive isotopes preset in these radioactive materials are below the levels specified by the Radiation Safety Norms (the values of specific activity and activity are identical with the values of exempt activity concentrations and exempt activities specified in the Table I-I of “International Basic Safety Standards for protection against Ionizing Radiation for the Safety of Radiation Sources”).
- Bulk amounts (more than 1 ton) of materials can be cleared from regulatory control if the values of specific activity of artificial radioactive isotopes preset in these radioactive materials are below the levels specified by the Radiation Safety Norms (the values of specific activities are identical with the values of activity concentration for radionuclides of artificial origin in bulk specified in the Table 2 of IAEA “Application of the Concepts of Exclusion, Exemption and Clearance”(IAEA Safety Guide No.RS-G-1.7).
- Radioactive materials containing radioactive isotopes of natural origin can be cleared from regulatory control if the values of specific activity of the radionuclides are below the levels specified by the Radiation safety Norms (the values of specific activities are identical with the values of activity concentration for radionuclides of natural origin specified in the Table 1 of IAEA “Application of the Concepts of Exclusion, Exemption and Clearance” (IAEA Safety Guide No.RS-G-1.7).
- Radioactive materials containing a mixture of radioactive isotopes of artificial origin can be cleared from regulatory control if the requirement (formula) specified by the Radiation Safety Norms is complied with (formula is identical with the one specified in the paragraph 4.7 of IAEA “Application of the Concepts of Exclusion, Exemption and Clearance” No.RS-G-1.7).

Radioactive materials containing a mixture of radioactive isotopes of natural origin can be cleared from regulatory control if the specific activity of each radioactive isotope preset in these radioactive materials is less than the relevant value of the specific activity specified by the Radiation Safety Norms (see 3rd bullet).

The exemption and clearance levels of radioactive materials are currently revised by the ANRA in order to bring in the line with IAEA General Safety Requirements Part 3 No. GSR Part3.

SECTION C. SCOPE OF APPLICATION

Article 3. Scope of application

Each Contracting Party shall state clearly the position as regards the following matters:

- (a) Whether the Contracting Party has declared reprocessing to be part of spent fuel management, pursuant to Article 3(1);*

Open nuclear fuel cycle scheme is used in Armenia. Currently the spent nuclear fuel is not reprocessed in Armenia and therefore spent nuclear fuel reprocessing is not declared to be part of spent nuclear fuel management, pursuant to Article 3(1).

- (b) Whether any waste that contains only naturally occurring radioactive material and does not originate from the nuclear fuel cycle has been declared as radioactive waste for the purposes of the Convention, pursuant to Article 3(2), and, if so, where this radioactive waste appears in the inventory; and*

Any waste that contains only naturally occurring radioactive material and does not originate from the nuclear fuel cycle has not declared as radioactive waste in Armenia for the purposes of the Convention, pursuant to Article 3(2).

- (c) Whether any spent fuel or radioactive waste within military or defense programs has been declared as spent fuel or radioactive waste for the purposes of the Convention, pursuant to Article 3(3).*

No nuclear material is used in military or defense program in Armenia. Any radioactive waste within military service or defense programs has not declared as a radioactive waste in Armenia for the purpose of the Convention, pursuant to the Article 3(3).

SECTION D. INVENTORIES AND LISTS

Each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall also include:

D1. List of spent fuel facilities

- (i) A list of spent fuel management facilities subject to this Convention, their location, main purpose and essential features;*

A list of spent fuel management facilities subject to this Convention, their location and main purpose is provided in Section L, Table 4. Essential features of the SNF facilities are described in section G2.

- (ii) An inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;*

Inventory of spent nuclear fuel is provided in Section L, Table 5. No spent fuel has been disposed in Armenia.

D2. List of radioactive waste management facilities

- (iii) A list of radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;*

There are two radioactive waste management facilities in Armenia:

- Armenian NPP
- Near surface institutional radioactive waste storage facility (Radon type facility).

Essential features of the radioactive waste management facilities are described in section H.

(iv) *An inventory of radioactive waste that is subject to this Convention that:*

(a) is being held in storage at radioactive waste management and nuclear fuel facilities;

Inventory of radioactive waste at Armenian NPP is presented in Section L, Table 6.

By the 1 January 2014 about 7035m³ of solid radioactive waste and about 2429 m³ of liquid radioactive waste was accumulated at ANPP.

Institutional radioactive waste inventory is presented in Section L. Table 7.

(b) has been disposed of;

There are no disposal facilities in Armenia for any category of radioactive waste.

(c) has resulted from past practices.

Inventory of radioactive waste which was generated from 1979 to 1 January 2014 is presented in Section L, Table 6.

(v) *A list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.*

In Armenian there are no facilities in the process of decommissioning.

SECTION E. LEGISLATIVE AND REGULATORY SYSTEM

E1. Implementing measures (Article 18)

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligation under this Convention.

The hierarchy of legislative framework of RA as follows:

- The Constitution of the RA has the highest legal force and its provisions are directly applied.
- Laws that should comply with the Constitution belong to the first level of legislative framework regulating the safety of spent fuel management and safety of radioactive waste management.
- Ordinances of the RA President, decrees of the RA Government and the RA Prime Minister belong to the second level of the legislative framework.
- Regulations approved by the ANRA Chairman, registered by the Ministry of Justice of the RA and named “ministerial normative legal acts” belong to the third level of the legislative framework.
- Guides, methodologies, industrial standards and so on belong to the forth level of the legislative framework.
- The intentional treaties of the RA are an integral part of the legislative framework and also belong to the first level of the legislative framework. If the international treaties ratified by the National Assembly of the RA stipulate provisions other than the ones stipulated in the law, the provisions of the ratified international treaties are applied. The list of international treaties ratified by the RA is provided in the Annex F.

E2. Legislative and regulatory framework (article 19)

- 1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.***
- 2. This legislative and regulatory framework shall provide for:***
 - (i) the establishment of applicable national safety requirements and regulations for radiation safety;***
 - (ii) a system of licensing of spent fuel and radioactive waste management activities;***
 - (iii) a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a license;***
 - (iv) a system of appropriate institutional control, regulatory inspection and documentation and reporting;***
 - (v) the enforcement of applicable regulations and of the terms of the licenses;***
 - (vi) a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management.***

National Safety Requirements and Regulations

The following laws directly pertain to the safety of spent fuel management and to the safety of radioactive waste management:

- On March 1, 1999 the National Assembly (Parliament) of the Republic of Armenia adopted the Law on Safe Utilization of Atomic Energy for Peaceful Purposes, which is the basic legal document for settling relations in the field of the atomic energy utilization and is called to ensure fulfillment of obligations of the RA under the international treaties in the field of atomic energy utilization. The amendment and supplements to the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes as of 30.09.2013 establishes provisions on accounting for and control of nuclear materials, requirements to accounting of nuclear materials at the nuclear facilities and locations outside the facilities on the levels of state and operator, exemption and termination of safeguards, submission of accounting reports and other issues related to the safeguards implementation.
- On May 30, 2001 (with further amendments as of 16 March 2004) the National Assembly of the Republic of Armenia adopted the Law on Licensing that establishes types of practices subject to licensing in the atomic energy utilization field and settles relations related to licensing.
- The Law of the RA on Environmental Impact Expertise as of 22.07.2014 specifies the activities that are subject to environmental impact expertise in the atomic energy utilization field.
- The Law of the RA on organization and conduct of inspections (№ N-172 17.05.2000) that settles relations concerned with organization and conduct of inspections and examinations of practices of entities as well as of individual entrepreneurs.
- The Code of the RA on Administrative Offenses, as amended in 1996. The amendments empower the ANRA to impose sanctions (fines) to offender of the legislation in the field of atomic energy utilization.
- On April 18, 2003 the National Assembly (Parliament) of the Republic of Armenia adopted the Criminal Code of the RA that specifies the types of crimes and liabilities in the field of atomic energy utilization.

- The Law of the RA on Population Protection in Emergencies (№ N-265 as of 09.12.1998) that establishes organization of population protection in emergency situations, rights and responsibilities of the state and local authorities, entities, officials and citizens involved in the national emergency response system. Decrees of the RA Government and the Prime Minister belonging to the second level of the legislative framework are specifically oriented and settle specific relations, for instance:
- The RA Government Decree № 631 as of 04.06.2009 on approval of Procedure on radioactive waste management designates the Ministry of Energy and Natural Resources as the state competent authority empowered with radioactive waste management related issues, specifies requirements to radioactive waste management in the RA, the functions of authorities involved in the management of radioactive waste and other relations related to radioactive waste management.
- The RA Government Decree № 1231-N as of 11.09.2003 on approval of the concept of physical protection and security of the Armenian NPP and nuclear materials and rules on physical protection of nuclear installations and nuclear materials that specifies the requirements to physical protection of nuclear facilities and nuclear materials, functions of responsible state authorities, legal entities and physical persons, requirements to notification of events concerned with physical protection of nuclear installations and nuclear materials and other issues.

The list of legally binding acts belonging to the second level of the legislative framework is provided in the Section L.

Legally binding acts, that are approved by the Chairman of Armenian Nuclear Regulatory Authority (hereinafter referred to as the ANRA) and registered by the Ministry of Justice of the RA, are adopted in pursuance of the legal acts of higher legal force. These legal acts belong to the third level of the legislative framework and settle specific issues. For instance the NPP emergency planning zones were approved under the order of the ANRA Chairman adopted on 27.03.2007 and registered in the Ministry of Justice of the RA under № 12506129 as of 04.05.2008.

The list of ministerial normative legal acts is provided in the Section L.

The relations concerned with development, agreement and approval of legal acts are settled by the Law of the RA on Legal Acts and the Ordinance of the RA President.

Licensing related relations are settled under the Law of the RA on Licensing, the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes and the relevant licensing procedures approved by the RA Government.

The following practices in atomic energy utilization field are subject to licensing:

- Site selection, design, construction, operation, and decommissioning of nuclear installations;
- Use, transport and storage of nuclear materials;
- Physical protection of nuclear installations and nuclear materials;
- Expertise of designs and other documents of nuclear installations,
- Physical persons implementing practices and holding positions important to safety in atomic energy field and other.

The licensing is implemented being subject to the complex procedure: licensing of specific type of practice is specified in respective licensing procedures (approved under the RA Government Decree). For instance, the RA Government Decree № 702 as of 19.05.2005 on approval of

licensing procedure and license form for operation of radioactive waste storage facilities specifies the requirements to licensing of radioactive waste storage facility operation, the list of application supporting documents, the requirements mandatory for obtaining a license, the provisions related to review of application supporting documents, to control over implementation of license conditions and other issues.

The ANRA reviews application for obtaining licence for construction, operation and decommissioning of nuclear installations and of nuclear facilities within 30 days after receiving all documents as required in the law, and grants or rejects licence within 180 days after all documents are submitted.

The Law of the RA on Licensing specifies also provisions for extension of licence validity period.

The ANRA establishes a licensing commission to make conclusions on granting, termination or revocation of license; the statute of licensing commission is approved by the ANRA.

Provisions related to public involvement and awareness of Object important in terms of atomic energy safety construction are specified in the Law of the RA on Environmental Impact Expertise (Articles 6), the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes (Article 10).

In accordance with the Code of the RA on Administrative Offences a legal entity has no right to implement the practices subject to licensing without a license, otherwise administrative or criminal liabilities shall be applied. In accordance with the Article 169 of the Code of the RA on Administrative Offences the implementation of a practice without licence is subject to fine at the rates specified in the legislation. The Article 188 of the Criminal Code of the RA stipulates provisions related to implementation of activities without special permit (license), causing losses to the citizens or commercial organizations and other as well as enforcement actions to be imposed for each offence.

The right of the ANRA to impose enforcement actions is established in the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes, the Law of the RA on Licensing and the Code of the RA on Administrative Offences.

The ANRA has developed a strategic plan that provides a realistic and balanced approach for improving the functioning of the regulatory body in all aspects which are part of its mission and identifies the managerial, technical and administrative issues that are typically applicable by the regulatory body.

The inspection is one of the major functions of the ANRA to satisfy itself that the Armenian NPP, that is spent fuel and nuclear waste management facility, and the “Rendering harmless of radioactive waste” CJSC, that is institutional waste management facility, fulfill the terms and conditions set out in the authorizations and the ANRA requirements. The ANRA’s inspections are organized and conducted in accordance with the Law on Safe Utilization of Atomic Energy for Peaceful Purposes, the ANRA statute and the Instruction on organization and conduct of inspections. The ANRA organizes inspections based on the 3-years baseline inspection program. Annual inspection plan is organized based on the mentioned program. There are planned and reactive inspections, that it its turn can be announced and unannounced. Reactive inspections are conducted as appropriate. In case of announced inspections the operating organization is notified in advance. Unannounced inspections can be conducted without prior notification. By the content of subject inspected, inspections can be complex, special and routine. Inspection consists of three stages:

- Preparations to conduct an inspection;
- Conduct of inspection;

- Recording of inspection results.
The ANRA Chairman issues order on appointment of an inspection team to conduct the inspection.
Experts or specialists of the ANRA TSO can be involved in inspections. An inspection program and plan are developed prior to inspection. The inspection program includes:
- Objective of inspection;
- Issues to be inspected;
- Structural divisions of facility to be inspected;
- Inspection periods.

The inspection program is approved by the ANRA Chairman.

The inspection team collects the following information prior to an inspection:

- Safety norms and rules related to the inspected subject;
- Documents related to the organizational structure of the operating organization, quality assurance program for practices implemented by the licensee and related to the inspected subject;
- Terms and conditions of licenses/permits issued by the ANRA to the operating organization;
- Enforcement actions imposed by the ANRA earlier and information on their implementation,
- and also reporting documents developed based on results of earlier conducted inspections.

The inspection program and plan are transmitted to the licensee not later than in 10 working days before inspection.

Visit to industrial areas, workplaces, observation of systems and elements important to safety are implemented in the order established at the operating organization.

Deficiencies detected during inspections are recorded and discussed at the final meeting with the management and responsible officials of the operating organization.

Inspection results are recorded in the form of reports if violations of safety requirements are not detected or act-enforcement if a non-compliance with the safety requirements is detected.

The following is indicated in the act-enforcement:

1. Fact of non-compliance with safety requirement;
2. Points of articles with indication of legal acts, norms and rules in atomic energy utilization field non-complied with;
3. Requirements to eliminate deficiency detected;
4. Deadline for elimination of deficiency.

Report and act-enforcement are signed by the inspection team chairman, all members of the inspection team and transmitted for signature to the manager of operating organization.

Routine inspections of Armenian NPP are conducted by the resident inspector. When detecting non-compliances with the safety requirements the resident inspector issues enforcement to the NPP director and informs ANRA about it.

The ANRA controls over fulfillment of its act-enforcements and enforcements through:

1. Receiving and review of information on fulfillment of requirements of act-enforcements and enforcements and control over timeliness of its submission;
2. Verification of fulfillment of act-enforcements and enforcements.

The right of the ANRA to impose enforcement actions is established in the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes, the Law of the RA on Licensing and the Code of the RA on Administrative Offences.

The Articles 36 and 37 of the Law of the RA on Licensing specify the cases for suspension and termination when the ANRA has right to suspend and terminate a licence.

The Code of the RA on Administrative Offences (Articles 97-97⁶) specifies the types of administrative offences in the atomic energy utilization field and the types of enforcement actions (fines) applied by the ANRA. The process of application of enforcement actions starts with drawing up a protocol on administrative offence. The protocol should indicate date and place, name and surname of person drawing up the protocol, information on person committed an offence, time and place where the offence was committed, subject-matter of offence, the normative document which establishes liability for the present offence, explanatory note of the offender, other information related to the case. The protocol is signed by the person drawn up the protocol and by the person committed the offence (offender). If the offender refuses to sign the protocol, the indication on that should be appropriately made. The offender has right to give explanations and comments to the protocol content which are to be attached to the protocol, as well as to express in writing reasons of his refusal to sign the protocol. While drawing a protocol the offender is notified of his rights and responsibilities and this is relevantly indicated in the protocol. The protocol is the basis for investigation of a case with offence. Authority (official) investigating the case when detecting causes and conditions resulting in administrative offence, makes relevant proposals on undertaking measures intended to eliminate those causes and conditions.

Having investigated the case on administrative offences the official makes one of the following decisions:

- Impose administrative penalty;
- Withdraw the case.

Decision on administrative offence is mandatory for implementation by state and public authorities, entities, officials and citizens. Decision on the case on administrative offence can be appealed in court by person to whom it was applied as well as by aggrieved party.

Thus, the RA has established and maintains the legislative and regulatory framework for Atomic Energy Utilization Object safety that includes:

- Establishment of relevant national requirements and regulations on safety,
- System for licensing of nuclear installations and nuclear facilities and prohibiting to operate them without licence,
- System of regulatory inspections and assessment to confirm the compliance with the requirements specified in the regulations and licence terms,
- Enforcement of requirements specified in the applied regulations and licence terms, including suspension, modification and termination of licence.

E3. Regulatory authority (Article 20)

- 1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.***
- 2. Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure an effective independence of regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation.***

Establishment of the Regulatory Body

ANRA was established under the RA Government Decree № 573 as of 16 November 1993 as a state authority under the RA Government empowered to regulate the nuclear and radiation safety in the atomic energy utilization field. In the period 2002-2008 the ANRA functioned within the Ministry for Nature Protection of the RA in the status of the inspectorate; in May 2008 under the Ordinance issued by the RA President the inspectorate was reorganized into the State Committee under the Government of the RA on Nuclear Safety Regulation (hereinafter referred to as the ANRA). The statute and the organizational chart of the ANRA were approved under the RA Government Decree № 866 as of 17 June 2008.

The ANRA is the republican body of the executive power implementing the state regulation of the atomic energy utilization field aimed to ensure the safety of population and personnel, environmental safety and to defend safety interests of the Republic of Armenia. The ANRA Chairman is appointed and dismissed by the RA Prime Minister. The ANRA Chairman reports to the RA President, RA Government and RA Prime Minister. The ANRA does not report to any other authority or ministry.

The ANRA is independent from the agencies responsible for promotion of nuclear energy, has its independent budget (is directly financed from the state budget); the ANRA's jurisdictions are established in the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes (Articles 17, 17¹) and its Statute.

In accordance with the above mentioned legal acts the ANRA's jurisdictions are:

- 1) Organization of development, development and submission of drafts of safety norms and rules, legal acts related to the atomic energy utilization field to the RA Government in accordance with the established procedure;
- 2) Licensing of practices and physical persons implementing practices and holding positions important in terms of safety in the atomic energy utilization field;
- 3) Suspension or termination of license in accordance with the requirements of the international treaties and the RA legislation when non-compliance by a licensee with license terms and conditions is detected;
- 4) Safety assessment, organization and conduct of expertise of practices, installations and equipment in the atomic energy utilization field;
- 5) Organization and conduct of researches for safety strengthening purposes in the atomic energy utilization field;
- 6) Control over compliance with requirements of the RA laws related to the atomic energy utilization field as well as terms and conditions of issued licenses by legal entities and physical persons;
- 7) Verification of QA programs of contractors implementing safety important activities and rendering services to licensees in the atomic energy utilization field;

- 8) Control on preparedness of licensees to possible emergency situations;
- 9) In case of emergencies, assessment of situation and on the basis of prognosis on its possible changes submission of proposals on implementation of necessary protective actions to the state authority of the RA empowered with the responsibility for emergency situation related issues;
- 10) Jointly with the authority empowered with responsibilities for foreign affairs within its jurisdictions control over fulfillment of the RA of commitments undertaken under the international treaties of the RA in the atomic energy utilization field;
- 11) Control on safeguards implementation;
- 12) Imposing sanctions to licensees binding for implementation when non-compliance with requirements specified in the RA legislation related to the atomic energy utilization field and with terms and conditions of issued licenses is detected, and issuing order for termination of activities being implemented in case of threat to the human health and the environment;
- 13) The right to stop immediately the Armenian NPP operation rests with the Chairman, his relevant deputy and the site inspector;
- 14) In accordance with the RA legislation, imposing administrative offences to licensees breaching the RA laws related to the atomic energy utilization field, safety norms and rules; requirements of sanctions imposed, and in the order established in the law, transmission of the materials related to breach to the law enforcement authorities;
- 15) With the purpose to determine the condition of nuclear and radiation safety, inspection of atomic energy utilization installations and of activities carried out there freely, using the necessary measurement and registration instruments, including audio and video recorders, entering industrial sites of atomic energy utilization objects freely, taking needed samples and obtaining data, installing necessary devices;
- 16) Involving in the established order specialists from the RA ministries, other state authorities, organizations as well as international organizations in inspection practices;
- 17) Assessment of investigations conducted by operating organization in relation to nuclear and radiological emergencies taken place during operation of atomic energy utilization installations and implementation of additional investigation, as necessary, in accordance with the procedure established by the RA Government and development of database of deficiencies;
- 18) State registration of nuclear materials, ionizing radiation sources and radioactive waste;
- 19) Providing information to state and local authorities, physical persons and mass media on nuclear and radiation safety in accordance with the procedure established in the RA legislation;
- 20) Cooperation with international and foreign competent organizations on safety regulation related issues;
- 21) Coordination of the RA national and regional projects in frame of technical cooperation with the IAEA;
- 22) Making early international notification on an emergency, in accordance with the provisions of the Convention on Early Notification in case emergencies at the atomic energy utilization installation or in activities implementing there;
- 23) Once a year submitting a report to the RA Government on nuclear and radiation safety situation in the RA, its separate regions or separate atomic energy utilization installations;

- 24) State regulation (within its jurisdictions) of physical protection of nuclear and radioactive materials and atomic energy utilization installations jointly with the RA police and state authority empowered with national security related issues;
- 25) Obtaining information necessary for nuclear and radiation safety assessment from state authorities and organizations in accordance with the procedure established in the RA legislation;
- 26) Adopting ministerial acts;
- 27) Monitoring and controlling exposure to environmental radiation.

The organizational structure of the ANRA is as follows (see figure 1):

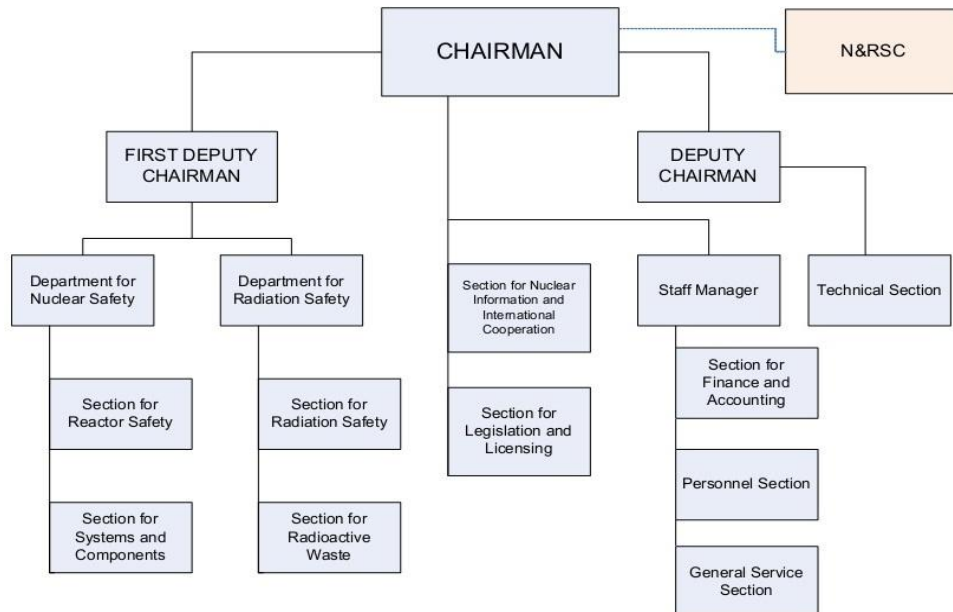


Figure 1: The organizational structure of the ANRA

The ANRA staff list as of 01.01.2014 includes 44 positions. At present 38 out of 44 positions are occupied at the ANRA; 27 out of 38 are the professional staff, 5 out of 27 have PhD, 18 have more than 10 years' experience in the atomic energy utilization field and 7 out of those 18 have 5-years work experience at the Armenian NPP. The dynamics of ANRA staffing is show on figure 2

The ANRA organizes training of new staff in accordance with the individual programs consisting of theoretical (on the jog self-training) and practical trainings. The resources of the IAEA, US NRC and EC cooperation programs are used for implementation of separate tasks concerned with training, improvement and maintaining of the personnel qualification.

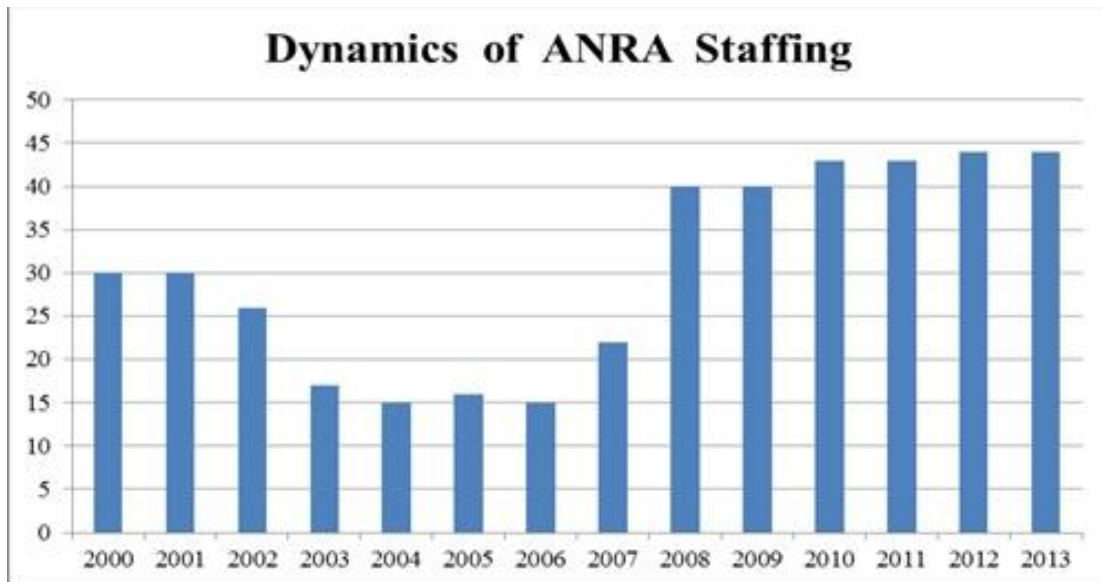


Figure 2: Dynamics of ANRA staffing

The ANRA is financed from the State Budget of the RA. The budget for 2014 is 226 million Armenian Drams (AMD) (approximately 546.000 USD) 2010 is 191.17 million Armenian Drams (AMD) (approximately 500,000 USD), which is for 34.83 million AMD more than in 2010. 48 million AMD are intended for funding the technical support organization of the ANRA – the Nuclear and Radiation Safety Center.

To function effectively and to continually improve the ANRA performance the ANRA has established a process oriented quality management system (QMS) which was certified for conformity with the requirements of ISO 9001-2000 standard. The ANRA QMS is represented in the management handbook. The ANRA QMS is a set of interrelated or interacting processes that establish policies and objectives and which enables those objectives to be achieved in safe, efficient and effective manner. At present measures to improve and extend the existing quality management system and transition to the Integrated Management System managing the totality of objectives (Safety – Health – Environmental – Security – Quality – Economic – Others) are planned, allowing implementation of 10 fundamental safety principles described in the IAEA Integrated Safety Fundamentals, Vienna 2006.

To improve safety and physical protection of nuclear facilities and nuclear materials, to promote non-proliferation and to prevent illicit trafficking of nuclear materials the ANRA cooperates with the international organizations and regulatory authorities of other countries to harmonize Armenia’s policy in the atomic energy utilization field.

Under the cooperation agreements and the technical cooperation projects of the IAEA and EC, ANRA cooperates with the following organizations:

- United States Nuclear Regulatory Commission (US NRC) in frame of the Arrangement between the ANRA and The United States Nuclear Regulatory Commission on the Exchange of Technical Information and Cooperation in Nuclear Safety Matters (signed 15 March 2007)
- Rostekhnadzor in frame of the Agreement between the Federal Authority of Russia on Nuclear and Radiation Safety and the State Authority of Armenia on Nuclear and Radiation Safety (23 May 1994).

In frame of EC Projects the ANRA cooperates with:

- Bel V, (a subsidiary of the Federal Agency for Nuclear Control), Belgium
- Bulgarian Nuclear Regulatory Authority (BNRA), Bulgaria

- Gesellschaft für Anlagen- und Reaktorsicherheit (GRS), Germany
- Institut de Radioprotection et de Sûreté Nucléaire (IRSN), France
- Nuclear Research Institute Řežplc (NRI Řež), Czech Republic
- Radiation and Nuclear Safety Authority of Finland (STUK),
- Slovak Nuclear Regulatory Authority (UJD SR),
- State Office for Nuclear Safety (SUJB), Czech Republic

The ANRA has no advisory committees. A nuclear energy safety council under the RA President was established under the Ordinance NH-606 issued by the RA President on 3 July 1996 (the statute was approved under the President Ordinance NH-679 as of December 19 1996). The main tasks of the council are:

- Formulation of trends on nuclear safety and its development priorities, development of instructions and development of proposals on principal tasks,
- Analysis and expertise of legal acts on safe and peaceful use of atomic energy submitted to the RA President.

The council implements its activities through meetings. The meetings are convened at the initiative of the RA President or members of the council in agreement with the RA President based on the nuclear safety process not less than once a year. The council is composed of world authorities in nuclear science and engineering. In accordance with the RA Prime Minister decree the ANRA submits report to nuclear energy safety council under the RA President on the ANRA`s activities performed, nuclear and radiation safety of the RA, its certain territories and nuclear installations.

The state republican authorities are the ministries of the RA, state authorities under the RA Government. The RA Government structure and the place of the ANRA within the structure is as follows (see figure 3):

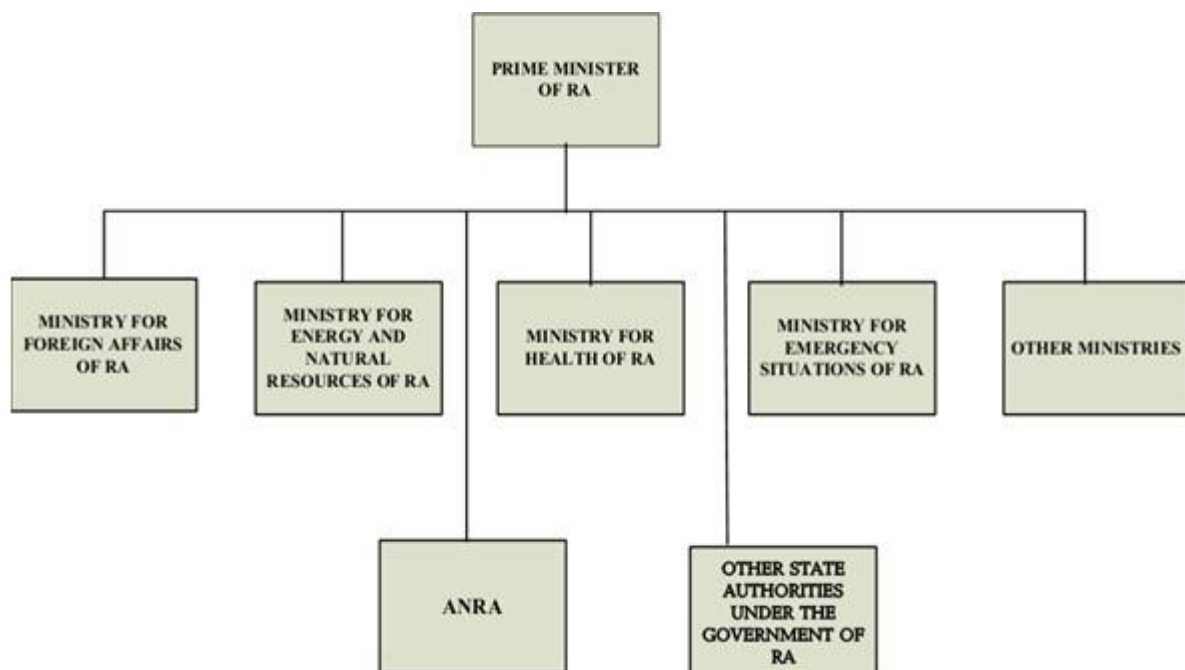


Figure 3: RA Government structure and the place of the ANRA within the structure

In accordance with the Article 17 (j) and its statute the ANRA submits annual report to the RA Government on nuclear and radiation safety of the RA, its certain territories and nuclear installations.

Thus, the ANRA for nuclear safety regulation has been established at the RA; it is provided with relevant jurisdictions, human and financial resources and there is an effective separation between the functions of the ANRA from the agencies responsible for promotion of nuclear energy.

The ANRA receives the technical support in implementation of the ANRA functions from the NRSC established under the Government Decree № 342 as of 25.04.2001. The NRSC hires experts on contractual basis and employs 33 permanent staffs, including:

- Physicists: 11;
- Engineers: 8;
- IT: 3;
- Management and administration: 11;

Among whom:

- PhD holders: 6;
- PhD students: 4.

The Nuclear and Radiation Safety Center provided technical and expert support to the ANRA in the following areas:

- Expertise of technical solutions and documents on safety justification in frame of licensing the Armenian NPP safety upgrades;
- Technical support at licensing of ionizing radiation sources;
- Expertise and review of the revised SAR of the Armenian NPP Unit №2;
- Technical support of the inspection activities of nuclear facilities, ionizing radiation sources, radioactive waste storage and disposal facilities;
- Development and review of the documents for regulation and control of the radiation safety, radioactive waste management and decommissioning;
- Drafting of the Design Safety Requirements;
- Review of the SAR of Spent Fuel Storage;
- Participation in seismic safety upgrading program;
- Participation in PSA Level 1 developments;
- Development of procedures for ERC of ANRA;
- Participation in radiation sources registration and licensing process.

The technical and expert support of the NRSC allows the ANRA to make decision on nuclear and radiation safety regulation with better quality and in a timely manner. With the NRSC's support the ANRA organizes training and retraining of its personnel, including on the job training and training in the international courses.

SECTION F. OTHER GENERAL SAFETY PROVISIONS

F1. Responsibilities of license holders (Article 21)

In accordance with the Article 19, paragraph 2 of the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes of the Armenian NPP the prime responsibility for safe operation of safety important installation rests with the operating organization.

In accordance with the Article 20 of the Law on Safe Utilization of Atomic Energy for Peaceful Purposes the operating organization:

- Develops and implements safety measures in the atomic energy utilization object;
- Ensures that a safety culture is maintained;
- Periodically submits reports in the manner prescribed on the safety of the object to the ANRA;
- Ensures that nuclear, radioactive and special materials, special equipment and technologies are put to useful purposes;
- Ensures the physical protection of atomic energy utilization object, nuclear, radioactive and special materials, special equipment and technologies;
- Develops the quality assurance program for each stage in the lifetime of the atomic energy utilization object (site selection, design, construction, commissioning, operation, decommissioning) and ensures its implementation;
- Organizes the control of dose limits amongst personnel in the manner prescribed;
- Organizes the accounting and control of nuclear, radioactive and special materials and radioactive waste;
- Organizes and conducts investigations in the manner prescribed into incidents and accidents occurring during the operation of atomic energy utilization installations;
- Develops the response plan in the manner prescribed for emergencies occurring in the atomic energy utilization object and ensures the preparedness of personnel and the necessary resources for its implementation;
- Develops the programs of activities for protection against fire in the atomic energy utilization installation and ensures its implementation;
- Organizes the recruitment and training of skilled personnel to work in the atomic energy utilization object, or with nuclear and radioactive materials;
- Ensures that the health and social conditions governing the personnel of the atomic energy utilization object are in accordance with the current regulations;
- Carries out periodical safety assessments of the object to ascertain its compatibility with the most recent safety requirements;
- Performs other authorities determined by this Law and other legislative and legal acts of the Republic of Armenia.
- The operating organization of the atomic energy utilization object carries out the following tasks important in terms of safety:
 - Establishes the services that control the nuclear and radiation safety;
 - Organizes the permanent control over the radiation situation in the controlled and supervised areas of the atomic energy utilization object;
 - Provides periodically the governor (mayor of Yerevan) of the territory included in the supervised area of the atomic energy utilization object with information in the established order on the radiation situation in the supervised area.

F2. Human and financial resources (Article 22)

F2.1. Human resources

Armenian NPP

Recruitment, training and permit-to work and control of personnel during NPP operation is organized in accordance with the “Main provisions on recruitment, training and permit-to-work

and control of personnel during NPP operation”. Based on the mentioned regulation and the IAEA Safety Standards Series No. NS-G-2.8 “Recruitment, Qualification and Training of Personnel for Nuclear Power Plants”, the Armenian NPP developed the documents that specify personnel recruitment, training and qualification related issues.

The Armenian NPP personnel training and qualification maintaining are implemented according to the approved standard and individual programs where the types of training and their sequence are determined. Centralized training on theoretical part is conducted in the Training Centre of the Armenian NPP during the initial training, qualification maintaining and simulator training.

The Armenian NPP is organised in several departments. The personnel dealing with radioactive waste and spent fuel management has adequate qualification and experience in the field.

Handling of radioactive waste is the responsibility of the Waste Management and Decontamination Department (WMDD) and Reactor Department (RD). WMDD is also responsible for decontamination activities.

The Nuclear Safety and Reliability Department is responsible for nuclear materials accountability and control, as well as for spent fuel management.

Personnel Qualifications and Experience

All technical positions at the Armenian NPP are assessed. The minimum requirements in terms of educational qualification, number of years of experience at relevant positions and certified competence to undertake certain tasks are assured by the Armenian NPP.

The qualifications consist of the basic formal education and of special knowledge. The courses and training exercises are organized by the Training Centre of the Armenian NPP, which also takes care of qualification record keeping.

Training

All personnel working at the plant receive basic introductory training. The training course is comprehensive addressing inter alia: organisational arrangements, area designations and arrangements for working in the radiological controlled areas, plant layout and services, industrial safety and emergency response.

Training in radiological protection is given at different levels of complexity, depending on the level of responsibility of the employee. A basic training course is given to all personnel before entering a radiologically controlled area, with the objective of ensuring that they have sufficient understanding of the principles of ionizing radiation to enable them to work safely in the controlled area.

Personnel dealing with radioactive waste and spent fuel are educated and trained to perform their duties. Special training is provided through participation in the Regional and Interregional IAEA training courses, workshops/seminars and the scientific visits. Experience exchange is also provided through the EC Nuclear Safety Program – On-Site Assistance to Armenian NPP.

Near surface institutional RW storage facility

The maintaining of “Rendering Harmless of Radioactive Waste” CJSC personnel qualification is implemented according to the individual programs where the types of training and their sequence are determined.

Newly appointed employee is permitted to the independent work after special theoretical and practical training and the examination. Periodic examination of knowledge of the staff is held once a year and the results are correspondingly recorded.

The participation of the staff in Regional and Interregional IAEA training courses and workshops ensures the required knowledge and skills in radioactive waste management field.

F 2.2. Financial resources

In accordance with the Article 19¹ of the Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes the operating organization from a product consumption (services rendered) shall allocate normative financial assignments for nuclear, radiation, and technical safety, fire protection, physical protection, nuclear material account and control, implementation of safety upgrades, scientific and technical support, as well as securities needed for storage of spent nuclear fuel and for decommissioning.

Financial securities for decommissioning of nuclear installations are accumulated on a special account of the Ministry of Finance and Economy of the RA. The use of these financial means in other purposes is prohibited. Then the RA Government adopted decree №1637-N as of 12 October 2006 on opening a special account for decommissioning of the Armenian NPP that establishes the procedure of servicing and transfer of amounts to the account and reporting.

The institutional radioactive waste management is financed from the country state budget.

F3. Quality Assurance (Article 23)

Armenian NPP

The Armenian NPP is operated in compliance with the existing Quality Assurance Program “Operation of the Armenian NPP” (hereinafter, QAP). The QAP was developed in compliance with the requirements, principles and approaches of the following scientific and technical documentation (STD):

- GS-R-3 “Management system for facilities and activity”, IAEA, 2006;
- GS-G-3.1 “Application of the management system for facilities and activity”, IAEA, 2006;
- GS-G-3.5 “Management system for nuclear facilities”, IAEA, 2009;
- GOST ISO 9001-2011 “Quality management systems. Requirements”, 2011 г.;
- STO1.1.1.01.0678-2007 “Utility standard. General rules of nuclear power plants operation”, Rosenergoatom Concern, 2007; PNAE G-01-011-97;
- NP-001-97 “General regulations for nuclear power plants safety” OPB-88/97, (PNAE G-01-011-97), Moscow, 1997;
- NP-011-99, “Requirements to quality assurance of nuclear power plants”, Moscow, 1999.

In the hierarchic structure of Armenian NPP operating organization’s internal documentation the QAP in the area of quality takes the highest level. The QAP includes brief description of management processes for all activity areas, including management of nuclear fuel and radioactive waste (RW), and also references to the lower level documents, i.e., Administrative Management Program (AMP), and more detailed documents (guidelines). The AMP and the guidelines describe these processes as a whole and in more detail in compliance with clear distribution of duties and responsibilities of corresponding officials. At the same time the requirements of these documents in regard to specific activity area and its sub-processes are established based on the QAP requirements and relevant STD for specific activity types.

Thus, the activity related to nuclear fuel management corresponds to the AMP “Management of nuclear fuel” and a number of guidelines which describe in detail all nuclear fuel management sub-processes, including spent nuclear fuel (SNF). In addition, another guideline was developed for quality assurance of the Spent Fuel Dry Storage Facility, including all requirements to SNF management administrative structure (also defining the duties); training and qualification of corresponding staff; documentation and record management; implementation of works; management of discrepancies and corrective actions, etc.

In general the activity on RW management is regulated with the AMP “Management of industrial waste and effluents”, and a number of guidelines defining the procedure of work implementation regarding solid radioactive waste, liquid radioactive waste, and gaseous radioactive waste, storage systems for RW, and also control and accounting of RW.

Also, some guidelines were developed for quality of operation of RW storage systems, and quality of activities related to RW collection, its preliminary treatment and packaging. These documents also define a detailed procedure for implementation of all activity types in the framework of RW management activity.

The Armenian NPP developed a quality audit program. It is aimed at quality control of implementation of STD and internal documentation requirements in the quality area, and for systematic assessment of all implemented activity types. Thus, the activity on management of SNF and RW is regularly controlled by the operating organization, and corresponding corrective actions are taken to remove the identified deficiencies.

Near surface institutional RW storage facility

CJSC "Rendering Harmless of radioactive waste" developed and applies quality assurance program (hereinafter QAP) according to the law of the Republic of Armenia on Safe Utilization of Atomic Energy for Peaceful Purposes as well as the provisions of the IAEA Standards and Guidelines.

The objective is to regulate all activities in area of quality assurance aimed at the implementation of the basic criteria and guidelines for the safe operation of storage facility.

QAP is a document of the highest level in the hierarchy of documentation of CJSC “RHRW”.

Quality system and quality management of all activities and at all levels include a variety of elements:

- private awareness of the importance of security and commitment to the common goals of security;
- effective organizational management structure with strict of rights, duties and responsibilities of the staff;
- relevant knowledge and expertise provided through the training and retraining of staff and the availability of the necessary detailed instructions;
- staff motivation through effective methods and principles of management, clear objectives and establishing a system of rewards and punishments;
- control and supervision, including the diverse practices of inspections, regulations and audits, as well as readiness to respond adequately to the critical position of individuals;
- System documentation describing all the procedures for the implementation of the various activities, as well as reflecting the results of ongoing work.

F4. Operational radiation protection (Article 24)

Armenian NPP

The Armenian NPP management adheres to the policy of absolute safety priority over other concerns and considers the dose optimization principle as the most important means to decrease exposure of personnel working in conditions of ionizing radiation as stated in “Armenian NPP Management Declaration about the Policy in the Area of Radiation Safety”.

Objectives, criteria, procedures, administrative limitations in the part of radiation safety are being set taking into consideration:

- Requirements of standard documents;

- International practice in the area of radiation safety;
- Available operational experience of the Armenian NPP and other NPPs;
- decrease of NPP impact on environment;

The efficiency of the Armenian NPP radiation safety is evaluated with the following indicators:

- Maximum individual dose;
- Personnel collective dose;
- Amount of radioactive substances in airborne release;
- Amount of liquid radioactive substances in effluents;
- Number of personnel radiation contamination cases;
- Number of radiation incidents subject to reporting.

When assessing the radiation safety efficiency the above mentioned indicators and corresponding standards ratio, dynamics of indicators, their comparison with the similar values, characterizing radiation safety condition at other similar NPPs, are considered.

For the practical implementation of the radiation protection optimization at the Armenian NPP the ALARA Committee and ALARA Engineering Group are established. The ALARA Committee and the ALARA Engineering group work on continual basis in close contact with all the ANPP departments participating in activities with ionizing radiation sources, and implement activities on the Armenian NPP radiation protection optimization according to the requirements of the “Armenian NPP radiation protection management optimization according to ALARA principle” program. Based on the results of the ALARA Committee activity an annual report is issued, which is the part of the Armenian NPP industrial activity annual report.

With the purpose of the ALARA principle further implementation at the Armenian NPP the “Program of the Armenian NPP Radiation protection for 2012” was developed which sets the objectives and tasks for minimization of the radiation impact and ensuring the effective radiation protection for the Armenian NPP personnel. It is aimed at maintaining the annual personnel collective dose rate as low as reasonably achievable.

The tasks were the following:

- Non exceeding of annual personnel collective dose above 1,0 man*Sv,
- Non exceeding of personnel collective dose during outage above 0,87 man*Sv ,
- Non exceeding annual individual dose above 18 mSv,
- Maintaining airborne release value lower than the administrative levels:
 - Noble radioactive gas – $40 \cdot 10^{12}$ Bq/year
 - Long-lived nuclides – $80 \cdot 10^6$ Bq/year
 - Iodine – $30 \cdot 10^6$ Bq/year
- Maintaining the amount of liquid radioactive effluents below the administrative levels - $\Sigma\beta_{act} = 3,7$ Bq/l,
- Reducing the number of contaminated people.

The majority of the personnel annual effective dose consists of the doses received by the personnel implementing radiation hazard operations during the annual outage and refueling: non-destructive testing, decontamination works, repair works on systems and components. These activities are mainly performed by the Armenian NPP personnel and this explains the difference in doses received by the personnel and contractors.

Near surface institutional RW storage facility

The mechanism of waste storage in near surface institutional waste storage facility is appropriate from a radiation safety perspective. To comply with the essence of the ALARA principle

the "RHRW" CJSC sets goals for dose rate for the personnel who may be exposed during waste management. The following operations carried out at the storage facility to provide radiological protection to the public.

- The waste and sources are monitored prior to placement in a drum
- The facility sets a surface dose rate limit of 2mSv/h and a dose rate limit at 1m from the drum of 0.1mSv/h
- The drums are placed in underground vaults covered with 2.7t concrete slab.

In addition, radiation monitoring surveys are carried within and around the storage facility. The results demonstrate that the environmental radiation levels around the facility are within background level. All three storage buildings are equipped with a radiation alarm and the first building, where the wastes are stored, is equipped with motion sensors and video cameras.

F5. Emergency preparedness (Article 25)

In Armenia the main legal act settling relations concerned with response to nuclear and radiation emergencies are:

- Law of the RA on Safe Utilization of Atomic Energy for Peaceful Purposes;
- Law of the RA on Population Protection During Emergencies;
- Plan on Protection of Population in case of Nuclear and Radiation Emergencies at Armenian NPP (off-site emergency plan of Armenian NPP) approved under the Government Decree № 2328 as of 22.12.2005 as amended in 2008, 2009;
- “Armenian NPP emergency response plan to nuclear and/or radiation emergencies (On-site plan of the Armenian NPP);
- Basic requirements to emergency planning and response at nuclear and radiation emergencies;
- Government Decree № 1219-N as of 18.08.2006 on approval of radiation safety norms;
- Government Decree № 1489-N as of 18.08.2006 on approval of radiation safety rules.

The basic framework for preparedness and response to nuclear and radiation emergencies in Armenia is established in above mentioned legal acts, which assign the main role to state authorities and other organizations and regulate issues related to different aspects of the emergency preparedness and response. The “Radiation safety standards” stipulate the generic optimized intervention levels for taking urgent protective actions for sheltering, evacuation, iodine prophylactic and permanent resettlement as well as the dose criteria for emergency workers.

Besides the above mentioned there are a number of legal acts that regulate separate issues concerned with the emergency preparedness (notification, organization and implementation of evacuation, transportation, emergency radiation monitoring, medical response, agricultural countermeasures and so on).

Structure of the National Emergency Response System

The National Population Protection Plan in case of a nuclear and radiation emergencies provides with the detailed assessment of organizational measures and allocation of the functions and responsibilities of the operator and national and local authorities implementing response measures in case emergencies at the Armenian NPP (Government Decree №2328-N as of 22 December 2005, amended in 2008 and 2010 respectively). This plan had been developed with account taken to requirements of the IAEA GS-R-2, GS-G-2.1 and EPR-METHOD-2003.

Armenian NPP

In area of Emergency Preparedness and Response Armenian NPP are in close cooperation with WANO MC Regional Crisis Center (RCC) for NPP-s with WWER type reactor facilities on the basis of "ROSENERGOATOM" OJSC Crisis Center. The WANO MC Regional Crisis Center assists the Armenian NPP in the following issues:

- Analysis of emergency situation and prognosis of its progression;
- Development of recommendations related to emergency situation management, localization, minimization of its consequences and recovery of safe condition at the NPP;
- Development of recommendations on protective measures for personnel and public;
- Providing the Armenian NPP with advises on nuclear safety, fire safety; engineering, radiation and chemical protection issues and on design-engineering characteristics of NPP units;
- Preparation of conclusions on accidents progression at the Armenian NPP and on necessity of taking measures on the state (national) level;
- Providing the Armenian NPP with inventory assistance.

Classification of Accidents

The guideline "Classification of Emergency Situations at ANPP" was developed to evaluate violations of normal operation conditions, nuclear and radiation accidents at the Armenian NPP. The guideline addresses various types of man-made accidents, natural disasters and human illegal actions that may lead to nuclear or radiation accident.

Implementation of Activities on Accidents Consequences Mitigation

For the accident management and prevention of its progression into the beyond design accident and in case of design accident – for elimination of its consequences on personnel and environment, in accordance with the requirements specified in the main rules on NPP safety, the Armenian NPP developed and enforced the instructions on mitigation of design and beyond design accidents. At present these instructions are revised based on the IAEA symptom-oriented approach.

Notification

The Instruction on "Organization of notification and communication in case of emergency situations at ANPP" (hereafter referred to as the instruction) establishes the order of organizing notification and communication of information from the moment when "Preparedness", "Local accident" and "General accident" situations are declared declaring at the Armenian NPP.

Permanent duty in the Crisis Management Centre (CMC) of the MES ensures prompt response to emergency situations.

Personnel Protection

When "Nuclear and/or Radiation Accidents Response Plan" (on-site plan) of the Armenian NPP is activated up to completion of actions, the radiation and medical protection of the personnel is provided, including radioactivity examination, radiation monitoring at the Armenian NPP, radiation monitoring of personnel involved in the accident management and other personnel, individual dosimetry control, control over the personnel overexposure, decontamination of equipment and personnel, evacuation and sheltering, use of individual protection tools, including iodine tabs, decontamination means and other.

Site Emergency Response Plan

The on-site plan of the Armenian NPP is the principal document that regulates organization and order of responding to nuclear and radiation accidents at the Armenian NPP, interrelations entities involved in the emergency activities.

Currently, the “Nuclear and Radiation Accidents Response Plan of Armenian NPP” (on-site plan) is being reviewed with respect to the requirements specified in the IAEA document “Methodology of Developing Activities in Response to Nuclear and Radiological Emergency Situations” (EPR – methodology - 2003).

Training and Exercises, Evaluation Activities and Main Results of Performed Exercises

A systematic training of the personnel on emergency preparedness and response related issues is conducted at the Armenian NPP.

The “Program for maintaining qualification of the personnel involved in Armenian NPP emergency response system” for 2012-2014 was developed. Based on this program, the schedules for organization of training and drills and practical lessons on emergency response were prepared.

Sixteen standard training programs for the personnel involved into the Armenian NPP emergency response system have been developed. Several standard programs for the personnel training, some training materials and drills programs are under development.

Trainings and drills based on ad hoc prepared scenarios and requiring participation of all the employees who are responsible for response critical tasks are conducted periodically in order to verify the emergency preparedness system of the Armenian NPP.

Drills and exercises are evaluated, and based on the evaluation results; the emergency procedures are relevantly updated.

Near surface institutional RW storage facility

The ANRA conducted inspections to verify implementation of the Armenian NPP on-site plan as it is provided for in the license terms and conditions. The following points have been inspected:

- Armenian NPP on-site plan;
- Armenian NPP personnel evacuation plan;
- Organization of medical protection of the Armenian NPP personnel during emergency situations;
- Organization and implementation of emergency and rescue works during emergency situations;
- Organization of communication and notification during emergency situations;
- Instruction on organization of evacuation measures during emergency situations;
- Instruction for technical support group;
- Radiation monitoring program during nuclear and radiation emergencies;
- Manual on classification of emergency situations at the Armenian NPP;
- Armenian NPP personnel and management preparedness programs.

The requirements specified in the enforcement report made as a result of inspection are in progress of implementation.

Information of the public and neighboring states

The responsibilities for notification about nuclear and radiation emergencies at the Armenian NPP are specified in the basic requirements to planning and response to nuclear and radiation emergencies and fixed in emergency response plans.

According to the above mentioned regulation the responsibilities for notification rest with:

The Armenian NPP – notification of population residing in the preventive actions zone;
The MES – notification of population residing in the urgent protective actions zone, and if necessary also population of other settlement;
The ANRA – international notification about nuclear and radiation emergencies at the Armenian NPP, and for receiving information about emergencies occurred in nuclear installations of other countries through the IAEA ERC.

International Cooperation

The Republic of Armenia is a party to a number of international treaties and conventions on emergency response and planning related issues (Section L).

The Republic of Armenia participates in the IAEA Convex exercises organized in accordance with the IAEA annual schedule.

Armenian organizations and authorities cooperate with the IAEA (in frame of technical cooperation projects), USA, United Kingdom and EC (in frame of INSC) on different issues related to the emergency response and planning.

F5.2. Near surface institutional RW storage facility

For the expected emergencies related to the activities of «Rendering Harmless of radioactive waste» CJSC, the emergency protection program and emergency response planning procedure are developed and implemented. In the mentioned documents the duties, responsibilities and actions of the «Rendering Harmless of radioactive waste» staff and as well the involved organizations are described.

F6. Decommissioning (Article 26)

The General Decommissioning Strategy has been developed for ANPP. The main purpose of that is to initiate a ‘living’ decommissioning strategy, which will be updated as ANPP moves closer to the end of its operation and prepares for shut down. Periodic reviews of the strategy will allow more detailed information to be included as it becomes available and as studies are undertaken in order to underpin initial decommissioning strategies and options.

In relation to the institutional waste storage facility there is no developed plan for decommissioning.

SECTION G. SAFETY OF SPENT FUEL MANAGEMENT

26. This section covers the obligations under the following articles:

G.1. Article 4. General safety requirements

G.2. Article 5. Existing facilities

G.3. Article 6. Siting of proposed facilities

G.4. Article 7. Design and construction of facilities

G.5. Article 8. Assessment of safety of facilities

G.6. Article 9. Operation of facilities

G.7. Article 10. Disposal of spent fuel

G1. General Safety Requirements (Article 4)

During safe use of atomic energy in peaceful purposes consideration is given to current international recommendations specified in INSAG-3, laws and decrees adopted by the Government of the Republic of Armenia.

In the field of spent fuel management the policy of the Republic of Armenia considers the following fundamental principles established by IAEA safety standards:

- assuring the safety of facilities for spent fuel management during their lifetime;
- securing an acceptable level of protection for human health;
- providing an acceptable level of environment protection;
- ensuring that predicted impacts on the health of future generations shall not be greater than relevant levels of impact that are acceptable today;
- not imposing undue burdens on future generations;
- managing spent fuel within an appropriate national legal framework, including clear allocation of responsibilities and provision for independent regulatory functions;
- keeping the generation of radioactive waste at the minimum practicable level;
- taking into account the independencies among all steps of fuel management.

General requirements to spent fuel management are as follows:

- a) minimising ionising radiation impacts on the personnel, public, and environment,
- b) keeping subcriticality,
- c) ensuring residual heat removal,
- d) minimising formation of radioactive wastes
- e) ensuring spent fuel integrity during handling, transportation and storing.

G1.1. Sub-criticality and removal of residual heat

According to above requirements effective neutron multiplication factor shall not exceed 0.95 in spent fuel management under normal operation and in design-basis accident by ensuring appropriate characteristics of facilities. The sub-criticality in spent fuel storage is ensured through limitation of fuel assemblies pitch; use of heterogeneous or homogenous absorbers and control of their absorbing capacity; control over availability, condition and composition of cooling medium in dry-type storage facility; control of technological parameters of spent fuel management systems.

Spent fuel assemblies residual heat removal systems and appropriate chemical composition of cooling medium are envisaged in the design of spent fuel management systems to avoid temperature increase above the designed values and uncontrolled level of corrosion in normal operation and design-basis accidents. Spent fuel pools are equipped with systems for supply, purification and cooling of water, ventilation, monitoring of radioactivity, temperature, level and quality of water and, if necessary, hydrogen concentration.

G1.2. Minimization of radioactive waste generation

Generation of radioactive waste associated with spent fuel management is kept to the practicable minimum in accordance with the established policy of nuclear fuel using. In order to achieve this goal, steps are taken to:

- improve the quality of nuclear fuel (fuel manufacturer agrees all changes with the ANPP and ANRA, there is possibility to perform inspections at the fuel manufacturing factory by ANPP);
- optimize spent fuel management technologies
- increase the nuclear fuel burn up.

G1.3. Interdependencies among the different steps in spent fuel management

Interdependencies among the different steps in spent fuel management are taken into account beginning from design of nuclear fuel. Technical requirements on spent fuel storage in spent fuel pool, cladding temperature and the storage conditions in dry storage facilities are

established at the stage of technical specifications for supply of fresh nuclear fuel. Armenia has not established the policy for the final stage of spent fuel management, therefore, the following two strategies are considered:

- “deferred decision” that is presented by designing and construction of dry storage facilities with terms of storage 50 or 100 years;
- transportation of spent fuel for processing to other country.

G1.4. Radiation protection of personnel, population and the environment

As prescribed in the operating license of spent fuel management facilities, all discharges of radioactive effluents must be monitored, quantified and documented. The licensee must report the relevant data on discharges and radiological exposure to the regulatory body. The licensee is required to set up and maintain an adequate off-site monitoring program. This program normally includes measurements of radiological exposures and possible contamination of grass and milk in the vicinity of the installation. The results are reported to and regularly checked by the regulatory body. Detailed description of the radiation protection systems in Armenia is provided in Section F4.1 of this report.

G1.5. Consideration of biological, chemical and other hazards

Biological, chemical and other hazards that may be associated with spent fuel management are taken into account in the safety analysis and assessment of spent fuel management facilities. Information on such hazards is provided according to “Safety of Spent Nuclear Fuel Storage. Requirements to Safety Analysis Report for Dry Spent Nuclear Fuel Storage Facility.

G1.6. Avoiding actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation

Protection of future generations is addressed in the SARs for spent fuel facilities. Regulatory review requires strong evidence that in the future personnel and population will be protected at the level consistent with the beginning of operation. It is also required that degradation of fuel claddings, processes under the elements of hermetic compartments and spent fuel storage facility shall be examined during operation of spent fuel storage systems in order to take timely corrective measures, if necessary. While licensing it is required to develop appropriate provisions for decommissioning of the facility.

G1.7. Reduction of burdens on future generations

The policy intended to reduce imposing undue burdens on future generations is achieved in two directions:

- Reducing the risk associated with nuclear energy through development and implementation of safety improvement measures at associated facilities in compliance with the Law of the Republic of Armenia “On Safe Utilization of Atomic Energy for Peaceful Purposes”
- Reducing the burdens on future generation related to decommissioning through establishment and collection of the decommissioning and RW management funds.

G2. Existing facilities (Article 5)

There two nuclear facilities in the Republic of Armenia:

- Armenian NPP (ANPP);

- Dry spent nuclear fuel storage facility (DSNFSF).

When a spent fuel assembly expires its service life in the reactor core it is discharged from the reactor into the spent fuel storage pool of Unit 2. Following the required storage time (3-5 years) the spent fuel assembly is transferred into the spent fuel storage pool of Unit 1. After an additional storage the spent fuel assembly is transferred to DSNFS facility. Total storage time of the spent fuel assembly shall meet at least the required value so that to be transported to DSNFS facility.

G2.1. Spent fuel storage pools

Spent nuclear fuel storage pools of Unit № 1 and Unit № 2 have the same design. Each spent fuel storage pool consists of:

- Container compartment;
- Assembly compartment.

Container compartment is designed for placing and retrieval of various containers for storage, relocation and transfer of fuel assemblies:

- Untight casing, type-12 – is designed for relocation of fresh fuel assemblies from the fresh fuel compartment into the storage pool for subsequent loading into the reactor core;
- Transfer cask/dry shielding canister – is a transfer cask with a dry shielded casing designed for relocation and transfer of spent fuel assemblies during their transport to DSNFS facility or during their transfer from one storage pool into another.

Assembly compartment is designed for storage of irradiated in reactor or spent fuel assemblies. According to design it consists of:

- 620 hexahedral cells designed for storage of spent fuel assemblies;
- 120 round cells designed for placing of leak-tight casings designed for storage of failed fuel assemblies.

For scheduled or emergency unloading of the reactor core an upper rack level is used for placing of fuel assemblies. There is only one upper rack level at ANPP. It could be installed either in Unit 1 pool, or in Unit 2 pool. It consists of three individual sections (351 cells):

- Left (from reactor side) unit – 110 cells;
- Central unit – 126 cells;
- Right (from reactor side) unit – 115 cells.

Spent fuel assemblies in the storage pool are stored vertically in fixed racks. Subcriticality is provided by spacing of the rack cells (225 mm) with no account taken of homogeneous absorber.

Radiation protection of the personnel is provided by availability of water layer over fuel assemblies (minimum 2.5 m). Storage pool is equipped with ventilation system that generates an air curtain over the surface of the pool for preventing release of radioactive substances. In normal operational mode of the power unit the storage pool is closed by overhead cover slabs.

Residual heat removal is provided by the storage pool coolant of required temperature (not higher than 70⁰C). Storage pool is equipped by the filling and cooling systems. The coolant quality (chemical composition and content of radioactive isotopes) is also regulated.

G2.2. SNF management at NPP

Spent fuel is generated during operation of ANPP Unit № 2. When the service life is ended, a fuel assembly is discharged of during refueling of the reactor core and is placed in a cell of the storage pool of Unit № 2. Refueling is performed once in a year, when the reactor is shut down,

depressurized and cooled down. Following discharging of the reactor core a spent fuel assembly is tested for leak-tightness. In case it is tight, a spent fuel assembly is placed in a cell of the storage pool. In case failed assembly is detected, it is placed in tight casings and stored in it.

During storage of spent fuel assemblies in the storage pool the following is periodically inspected:

- Level of coolant;
- Coolant temperature;
- Quality (chemical and radiochemical composition) of coolant.

Following the required storage time (3-5 years), spent fuel assemblies are relocated into the spent fuel storage pool of № 1, where they are stored until reaching the parameters required for their transferring to DSNFS facility.

Relocating spent fuel assemblies out of storage pool of Unit № 2 into storage pool of № 1 is performed using Transfer casks/Dry shielding canister.

G2.3. Armenian NPP dry spent nuclear fuel storage facility (ANPP DSNFS facility)

Storage of spent fuel assemblies following adequate storing in storage pools is performed in Dry Spent Nuclear Fuel Storage (DSNFS) Facility designed and built according to the standard NUHOMS-56 system foreseen for a long-term interim storage of spent fuel assemblies of WWER-440 type reactors.

Spent fuel assemblies are placed in Dry Shielding Canister (DSC), which is filled with nuclear purity helium of retained overpressure. The DSC shielding and insulation are provided by massive reinforced concrete Horizontal Storage Module (HSM). Radioactive decay heat caused by DSC and HSM is removed using draught ventilation system, which operation is based on a passive natural convection.

Basic design characteristics of DSNFS facility:

- *Storage of spent fuel assemblies in a leak-tight welded protective casing inside a protective concrete module.* It provides availability of a highly efficient multi-barrier protection system that ensures storage safety of spent fuel assemblies;
- *Transportation of DSC in horizontal position into DSNFSF and back.* Optimum means provide biological protection and passive storage of spent fuel assemblies in a safe storage that doesn't require any special maintenance. Another opportunity is retrieval of DSC and their further shipping outside the plant in the same licensed transfer cask.
- *Transportation of DSC in the transfer cask from technological transport corridor of the reactor department to DSNFSF.* It provides radiation protection of the personnel and integrity of DSC during transfer, at the same time maintaining possibility of passive heat removal from Transfer Cask/DSC to atmosphere;
- *Protective end plugs.* Provision is made for contact manipulation and monitoring from the top and bottom ends of DSC, which is located in a Transfer cask or HSM.
- *Passive cooling by natural air circulation.* Temperature of the fuel element cladding is maintained lower maximum allowable limit, and therefore, their damage is prevented during a long-term storage.
- *Helium storage medium.* Provision is made for efficient heat removal and prevention of cladding oxidation of spent fuel assemblies and fuel elements. Welding of the DSC cladding by a double root-penetration seam provides maintaining of helium medium.

Sub-criticality of DSC is ensured and justified for the loading of 56 fresh fuel assemblies and filling with non- borated water.

Currently in operation:

- First phase of DSNFS facility, commissioned in 2000, consists of 11 HSM (616 pcs. spent fuel assemblies);
- Second phase of DSNFS facility, commissioned in 2008, consists of 12 HSM, (560 pcs. spent fuel assemblies are placed in 10 HSM, 2 HSM are still empty for 112 pcs.).

Total number of spent fuel assemblies stored in DSNFS facility – 1176 pcs.

G3. Siting of Proposed Facilities (Article 6)

Siting for nuclear installation is performed according to Government Decree № 609-N as of 12.05. 2005 on approval of the Licensing Procedure and License Form for Site Selection of Nuclear Installations.

The abovementioned document defines mandatory requirements and documentation required for licensing of site selection.

G3.1. Evaluation of all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime

Assessment of the all related to the site factors that impact safety during the whole service life is a part of documentation package required for the site selection licensing.

In compliance with the Government Decree No.609-N “On Approval of the Licensing Procedure and License Form for Site Selection of a Nuclear Installation” decision-making on siting of nuclear facilities (including spent nuclear fuel storage facilities) is in the competence of the National Assembly (Armenian Parliament) and Cabinet of Ministers of the Republic of Armenia. According to this Law, the applicant for nuclear facility siting shall submit properly prepared documentation containing substantiation for such a facility and at least three siting options. The submitted documents shall obligatory include:

- characteristic of the environment on possible facility site;
- human and environmental impact assessment for planned construction, commissioning, operation, decommissioning and closure of the facility;
- design basis measures for prevention and mitigation of the environmental impact.

Data related to characteristics of possible nuclear facility sites are provided in the feasibility study for facility siting.

Site description and safety assessment of associated facilities, taking into account characteristic of the facility site, are set forth in the SAR for these facilities developed according to Safety Analysis Report for Metsamor NUHOMS Storage Facility”.

G3.2. Evaluation of the likely safety impact of such a facility on individuals, society and the environment

Such assessment is performed in SAR for DSNFSF and is justified that during the life cycle and all design based accidents the facility has no considerable impact on individuals, society and environment.

G3.3. Making information on the safety of such a facility available to members of the public

Public hearings related to nuclear energy utilization and radiation safety are provided for by current legislation. The main objective of public hearings on nuclear energy utilization and

radiation safety is to respect rights of members of the public and their associations for participation in discussion of such issues as for example siting, design, construction, operation and decommissioning of nuclear facilities.

G4. Design and Construction of Facilities (Article 7)

Design and construction of nuclear facilities is performed according to following procedures:

- Government Decree No.608-N as of 12.05.2005 “On Approval of the Licensing Procedure and License Form for Designing of Nuclear Installations”
- Government Decree No.649-N as of 12.05.2005 “On Approval of the Licensing Procedure and License Form for Construction of Nuclear Installations”

G4.1. Limitation of possible radiological impacts of SNF management facilities

Legislation of Armenia provides obligatory licensing of designing and construction activities of spent nuclear fuel management facilities. A license for activities at a corresponding stage of the nuclear facility life cycle is issued on the basis of a comprehensive safety assessment of the facility and capability of the applicant to take all safety measures. The construction license for a nuclear facility shall be issued only if the facility decommissioning plan is available.

The following measures are taken to limit possible radiological impacts on individuals, society and the environment: defense in depth principle based on the application of a system of physical barriers to the spread of radioactive materials and ionizing radiation into working areas and the environment and application of a system of technical and organizational measures to ensure integrity and effectiveness of barriers. Safety principles and requirements to be incorporated in the design of nuclear facilities are set forth in documents referred to in Sections G1 and F4.

G4.2. Conceptual plans and technical provisions for the decommissioning of SNF management facilities

Currently Armenia has no developed program for decommissioning of SNF facilities. Under the framework of Armenia – EC cooperation now is in development the document “Radioactive waste and spent nuclear fuel management strategy for RA” and the issue of SNF facilities decommissioning will be also included in that strategy.

G4.3. Support of technologies incorporated in the design by experience, testing or analysis

Technologies used for SNF storage facilities are supported by experience, testing and analysis. Technologies incorporated in the design of ANPP DSNFS facility represent adaptation of the technology for SNF storage in casks NUHOMS-56 used in US NPPs. These technologies incorporate operational experience of appropriate storage facilities in the USA and are supported by the analysis provided in the SAR for the storage facility. The ANPP systems related to the SNF are described and justified in the ANPP SAR.

G5. Assessment of Safety of Facilities (Article 8)

G5.1. Safety assessment and environmental impact examination

According to legislation currently in force in Armenia operating organization (utility) shall submit documents confirming the safety of the nuclear facility to obtain licenses for specific stages of the nuclear facility lifetime. A list of these documents is established by the state regulatory bodies for nuclear and radiation safety.

Safety analysis reports (SAR) is subject to expertise on nuclear and radiation safety, and environmental impact assessment (EIA) is also subject to expertise in compliance with the Law of Armenia “On Environmental Impact Expertise”.

Requirements to the content of SAR for spent nuclear fuel storage facilities are set forth in the document “Safety of Spent Nuclear Fuel Storage. Requirements to Safety Analysis Report for Dry-Type Spent Nuclear Fuel Storage Facility”. Provisions of this document require that SAR submitted for DSNFS facility construction license should contain information adequate for assessment of the DSNFSF safety. According to current legislation, the design of the facility is subject to other relevant expertise.

G5.2. SAR re-assessment in construction and commissioning

Upon completion of the construction, the safety level of the completed DSNFS facility shall be proved consistent with the safety level incorporated in the design. The SAR substantiates the safety of changes, modifications and corrections made to the original design in the DSNFS facility construction, pre-commissioning and testing.

G6. Operation of facilities (Article 9)

G6.1. Licenses for operation of facilities

Submission of documents substantiating nuclear and radiation safety is an obligatory condition for issuing the license to operate a nuclear facility. A list of these documents is established by the ANRA (see Section E). The license in particular establishes operating limits and conditions for the facility. These conditions are based on the review of the submitted documents. Documents submitted for the review in particular shall contain:

- SAR updated according to results of facility commissioning;
- Operational and technical documentation establishing procedures for operation, maintenance, monitoring, inspection and testing of facility equipment, operational limits and conditions substantiated in SAR. The documentation establishes conditions, procedure and periodicity of its revision;
- report on facility commissioning results;
- decommissioning program of the facility, which is to be periodically updated and detailed;
- inspection report on availability of the facility for operation.

G6.2. Definition and revision of operational limits and conditions

In compliance with the “Basic Requirements to NPP Safety”, the design of every nuclear installation incorporates limits of nuclear plant safe operation – designed process parameters whose deviations can cause an accident – and conditions of safe operation – designed minimal conditions of the quantity, characteristics, operability and maintenance of safety-significant systems (components) intended to maintain limits of safe operation and/or safety criteria.

According to the terms of issued licenses, the operating organization shall reassess the safety of operating nuclear facilities and submit associated reports to the ANRA every 10 years. The reassessment constitutes the basis for defining and revising operational limits and conditions of the facility.

G6.3. Operating procedures

The operation license issued to operating organizations in particular defines conditions of this activity, which are substantially based on provisions of operational and technical documentation

submitted by the applicant. The documentation establishes procedures for operation, maintenance, monitoring, inspection and testing of facility equipment and operational limits and conditions.

G6.4. Engineering and technical support in operation

In compliance with the “Basic Requirements to NPP Safety”, the operating organization is responsible for establishment of the organizational structure required for safe operation of the nuclear facility as a whole and for its engineering and technical support in particular. In order to fulfill this provision, the operating organization develops and implements appropriate programs and carry out needed activities. In Armenia the main technical support organization for Armenian NPP is “Armatom CJSC”.

G6.5. Reporting on incidents significant to safety to the ANRA

Information on all operational events, emergencies and accidents occurred at nuclear facilities is investigated in compliance with the “Provision on Investigation and Accounting of Events Occurred in Armenian NPP Operation” and reported to the ANRA and other relevant organizations.

The following information is to be reported on each operational event at the facility:

- early notification on the event (within an hour);
- preliminary notification on the event (within 24 hours);
- classification of the event;
- report on investigation of the event (within 15 days since occurrence).

Representatives of the ANRA and their experts participate in the investigation of the operational events at the facility, if necessary.

G6.6. Analysis of relevant operating experience

In compliance with the “Basic Requirements to NPP Safety”, the operating organization is responsible for the completeness and quality of investigation, development and implementation of measures to prevent further operational events and accidents, submission of truthful and timely investigation reports to the state ANRA bodies,

The operating organization exercises constant monitoring of all activities significant to safety of nuclear facilities. The operating organization submits findings of safety inspections of the facility and periodical reports on current safety level to the ANRA. In compliance with the “General Provisions of Nuclear Power Plant Safety Assurance”, information on violations of limits and conditions of safe operation shall be included in periodic reports on current safety level. Requirements on annual safety reports are established in the document “Requirements on Annual Safety Reports for WWER NPPs”.

G7. Disposal of Spent Fuel (Article 10)

Currently the issue of spent nuclear fuel disposal from ANPP operation is still open.

SECTION H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

H.1. Article 11. General safety requirements

H.2. Article 12. Existing facilities and past practices

H.3. Article 13. Siting of proposed facilities

H.4. Article 14. Design and construction of facilities

H.5. Article 15. Assessment of safety of facilities

H.6. Article 16. Operation of facilities

H.7. Article 17. Institutional measures after closure

H1. General Safety Requirements (Article 11)

The laws, decrees adopted by the RA Government and the recommended IAEA safety standards are applied in the nuclear energy field.

General safety aspects of RW management are defined in the Government Decree No.1489 as of 18 August 2006 "Radiation Safety Rules".

In the field of radioactive waste management the policy of the Republic of Armenia considers the following fundamental principles established by IAEA safety standards:

- securing an acceptable level of protection for human health,
- providing an acceptable level of protection of the environment, including natural resources,
- ensuring that predicted impacts on the health of future generations shall not be greater than relevant levels of impact that are acceptable today,
- not imposing undue burdens on future generations,
- managing the radioactive waste within an appropriate national legal framework. including clear allocation of responsibilities and provision for independent regulatory functions,
- keeping the generation of radioactive waste at the minimum practicable level,
- taking into account the interdependencies among all steps in radioactive waste generation and management,
- assuring the safety of facilities for radioactive waste management during their lifetime.

H1.1. Minimization of radioactive waste generation

One of the main principles of the state policy in radioactive waste management is to ensure that the generation of radioactive waste is kept to the minimum practicable (Article 17 of the Radioactive waste management procedure approved by RA government Decree No. 631 as of 4 June 2009).

This is achieved through developing and implementing radioactive waste minimisation program within the radioactive waste management practices.

The Guidance and the Program on Solid Radioactive Waste Minimization had been issued at Armenian NPP. These documents are intended for defining and establishing requirements to implement the minimisation of solid radioactive waste at ANPP.

The main tasks within the Program are:

- identify sources of solid radioactive waste generation,
- develop appropriate minimisation measures.

The Program is also aimed at ensuring the qualitative and safe organization, management and implementation of solid radioactive waste minimisation.

The topical problem at ANPP is minimisation of liquid radioactive waste. To reduce the volume of produced at ANPP liquid radioactive waste their concentration is used through deep evaporation resulted in salt cake.

H1.2. Radiation protection of personnel, population and the environment

Fulfilling the regulations, implementing organizational and technical measures for radioactive waste management and the radiation monitoring as well assures effective protection of individuals, society and the environment. Detailed description of the radiation protection systems at Armenia NPP is provided in Section F4.1 of this report.

Detailed description of the radiation protection systems at «Rendering Harmless of radioactive waste» is provided in Section F4.2.

H1.3. Avoiding actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation

Based on the IAEA Safety Standard GSR Part 3 the amendments and supplements are being incorporated in the radiation safety norms and rules that precisely specify more strict requirements to the RW management.

H1.4. Reduction of burdens on future generations

This issue is defined as a requirement in the Government Protocol Decision No 43 of 04.11.2010 “On Approval of the Concept on Radioactive Waste and Spent Fuel Management in the RA”.

Based on the IAEA Safety Standard GSR Part 3 the amendments and supplements are being incorporated in the radiation safety norms and rules that precisely specify more strict requirements to the RW management.

H2. Existing facilities and past practices (Article 12)

There are two waste management facilities in Armenia:

- Armenian NPP
- Near surface institutional RW storage facility (Radon type facility)

Armenian NPP

The description of waste management systems at Armenian NPP is presented below:

Low Level Solid Radioactive Waste Storage System

The LL SRW storage area is 12000 m². Total capacity of cells is 17051 m³. The LL SRW is placed for storage in LL SRW cells. The dimensions of each cell are 27×36×8,9 m. The cell bottom and walls are constructed of 0,6m thickness solid reinforced concrete with three-layer hydraulic insulation. The cells are covered with reinforced concrete plates and asphalted. The SRW is loaded into the cells through the hatches of 0,75 × 0, 75m. Totally there are 108 hatches.

Intermediate Level Solid Radioactive Waste Storage System

IL SRW storage system is designed for storage of intermediate level SRW. It is located in the auxiliary building, representing separate compartments covered with hatches. The total capacity of the storage is 1001 m³. Part of DEF drums is also stored there. Due to insufficient storage capacity on the roof of auxiliary building was designed the temporary storage place under metallic shelter. The useful storage capacity is not more than 3000 DEF drums based on working area of 655 m².

High Level Solid Radioactive Waste Storage System

HL SRW storage is designed for storage of high level SRW. The storage facility is located in the Central Hall of reactor building. The facility consists of 380 cells of 0,18 m diameter, 8,9 m length, closed with 0,72m height plugs. A cell represents a metal tube of 6 mm wall thickness with a welded bottom.

Liquid Radioactive Waste Storage System

Armenian NPP has the following storage capacities for temporary liquid waste storage located in auxiliary building:

Six evaporator concentrate tanks ECT (tanks are made of stainless steel) with a volume of 550 m³ each, which results in total storage capacity of 3300 m³.

Two high level sorbent tanks (HLST) made of stainless steel with the volume of 420 m³ each, which results on total storage capacity of 840 m³ (Originally designated for storage of high level activity sorbents. As far as high level liquid waste is not generated at ANPP, these tanks are used for storage of intermediate level waste. Spent ion exchange resins (sorbents) are stored in one of these tanks).

Two stainless steel tanks for storage of low level activity sorbents (LL ST) with capacity of 192 m³ each, which results in total storage capacity of 384 m³.

Near surface institutional RW storage facility

The designed capacity of the near surface institutional RW storage facility is 2268 m³, consisting of three separate storages, 756 m³ of each, with seven double-layer underground concrete vaults covered with the concrete slabs.

H3. Siting of proposed facilities (Article 13)

Currently there is no intention in Armenia for siting any additional facility for RW management. Siting of existing buildings for RW management at Armenian NPP took place within the siting of the entire NPP, as described in the design documentation.

Two documents are issued in Armenia relating to siting of the radioactive waste management facilities:

- the RA Government Decree No.609-N as of 12.05.2005 “On approval of the licensing procedure and license form for site selection of nuclear installations”;
- The RA Government Decree No.1203-N as of 11.08.2005 “On approval of the licensing procedure and license form for site selection of the radioactive waste storage facility”.
- The RA Government Decree No.1204-N as of 11.08.2005 “On approval of the licensing procedure and license form for site selection of the radioactive waste disposal facility”.

The site selection for the Armenian NPP was carried out in 1968 in accordance with the acting at those period normative documents. Thus, practically the siting factors which can influence the Armenian NPP safety were taken into account.

- The ANPP site is located on solid, crystal and basalt area;

Geological conditions of site are acceptable, steady;

- Ground waters deposited on depth 85-90m;
- Seismicity of site MDE-8 degree on scale MSK-64;
- The volcanic hazard of the site is extremely small;
- Other natural events (flooding, tornado, landslides and so on) on the territory of the site are not observed.

In 1972 designed seismicity of 9 point intensity was accepted for the reactor building, boron unit and auxiliary building. Seismic loading value for ANPP systems and facilities is differentiated with partitions into 3 category with the following relevant free ground acceleration (PGA) to determine horizontal seismic loading 0.4g – I category, 0.2g – II category, 0.1g – III category, where auxiliary building designed for liquid radioactive waste storage was classified to I category seismicity.

In 1987, after issuing of first standard on seismic resistant NPP design in USSR (ПНАЭГ 006-87) full scope activities were performed for ANPP compliance with the above mentioned standards. According to the results of analyses it was detected that the auxiliary building completely meets the requirements of these standards.

The structures of DSNFS were classified to I category seismicity and were designed and built with PGA=0.4g.

H4. Design and construction of facilities (Article 14)

For existing facilities the required information is provided in Section H2.

Currently there is no plan to design and construct any radioactive waste management facility in Armenia.

The requirements to the design and construction of RW management facilities are established in the below mentioned documents:

- The RA Government Decree 416-N as of 31.03.2005 on approval of the licensing procedure and license form for construction of radioactive waste disposal facility;
- The RA Government Decree 417-N as of 31.03.2005 on approval of the licensing procedure and license form for construction of radioactive waste storage facility;
- The RA Governmental Decree 985-N as of 07.07.2005 on approval of the licensing procedure and license form for design of radioactive waste disposal facility.
- The RA Governmental Decree 986-N as of 07.07.2005 on approval of the licensing procedure and license form for design of radioactive waste storage facility.

H5. Assessment of safety of facility (Article 15)

Armenian NPP

All radioactive waste storage systems at Armenian NPP are included into the Armenian NPP design. For this reason the issues of the safety assessment are presented in the Safety Analysis Report for ANPP Unit 2.

Near surface institutional RW storage facility

The safety assessment of near surface institutional waste storage facility was performed in 2006 in the frame of EU support project.

H6. Operation of facilities (Article 16)

Armenian NPP

The RA Government decree N 702-N as of 19.05.2005 on approval of the licensing procedure and license form for operation of the radioactive waste storage facility has specified all necessary activities for obtaining the license for operation of radioactive waste storage facility. The systems for radioactive waste storage existing at ANPP are fully compliant with the requirements of this document.

ANPP is developing a program for a long-term storage of salt cake containing drums, the main point of which is development of a long-term salt cake drums storage technique in concrete irretrievable containers. Implementation of such technique is planned for 2016.

An important part of the radioactive waste management process at ANPP is a careful accounting. Corresponding records are done starting from the location of waste production, subsequent radioactive waste treatment methods, and also the waste storage location. Such an approach ensures an adequate supervision over the waste and reduces probability of an uncontrolled impact of radioactive waste to environment.

The records are done for the following waste types:

- Waste at different treatment stages
- Waste in storage

Every record contains the following information:

- Identification/recorded number
- Waste description
- Composition of nuclides and total activity
- Activity concentration (in Bq/g or Bq/m³).
- Location (in storage).
- Place/method of storage
- Storage time

The format and time of keeping records are governed by the national regulations and are a part of the quality assurance program. The quality assurance program is being implemented to ensure confidence that the taken measures and records are adequate.

Terms of issuing permission for radioactive waste storage granted by the ANRA depend on requirements to the waste physical protection, potentially possible exposure of workers' who service the storage, and the probability of environment contamination during accidents and incidents. The permission request as a minimum contains the following data:

- composition of radionuclides within the waste to be stored
- maximum waste activity in storage system
- waste configuration
- storage time
- storage mode details and description of storage containers
- purpose of storage

Near surface institutional RW storage facility

Institutional waste storage facility was designed as a disposal facility for solid and liquid waste generated by institutional RW producers. In the disposal facility the radioactive wastes were grouted into standard drums (200 l) bringing them to a suitable safety condition for their disposal, place them into an underground concrete vault and finally empty space between drums was filled with grouting. The designed disposal facility included two layers.

In 2009, according to the legislation in force, the RWRH CJSC applied for the operation license as a RW disposal facility. Nevertheless, ANRA granted the license for operation as a RW storage facility. Currently, facility stores solid LL and ILW-SL waste from institutional producers.

H7. Institutional measures after closure (Article 17)

There is no disposal facility in Armenia.

SECTION I. TRANSBOUNDARY MOVEMENT

There is no transboundary movement of spent nuclear fuel. All spent fuel is stored at ANPP site. According to the Law of Republic of Armenia “On Safe Utilization of Atomic Energy for Peaceful Purposes” import of radioactive waste to Armenia is prohibited.

SECTION J. DISUSED SEALED SOURCES

Disused sealed sources (Article 28)

- 1. Each Contracting Party shall take, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.*
- 2. A Contracting Party shall allow for reentry into its territory of disused sealed sources if, in the framework of its national law, it has been accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.*

1. According to paragraph 137 of Government Decree № 1489 as of 18.08.2006 on approval of Radiation safety rules, disused sealed sources are considered as solid radioactive waste. The sealed radionuclide sources (SRS), which are no longer used due to lifetime expiration or defect are transferred to the correspondent level solid RW storage facility for storage.

Accounting of ionizing radiation sources is implemented starting from the moment of their delivery up to assignment to RW category and placing for storage.

In the existing RA legislation there is no binding tool on the return of disused radioactive sources to the supplier. Nevertheless, the importer is encouraged to have an agreement with the supplier on return of disused sources, according to international recommendations.

It is planned to include the repatriation of disused sources to a supplier or manufacturer as an issue in the National Strategy for SF and RW Management, which is being developed.

Sealed sources are not manufactured or supplied by Armenia.

SECTION K. GENERAL EFFORTS TO IMPROVE SAFETY

Armenian NPP

According to the requirements of the ANRA, as well as recommendations of the Atomic Energy Safety Council under the President of the RA and the IAEA OSART and OSART Follow-up Missions Armenian NPP has revised “The program for improvement of operational safety” taking into account suggestions and recommendations of the IAEA OSART Mission. The IAEA OSART Follow-up mission positively assessed the implemented work, and pointed out that the programs related to the management of radioactive waste should be continued. The two issues, which were assessed in 2013 by IAEA OSART Follow-up mission as having “insufficient progress” and corresponding recommendations were made to them referred to management of low and intermediate level radioactive waste.

Following the OSART mission in 2011 in order to address the problems with accumulated operational waste at ANPP a contract was concluded with Czech UJP Praha Co. for development of ANPP waste management concept. Based on the suggested concept the ANPP developed a program for waste management which will be brought in line with national strategy of RW management. The national waste management strategy is under development in the framework of EC project under Development and Cooperation (DEVCO) Programme.

In short-term perspective (until 2016) it is planned to modify the existing system of RW management aimed at implementation of OSART mission recommendations. .

Near surface institutional RW storage facility

Continuing the improvement of the physical protection of CJSC "RHRW" Coordinated by the international community. By the support of U.S. Nuclear Regulatory Commission (US NRC) was improved the electronic registry in Armenia of the ionizing radiation sources and continuing the registration of radioactive materials, including orphan materials. By the support of U.S. Department of Energy (US DOE), under the framework INSEP, in the Republic of Armenia continuing implementation of non-destructive methods for nuclear material accounting and control, as well as the programs for environmental radiation monitoring (computer software installation, staff training, and provision of modern equipment). Developed the project of statute of nuclear material accounting and control, which will be confirmed after the international examination. By the assistance of "Nuclear and Radiation Safety Center" and support of U.S. Department of Energy has been developed the accounting software for the nuclear materials, which are in implementation phase.

SECTION L. ANNEXES

a) List of Spent Nuclear Fuel Management Facilities (as of 1 January 2014)

Table 4

Name of facility	Location	Main purpose	Comment
Armenian NPP	Reactor Building, Armenian NPP	SNF temporary storage	In operation
Dry Spent Nuclear Fuel Storage Facility DSNFS facility	Armenian NPP site	Interim SNF storage	In operation

b) List of RW management facilities

- Armenian NPP
- Near surface institutional RW management facility.

c) List of nuclear facilities in the process of being decommissioned

- Armenia has no nuclear facilities under decommissioning.

d) Inventory of spent fuel (as of 1 January 2014)

Table 5

Location	Unit 1 spent fuel pool	Unit 2 spent fuel pool	Total at ANPP	DNSFSF – 1	DNSFSF – 2	Total in DSNFSF
Quantity of SNF Assemblies	344	305	649	11 DCS	10 DSC	1176
				616	560	

e) Inventory of RW accumulated at ANPP

Table 6

No.	Storage System	Purpose & location	Design capacity m ³	Waste volume m ³
1	LL SW	Storage of solid LLW, ANPP site	17051	6084
2	IL SW	Storage of solid ILW, auxiliary building	1001,32	482*
	IL SW “salt cake”	Temporary storage on the roof of auxiliary building	Up to 3000 containers	435
	IL LW (evaporator concentrate)	Evaporator concentrate tanks 1-6, auxiliary building	6×550	2270
3	HL SW	HLW storage, reactor building	78,34	34
	HL LW (spent resin)	High level activity sorbents tanks, auxiliary building	2 x 420	158,5**

Note:

* including 324 m³ of “salt cake” in drums;

** Class of waste is defined based on data of operational dose rate measurement (subject for further waste characterization).

Inventory of institutional radioactive waste at near surface institutional RW management facility

Table 7

Location	Storage capacity, m ³	Waste volume, m ³	Total activity [TBq]
RHWR	2268	265	2.64

f) Legislative framework of the RA

The international treaties ratified by the RA

- Convention on Nuclear Safety ratified on 24.09.1997
- Convention on Early Notification about Nuclear Accident ratified on 22.06.1993
- Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency ratified on 22.06.1993
- Vienna Convention on Civil Liability for Nuclear Damage ratified on 22.06.1993
- Convention on Physical Protection of a Nuclear Material ratified on 22.06.1993
- Amendment to the Convention on Physical Protection of Nuclear Material signed on 8 July 2005 adopted by the National Assembly as of 18.03.2013
- CTBT Comprehensive Nuclear-Test-Ban Treaty ratified on 21.12.1993
- Treaty on the Non-Proliferation of Nuclear Weapons ratified on 24.09.1991
- Agreement between the Republic Armenia and the International Atomic Energy Agency for the Application of Safeguards in connection with Treaty on the Non-Proliferation of Nuclear Weapon signed on 23.09.1993
- Protocol Additional to the Agreement between the Republic Armenia and the International Atomic Energy Agency for “The Application of Safeguards in connection with Treaty on the Non-Proliferation of Nuclear Weapon ratified on 28.06 2004
- Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the International Atomic Energy Agency to the Government of the Republic of Armenia ratified on 04.06 2003

Laws Adopted in Atomic Energy Utilization Field

- Law on Safe Utilization of Atomic Energy for Peaceful Purposes with amendments and supplements as of 21.03.2000 HO-44; 09.11.2004 HO-119-N; 15.12.2005 HO-8N; 22.02.2007 HO-119-N; 19.05.2008 HO-70-N; 19.03.2009 HO-72-N
- Law of the RA on Licensing (adopted 30.05. 2001 NO-193 with supplements as of 16 March 2004 HO-52, 19.03.2009 HO-73-N)
- Code of the RA on Administrative Offences
- Law of the RA on Legal Acts (03.04.2002. HO-320N)
- Law of the RA on Civil Service (27.12.2001 HO-272)
- Law of the RA on Population Protection in case of Emergencies (02.12.1998 HO-265)
- Law of the RA on Organization and Conduct of Inspections (17.05.2000 HO-172)
- Criminal Code of the RA (18.04.2003)

- Law of the RA on Administration Principles and Procedure (18.02.2004 HO-41N)
- Law of the RA on Energy (07.03.2001 HO-148)
- The Law of the RA on Environmental Impact Expertise (22.07.2014)

Government Decrees Adopted in Atomic Energy Utilization Field

- Government Decree № 573 as of 13.11.1993 on establishment of the state authority under the government of the RA on regulation of nuclear and radiation safety for atomic energy utilization (ANRA)
- Government Decree № 768 as of 22.12.1999 on approval of the list positions important in terms of safety in atomic energy utilization field
- Government Decree № 342 as of 25.04.2001 on establishment of the scientific and technical center on nuclear and radiation safety
- Government Decree № 640 as of 12.07.2001 on approval of the procedure for organization and conduct of safety expertise in the atomic energy utilization field
- Government Decree № 912-N as of 27 June 2002 on reorganization of ANRA
- Government Decree № 2013-N as of 21.11.2002 on approval of the requirements to form and contents of the Safety Analysis Report of the Armenian NPP Unit 2
- Government Decree № 1953-N as of 30.10.2004 on preparedness to response to nuclear and radiation emergencies in the RA
- Government Decree № 1792-N as of 09.12. 2004 on approval of the procedure licensing and form of license for storage of radioactive materials, devices containing radioactive materials, or radiation generators
- Government Decree № 257-N as of 10.02. 2005 on approval of the licensing procedure and licence form for designing of systems, structures and components important to safety of atomic energy utilization object
- Government Decree № 258-N as of 10.02. 2005 on approval of the licensing procedure and licence form for manufacture of systems, structures and components important to safety of atomic energy utilization object
- Government Decree № 345-N as of 24.03.2005 on approval of the licensing procedure and licence form for expertise of atomic energy utilization objects, their designs and other documents
- Government Decree № 400-N as of 24.03. 2005 on approval of the licensing procedure and licence form for operation of nuclear installations
- Government Decree № 608-N as of 12.05. 2005 on approval of the licensing procedure and licence form for designing of nuclear installations
- Government Decree № 609-N as of 12.05. 2005 on approval of the licensing procedure and licence form for site selection of nuclear installations
- Government Decree № 649-N as of 12.05. 2005 on approval of the licensing procedure and licence form for construction of nuclear installations
- Government Decree № 707-N as of 01.06. 2005 on approval of the licensing procedure and licence form for decommissioning of nuclear installations
- Government Decree № 781-N as of 16.06. 2005 on approval of the licensing procedure and licence form for services and practices not foreseen in the original design implemented during site selection, designing,

construction, commissioning, operation and decommissioning of nuclear installations

- Government Decree № 1858-N as of 14.12.2006 on approval of the licensing procedure and licence and application form and procedure for qualification check of physical persons holding positions important for safety in atomic energy utilization field
- Government Decree № 1489-N as of 18.08. 2005 on approval of radiation safety rules
- Government Decree № 1219-N as of 18.08. 2005 on approval of radiation safety norms
- Government Decree № 1637-N as of 16.10.2006 on opening a special account for decommissioning of Armenian NPP
- Government Decree № 532-A as of 03.05.2007 on approval of composition of a commission on management of special account for decommissioning of Armenian NPP
- Government decree № 866-N as of 17.07.2008 on establishment of the State Committee under the Government of the RA on Nuclear Safety Regulation, approval of the statute and organizational structure, content and size of property of the State Committee under the Government of the RA on Nuclear Safety Regulation
- Government Decree № 602-N as of 29.05.2009 on amendments to the licensing procedures of the atomic energy utilization field
- Government Decree № 631-N as of 04.06.2009 on approval of the procedure on radioactive waste management
- Government Decree №1552-N as of 25.11.2010 on approval of amendments to the Government Decree № 1219-N as of 18.08.2006 on approval of radiation safety norms and the Government Decree № 1489-N as of 18.08.2006 on approval of radiation safety rules
- Government Decree №1611-N as of 17.11.2011 on amendments and supplements to the Government Decree № 400-N as of 24.03. 2005 on approval of the licensing procedure and licence form for operation of nuclear installations
- Government Decree № 418-N as of 05.04.2012 on approval of procedure on investigation of NPP operational events
- Government Decree № 709-N as of 04.07.2013 on approval of List of Internal Legal Acts Applied in Atomic Energy Utilization Field in Russian and in English
- Government protocol decree №43 as of 4 November 2010 on approval of Concept on safe management of radioactive waste and spent nuclear fuel in RA
- Government Decree № 1263 as of 24.12.2001 on approval of Special rules on transportation of nuclear and radioactive materials
- Government Decree № 1653 as of 11.12.2003 on Determination of the price for radioactive waste transport, neutralization and storage services

- Government Decree № 2141 as of 01.12.2005 on approval of the licensing procedure and licence form for decommissioning of radioactive waste storage and for closure of disposal facilities
- Government Decree № 931 as of 27.06.2002 on approval of Procedure for safe transport of nuclear and radioactive materials
- Government Decree № 1231 as of 11.09.2003 on approval of Concept of physical protection and security of Armenian NPP and nuclear materials and rules on physical protection of nuclear installations and nuclear materials
- Government Decree № 1597 as of 26.10.2004 on fulfillment of obligations undertaken under the Protocol Additional to the Agreement between the Republic of Armenia and the International Atomic Energy Agency for the Application of Safeguards in Connection with Treaty on the Non-Proliferation of Nuclear Weapons
- Government Decree № 1953 as of 30.10.2004 on preparedness to response to nuclear and radiation emergencies in the RA
- Government Decree № 1751 as of 09.12.2004 on approval of licensing procedure and license form for use of radioactive materials, devices containing radioactive materials, or radiation generators
- Government Decree № 1790 as of 09.12.2004 on approval of licensing procedure and application form for import and export of radioactive materials, devices containing radioactive materials, or radiation generators
- Government Decree № 346 as of 24.03.2005 on approval of licensing procedure and license form for import and export of nuclear materials
- Government Decree № 375 as of 24.03.2005 on approval of licensing procedure and license form for import and export of radioactive wastes
- Government Decree № 376 as of 24.03.2005 on approval of licensing procedure, license and application forms for import and export of special materials, equipment and technologies in the RA
- Government Decree № 401 as of 31.03.2005 on approval of licensing procedure and license form for implementation of physical protection of nuclear installations and nuclear materials
- Government Decree № 416 as of 31.03.2005 on approval of licensing procedure and license form for construction of radioactive waste storage facility
- Government Decree № 417 as of 31.03.2005 on approval of licensing procedure and license form for construction of radioactive waste disposal facility
- Government Decree № 647 as of 05.05.2005 on approval of licensing procedure and license form for storage of radioactive wastes
- Government Decree № 652 as of 19.05.2005 on approval of licensing procedure and license form for operation of radioactive waste disposal facility
- Government Decree № 660 as of 05.05.2005 on approval of licensing procedure and license form for transport of radioactive waste
- Government Decree № 702 as of 19.05.2005 on approval of licensing procedure and license form for operation of radioactive waste storage facility
- Government Decree № 703 as of 19.05.2005 on approval of licensing procedure and license form for processing of radioactive wastes

- Government Decree № 745 as of 09.06.2005 on approval of licensing procedure and license form for storage of nuclear materials
- Government Decree № 746 as of 09.06.2005 on approval of licensing procedure and license form for transport of nuclear materials
- Government Decree № 762 as of 09.06.2005 on approval of licensing procedure and license form for use of nuclear materials
- Government Decree № 985 as of 07.07.2005 on approval of licensing procedure and license form for designing of radioactive waste storage facility
- Government Decree № 986 as of 07.07.2005 on approval of licensing procedure and license form for designing of radioactive waste disposal facility
- Government Decree № 1203 as of 11.08.2005 on approval of licensing procedure and license form for site selection of radioactive waste storage facility
- Government Decree № 1204 as of 11.08.2005 on approval of licensing procedure and license form for site selection of radioactive waste disposal facility
- Government Decree № 2129 as of 01.12.2005 on approval of licensing procedure and license form for closure of radioactive waste disposal facility
- Government Decree № 2140 as of 01.12.2005 on approval of licensing procedure and license form for manufacture of radioactive materials, equipment containing radioactive materials, or radiation generators
- Government Decree № 2141 as of 01.12.2005 on approval of licensing procedure and license form for decommissioning of radioactive waste storage facility

Ministerial Acts Adopted in Atomic Energy Utilization Field

- Requirements to format and content of conclusion on safety expertise in atomic energy utilization field (Registered by the Ministry of Justice of RA. Registration № 10503349 as of 12.11.2003).
- Establishment of Armenian NPP emergency planning zones (Registered by the Ministry of Justice of RA. Registration № 12506129 as of 04.05.2006).
- Statute and procedure on formation of commission on qualification check of physical persons holding positions and implementing practices important to safety in atomic energy utilization field (Registered by the Ministry of Justice of RA. Registration № 12507398 as of 21.11.2007).
- Requirements to content and form of program on decommissioning of nuclear installations (registered by the Ministry of Justice of RA. Registration № 12511432 as of 27.09.2011).
- Requirements to format and content of environmental radiation monitoring system of nuclear energy utilization installation (registered by the Ministry of Justice of RA. Registration № 12512230 as of 31.05.2012).
- Requirements to format and content of occupational exposure personal cards (registered by the Ministry of Justice of RA on 25 March 2013 under the state registration № 12513109).
- Requirements on accounting of radioisotopic and ionizing radiation sources at atomic energy utilization installations (Registered by the Ministry of Justice of RA. Registration № 12512188 as of 11.04.2012).

- Requirements to format and content of occupational exposure personal cards (Registered by the Ministry of Justice of RA. Registration № 12513109 as of 25.05.2013).

g) Official national and international reports related to safety

- Sixth National Report of Armenia under Convention on Nuclear Safety (2013)
- National report of Armenia prepared for Second Extraordinary Meeting under Convention on Nuclear Safety (2012).
- Report of the 13th Meeting of the Atomic Energy Safety Council under the RA President

h) Reference to the report of international review mission performed at the request of a Contracting Party

- Report of OSART mission on 2011
- Report of OSART follow-up mission 2013