NATIONAL APPROACHES IN ARMENIA ON THE CONTROL OF RADIOACTIVITY OF FOODSTUFF AND DRINKING WATER IN EXISTING (POST-EMERGENCY) EXPOSURE SITUATIONS

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The main institutions involved in the nuclear and radiological safety management in Armenia are:

- Ministry for Energy and Natural Resources (MENR),
- State Regulatory Authority for Nuclear and Radiation Safety (ANRA), is the regulatory body for nuclear and radiological safety management in Armenia,
- CJSC "Armenian NPP" (ANPP), authorized to be the operator of the NPP.
- “Rendering Harmless of Radioactive Waste CJSC” (RADON Storage Facility), is responsible for the collection, transport and storage of solid radioactive waste from producers (industry, medicine and research).
- “Nuclear and Radiation Safety Centre (NRSC), which was set up in 2001 to provide technical support to ANRA.
- "Armatom" Institute CJSC, which provides engineering support to the ANPP.
- Ministry of Health (MoH), State Health Inspectorate: is responsible for conducting sanitary inspections in Armenia.
- NCDC: is responsible for disease control and prevention, drinking water quality state monitoring.
- Ministry of Agriculture (MoA), State Service of food safety
Armenian legislative framework regarding nuclear and radiological safety

Armenia has ratified the following international Conventions and Treaties:

• 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
• Comprehensive Nuclear-Test-Ban Treaty ratified on 21.12.1993
• Treaty on the Non-Proliferation of Nuclear Weapons (TNP) 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
• Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was ratified by the National Assembly of the RA in April 2013.
Armenian legislative framework regarding nuclear and radiological safety

The Republic of Armenia has also ratified:

• Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) in 1997
Armenian legislative framework regarding nuclear and radiological safety

The main laws are:

- Law on Safe Utilization of Atomic Energy for Peaceful Purposes (Atomic Law) adopted on 1 March, 1999. It is the basic legal document for settling relations in the field of the atomic energy and is called to ensure fulfilment of obligations of the RA under the international treaties in the field of atomic energy.

- Law on Licensing (Licensing Law) adopted on 30 May, 2001 establishes types of practices subject to licensing in the atomic energy utilization field and settles relations related to licensing.


- Law on the Protection of People in case of Emergencies (Emergency law adopted on 9 December 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.

- Law on Organization and Conduct of Inspections (17.05.2000 HO-172).

- The Code on Administrative Offenses, as amended in 1996. The amendments empower Armenian Nuclear Regulatory Authority (ANRA) to impose sanctions (warnings and fines) to offender of the legislation in the field of atomic energy utilization.
Armenian legislative framework regarding nuclear and radiological safety

**Government Decrees of RA are:**

- Decree № 573 as of 16.11.1993 on establishment of the state authority under the government of the RA on regulation of nuclear and radiation safety for atomic energy utilization (Armenian Nuclear Regulatory Authority).
- Decree № 1263 as of 24.12.2001 on approval of special rules on transportation of nuclear and radioactive materials.
- Decree № 631 as of 4 June 2009 on approval of “Procedure on Radioactive Waste Management”.
- Decree № 1552 as of 25 November 2010 on introduction of additions and amendments to the RA Government Decrees №1219 and №1489 as of as of 18 August 2006, in which the levels for exemption/clearance of bulk amounts of radioactive materials are established.
- Decree № 43 as of 04.11.2010 on approval of “Concept on safe management of radioactive waste and spent fuel in RA”.
- Decree № 553 as of 03.05.2007 on approval of procedure on detection and isolation of radioactive materials.
- Decree № 640 as of 12.07.2001 on approval of “Procedure for organization and conduct of safety expertise in the atomic energy utilization field”.
- Decree № 931 as of 27.06.2002 on approval of “Procedure for safe transport of nuclear and radioactive materials”.
- Decree № 1231 as of 11.09.2003 on approval of “Concept of physical protection and security of Armenian nuclear power plant NPP and nuclear materials and rules on physical protection of nuclear installations and nuclear materials”.
- Decree № 1597 as of 26.10.2004 on fulfillment of obligations undertaken under the Protocol Additional to the Agreement between the RA and the International Atomic Energy Agency for “The Application of Safeguards in Connection with Treaty on the Non-Proliferation of Nuclear Weapons”.
- Decree № 1953 as of 30.10.2004 on preparedness to response to nuclear and radiation emergencies in the RA.
- Decree № 342 as of 25.04.2001 on establishment of the scientific and technical center on Nuclear and Radiation Safety, CJS.
- 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.
Armenian legislative framework regarding nuclear and radiological safety

Numerous Government Decrees of RA on licensing

- Decree № 609 as of 12.05.2005 on approval of the licensing procedure and licence form for site selection of nuclear installations.
- 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”.
- Decree № 1790 as of 09.12.2004 on approval of “Licensing procedure, license and application form for import and export of radioactive materials, devices containing radioactive materials, or radiation generators”.
- Decree № 257 as of 10.02.2005 on approval of “Licensing procedure and license form for design of systems, structures and components important to safety of atomic energy utilization installation”.
- Decree № 258 as of 10.02.2005 on approval of “Licensing procedure and license form for manufacture of systems, structures and components important to safety of atomic energy utilization installation”.
- Decree № 345 as of 24.03.2005 on approval of “Licensing procedure and license form for expertise of atomic energy utilization installations, their designs and other documents”.
- Decree № 346 as of 24.03.2005 on approval of “Licensing procedure and license form for import and export of nuclear materials”.
- Decree № 375 as of 24.03.2005 on approval of “Licensing procedure and license form for import and export of radioactive wastes”.
- 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”.
- Decree № 400 as of 24.03.2005 on approval of “Licensing procedure and license form for operation of nuclear installations”.
- 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”.
- Decree № 416 as of 31.03.2005 on approval of “Licensing procedure and license form for construction of radioactive waste storage facility”.
- Decree № 417 as of 31.03.2005 on approval of “Licensing procedure and license form for construction of radioactive waste disposal facility”.
- Decree №608 as of 12.05.2005 on approval of “Licensing procedure and license form for designing of nuclear installations”.
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Decree № 417 as of 31.03.2005 on approval of “Licensing procedure and license form for construction of radioactive waste disposal facility”.

Decree №608 as of 12.05.2005 on approval of “Licensing procedure and license form for designing of nuclear installations”.

Decree № 609 as of 12.05.2005 on approval of “Licensing procedure and license form for site selection of nuclear installations”.
Armenian legislative framework regarding nuclear and radiological safety

- Decree № 647 as of 05.05.2005 on approval of “Licensing procedure and license form for storage of radioactive wastes”.
- Decree №649 as of 12.05.2005 on approval of “Licensing procedure and license form for construction of nuclear installations”.
- Decree № 652 as of 19.05.2005 on approval of “Licensing procedure and license form for operation of radioactive waste disposal facility”.
- Decree № 660 as of 05.05.2005 on approval of “Licensing procedure and license form for transport of radioactive waste”.
- Decree № 702 as of 19.05.2005 on approval of “Licensing procedure and license form for operation of radioactive waste storage facility”.
- Decree № 703 as of 19.05.2005 on approval of “Licensing procedure and license form for processing of radioactive wastes”.
- Decree № 707 as of 01.06.2005 on approval of “Licensing procedure and license form for decommissioning of nuclear installations”.
- Decree № 745 as of 09.06.2005 on approval of “Licensing procedure and license form for storage of nuclear materials”.
- Decree № 746 as of 09.06.2005 on approval of “Licensing procedure and license form for transport of nuclear materials”.
- Decree № 762 as of 09.06.2005 on approval of “Licensing procedure and license form for use of nuclear materials”.
- Decree № 781 as of 16.06.2005 on approval of “Licensing procedure and license form for services and practices not foreseen in the original design implemented during site selection, designing, construction, commissioning, operation and decommissioning of nuclear installations”.
- Decree № 985 as of 07.07.2005 on approval of “Licensing procedure and license form for designing of radioactive waste storage facility”.
- Decree № 986 as of 07.07.2005 on approval of “Licensing procedure and license form for designing of radioactive waste disposal facility”.
- Decree № 1203 as of 11.08.2005 on approval of “Licensing procedure and license form for site selection of radioactive waste storage facility”.
- Decree № 1204 as of 11.08.2005 on approval of “Licensing procedure and license form for site selection of radioactive waste disposal facility”.
- Decree № 1637 as of 16.10.2006 on opening a special account for decommissioning of Armenian NPP.
- Decree № 2129 as of 01.12.2005 on approval of “Licensing procedure and license form for closure of radioactive waste disposal facility”.
- 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”.
- Decree № 2141 as of 01.12.2005 on approval of “Licensing procedure and license form for decommissioning of radioactive waste storage facility”.
Armenian legislative framework regarding nuclear and radiological safety

- 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 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),
- Decree № 1489 as of 18.08.2006 on approval of “Radiation Safety Rules”,
- Decree № 1219 as of 18.08.2006 on approval of “Radiation Safety Standards”,
Armenian legislative framework regarding nuclear and radiological safety

Public Health safety legislation

- “Hygienic Demands to foodstuffs and food safety” sanitary normes and rules
- “Sanitary and hygienic requirements for the roentgen cabinets of the stomatologist’s services”

Draft paper for “Sanitary and hygienic requirements for products that are the source of ionizing radiation, including generating, as well as products and goods containing radioactive substances”
Government Decree № 1219 as of 18.08.2006 on approval of “Radiation Safety Standards”

in which are established the radiological safety norms for ensuring safety from harmful impact of ionizing radiation and the levels for exemption/clearance of moderate amounts of radioactive materials.

The radiological safety norms are for:

• population and personnel working with anthropogenetic sources,
• population and personnel during the event of a radiological emergency,
• patients for the purposes of diagnostics exams (X-rays, CT or CAT (computed tomography) scans, PET (positron emission tomography) scans, Fluoroscopy) or treatment,

Also the norms establish allowable levels of radiation impact for population and personnel for the chronic radiation cases, the protective actions that would be initiated in the cases of radiological emergency.
The norms aren’t implemented for:

• the equipment that are sources of radioizotopic radiation, on the distance of 0.1m from exterior surface of the equipment equivalent radiation dose intensity don’t exceed 1 $\mu$Sv/h,

• the sources of generic radiation, on the distance of 0.1m from exterior surface of the equipment the equivalent radiation dose don’t exceed 5 keV,

• the sources of generic and radioizotopic radiation, from which the annual individual equivalent radiation dose don’t exceed 10 $\mu$Sv, or annual gross dose don’t exceed 50 mSv, or in the eye lens 15 mSv, or collective gross dose don’t exceed 1 Sv*man,

• The internal radiation from the natural potassium (calium) in the human body or earth surface radiation from cosmic,
Government Decree № 1219 as of 18.08.2006 on approval of “Radiation Safety Standards”

are established
Derived Intervention Levels (DILs), criteria for making decisions for contingency response and preventive measures,

Derived Intervention Levels for foodstuff and drinking water ($\text{kBq/kg}$)
The levels are implemented for local produced, not processed, concentrated or dried food. For the food, that is used daily in limited amounts the levels of intervention can be more, for 10 times.
The levels are in force for 1 year after the radiological accident

<table>
<thead>
<tr>
<th>Radioactive isotopes</th>
<th>Derived Intervention Levels for foodstuff, Bq/kg</th>
<th>Derived Intervention Levels for baby food, milk and drinking water, Bq/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{134}\text{Cs}$, $^{137}\text{Cs}$, $^{103}\text{Ru}$, $^{106}\text{Ru}$, $^{89}\text{Sr}$</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>$^{131}\text{I}$</td>
<td>--</td>
<td>0.1</td>
</tr>
<tr>
<td>$^{90}\text{Sr}$</td>
<td>0.1</td>
<td>--</td>
</tr>
<tr>
<td>$^{241}\text{Am}$, $^{238}\text{Pu}$, $^{239}\text{Pu}$, $^{240}\text{Pu}$, $^{242}\text{Pu}$</td>
<td>0.01</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Screening levels for drinking-water below which no further action is required are:

<table>
<thead>
<tr>
<th>radioactivity</th>
<th>norms</th>
</tr>
</thead>
<tbody>
<tr>
<td>α- radioactivity</td>
<td>Bq/liter</td>
</tr>
<tr>
<td>gross alpha activity</td>
<td></td>
</tr>
<tr>
<td>β- radioactivity</td>
<td>Bq/liter</td>
</tr>
<tr>
<td>gross beta activity</td>
<td></td>
</tr>
</tbody>
</table>
Permissible limits of radiation in food are established. Examples:

<table>
<thead>
<tr>
<th></th>
<th>Bakery and pasta</th>
<th>Meat and vegetable preserves</th>
<th>Fish preserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesium-137</td>
<td>40 Bq/kg</td>
<td>70 Bq/kg</td>
<td>100 Bq/kg</td>
</tr>
<tr>
<td>Strontium-90</td>
<td>20 Bq/kg</td>
<td>30 Bq/kg</td>
<td>60 Bq/kg</td>
</tr>
</tbody>
</table>
For protection of public health from the radiological hazards is needed:

• Establishment of levels of radionuclide concentrations in food and drinking water within Armenia and in imported food following a Nuclear Accident,
• Terms, conditions of food and drinking water consumption following a Nuclear Accident,
• Radiological hazards Health Impact Risk Assessment following a Nuclear Accident and:
  - Implementation of Public Health Laboratory Biological specimens testing (biomonitoring),
  - Implementation of population’s morbidity monitoring,
  - Staff training and Guidelines in Armenian or Russian languages.
THANK YOU FOR ATTENTION!