

## LEGAL AND INSTITUTIONAL MEANS OF INTERVENTION IN CASE OF RADIOLOGICAL ACCIDENTS IN ROMANIA

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**Key words:** radiation pollution, INES (The International Nuclear and Radiological Event Scale), radiological accident, emergency intervention, SNMSU (National Management System for Emergency Events).

**Abstract.** A multilateral and universal form of pollution, the radioactive pollution slowly affects any living organisms by contaminating the air, water, underground and ground-cover. After the Chernobyl accident, a particular importance is given to the problem of nuclear safety, involving planning, preparedness, intervention and assistance issues in case of a potential radiological emergency.

### Introduction

Radioactivity (emission of alpha, beta, gamma particles) can naturally occur, from the sun, atmosphere, as well as from different kinds of rocks or may have artificial causes, related to the extraction and processing of radioactive ores or to the use of radioactive fuels in nuclear reactors in order to produce electricity. Radioactive exposure is also associated to the use of Roentgen (X-ray) installations or to all kind of experiments involving the use of nuclear stuff. etc.

The ever-growing demand for electricity, both for individual and industrial use, automatically leads to the premises of assuring a safe environment around the source meant to produce electricity, that is specifically to ensure the maximal security conditions to all facilities producing electricity, throughout all stages of technological process, up to the final stage of radioactive waste.

Radiological accidents are more often than the nuclear ones, having impact on smaller groups of individuals. Radiological accidents may occur (*Baciu , 2010*) within a state's territory, outside the state's area but with cross-border effects, or high up in the atmosphere.

The radiological accidents within a state's territory may occur inside the medical facilities, warehouses, industrial devices, research and educational institutions, transportation routes, during the nuclear fuel cycle, in land applications based on gamma rays surveys, in case of theft or loss of the source, in case of the destruction or extraction of the source from its container, in case of burning the

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source, in case of illegal traffic, in case of the dispersion of alpha emitters, in case of improper transportation or whenever terrorist or criminal actions are carried out, as well as in case of accidents in which neutron-generating radiological devices from research reactors are used.

Radiological accidents with cross-border effects are those occurring in the outer areas of nuclear plants but result in the environmental contamination by radioactive fall or deposits in a neighboring country.

Radiological accidents caused by nuclear powered satellites require their entrance into the Earth's atmosphere and fall on the ground.

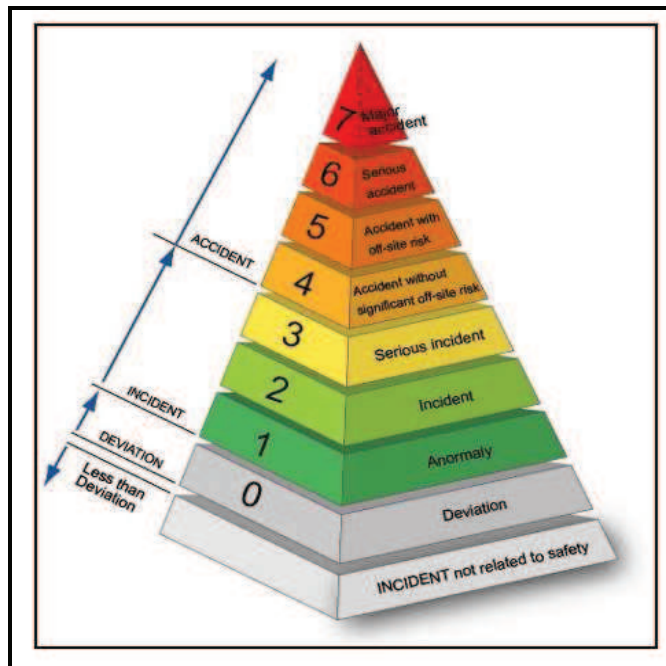


Fig. 1 - INES (The International Nuclear and Radiological Event Scale)  
(source: [www.centrale-nucleare.ro](http://www.centrale-nucleare.ro))

The effects of radiological accidents on human health can directly be related to the exposure to radiation and the duration of the irradiation process, which, depending on the cumulative dose absorbed, can occur shortly after irradiation, up to several dozen of days (non-stochastic effects), or they may be felt after a longer period of time, due to the accumulation of weak radiation-doses at long intervals

(stochastic effects), or even in the first months of pregnancy, thus affecting the fetus, because of its mother's exposure (teratogenic effects) (Marinescu Daniela,2008), or they may indirectly be linked, due to the improper intervention in case of radiological accident and inadequate medical care.

INES (The International Nuclear and Radiological Event Scale) is an instrument used by states possessing nuclear plants and equipment, members of the international nuclear community, to assess the size of potential effects in case of radiological accidents.

INES Scale (fig. 1) divides nuclear and radiological events as follows:

A. Nuclear incidents

- Level 3 serious incidents
- Level 2 incidents
- Level 1 anomaly

B. Nuclear accidents

- Level 7 major accidents
- Level 6 serious accidents
- Level 5 accidents with serious and widespread consequences outside the processing area
- Level 4 accidents with less severe consequences, having a small area extension (local, limited) if considering the people and the environment involved(levels 4-7), the radiological barriers and control-points (levels 2-5) and in depth defense/protection of nuclear facilities by activating the nuclear safety systems and control activities (levels 1-3).

### **1. The international legal framework concerning nuclear activities and accidents**

The danger of radioactive pollution has considerably increased as more countries carried out nuclear activities, this requiring global efforts for the adoption and implementation of preventive measures and mitigation of the associated pollution type.

The international intergovernmental organizations play an important role in this matter, such as the International Atomic Energy Agency (IAEA), the European Nuclear Energy Agency (NEA), the European Atomic Energy Community (EURATOM).

Among the documents adopted in this respect at international level and ratified by our country, the most significant are the following:

- The International Convention on Nuclear Safety, ratified by Romania in Law no 43/1995
- The Convention on the Physical protection of Nuclear Material, ratified by Romania in Law no 78/1993

- The Convention on Early Notification of a Nuclear Accident, which Romania joined by Decree no 223/1990

- The Convention on Assistance in case of Nuclear Accident or Radiological Emergency, to which Romania acceded by Decree no 223/1990

The Joint Convention on the Safety of Radioactive Waste, ratified by Romania in Law 105/1999.

## 2. The romanian legislation regarding intervention in case of radiological accidents

The issue of safely operating the nuclear activities for exclusively peaceful purposes, in order to meet the requirements of nuclear safety, protection of occupationally exposed workers, population, and environment is covered by the Law no 111/1996 related to the safe deployment, regulation, authorization and control of nuclear activities.

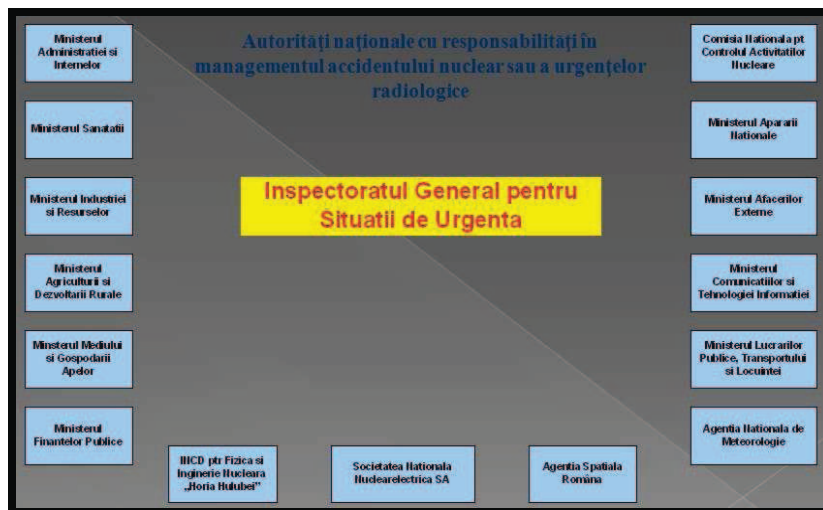


Fig. 2 - National authorities with responsibilities in the Management of nuclear accidents or radiological emergencies (source: [www.cncan.ro](http://www.cncan.ro))

In Romania, the activities in the nuclear field are deployed according to the National Nuclear Program, developed under the National Development Strategy in the nuclear field, approved by the Government Decision no 1259/2002.

The NCNAC (National Commission for Nuclear Activities Control) is the most competent national authority in the nuclear field and stands for a national

contact point in the relationship with IAEA, in accordance with the Decree no 233/1990 on the Convention on Early Notification of a Nuclear Accident.

In fig.2 are pictured the national authorities with responsibilities in the Management of nuclear accidents or radiological emergencies, as follows:

- The Ministry of Administration and Domestic Affairs – coordinates the evacuation (resettlement) of people, animals and public institutions out of the affected areas, establishing the districts for the transportation and assembly of the evacuated people, inspecting the potentially contaminated site areas (districts), setting the central place (point) for intervention management actions.

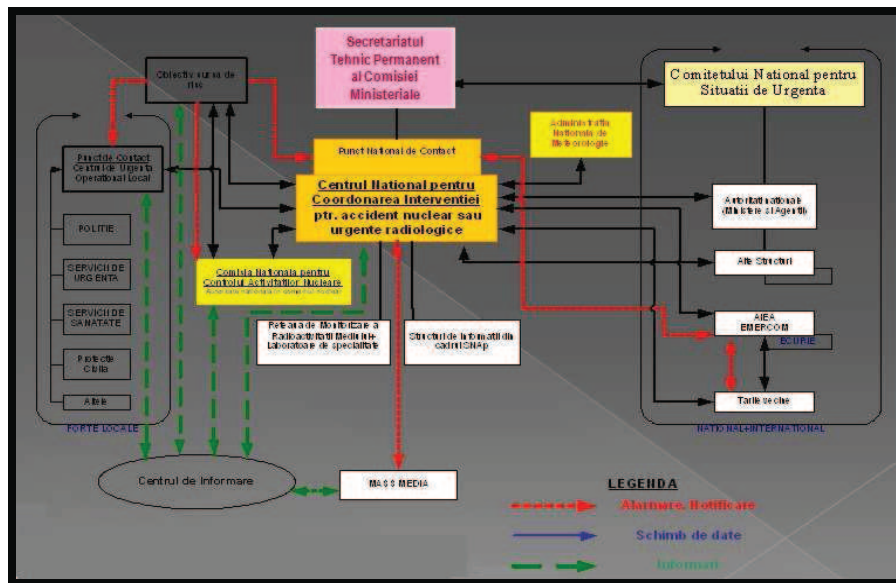


Fig.3 - The National Notification System in case of nuclear accident or radiological emergency (source: www.cncan.ro)

- The General Inspectorate for Emergency Situations – participates in drawing up plans for the protection and intervention in case of nuclear accident or radiological emergency, trains the local authorities, central government, public institutions and commercial agents for intervention in case of nuclear accident or radiological emergency, coordinates the preparation of resettlement plans for the evacuees, material goods and animals in case of nuclear accident or radiological emergency, prepares the intervention within GIES structure for action in case of nuclear accident or radiological emergency, both domestic and abroad, at the request of

international bodies. It also prepares the population to take measures of protection against nuclear accident or radiological emergency.

Within the NCNAC there is an Emergency Response Center providing a permanent secretariat for the National Committee for Emergency Situations (fig. 3). From a functional perspective, the National Centre for the Coordination of Interventions in case of nuclear accident or radiological emergency (NCCI), in normal situations, establishes the direct liaisons to the public authorities and institutions with responsibilities in this respect; coordinating all the activities related to planning, preparing and intervention decisions, and also creates the organizational and functional framework for the implementation of programs implemented in EU member states: ECURIE, RODOS (EURANOS), monitorizing and documentating on any hazardous situation that can lead to nuclear or radiological emergencies.

The National Centre for the Coordination of Interventions in case of nuclear accident or radiological emergency (NCCI) immediately sends notifications to all central public authorities and institutions within the Central Commission in case of nuclear accident or radiological emergency, activating the Expert Group, providing effective links with the affected nuclear object, submits the documents for intervention and implementation of necessary actions, until the Commission is fully activated, coordinates monitors the implementation of the decisions, long-term recovery measures, after the Commission has been dissolved.

The intervention at local level in case of radiological emergency requires the existence of pre-disaster, disaster and post-disaster intervention activities.

The Pre-disaster activities imply:

- knowledge about sources of nuclear danger in the area, about immediate protective measures to be taken against radiation, about a potential housing site;
- a prior preparation of water and food reserves, of first aid kits (which include potassium iodide pills), a portable radio, a phone and a flashlight;

In case of disaster, the alarm is given and the following measures are to be taken to avoid and limit the impact of disaster:

- people are moving quickly towards the housing site (where radiation exposure must be five times lower than the radioactive cloud and 20 times lower than the outer radionuclide depositions);
- people must seek housing in the most distant and isolated room from the outdoors, by best sealing windows and doors;
- authorities must ensure the protection of water sources and establish water reserves;
- people must take animals to stalls;
- people must keep their radio or TV sets open to receive information about the situation and the urgent measures to be taken;

- people must prepare improvised means of protection for the respiratory organs and the entire body if there are no gas masks and suits for special protection;
- authorized agencies must enhance their monitoring activities of environmental radioactivity in order to remove the population out of the area that could become dangerous, if necessary (but before the radioactive material is emitted out of the nuclear object);
- authorities must make regular dosimetry inspections (in order to assess the radiation dose received by the population);
- authorities must organize emergency medical assistance points;
- authorities must forbid the water consumption (for humans and domestic animals) from opened and unprotected water sources and also the consumption of contaminated food.

The post-disaster intervention measures aim specifically to remove the effects and to return to normal conditions, by assuming:

- the radioactive decontamination of buildings, access routes, schools, kindergartens, workplaces and material goods;
- the evacuation of people from the endangered areas, only after the decontamination of the access roads.

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