

Luxembourg

National Report on the measures taken
by Luxembourg to fulfill the obligations
laid down in the:

“CONVENTION ON NUCLEAR SAFETY”

Fifth review meeting of the contracting
parties in 2011

List of Acronyms and Abbreviations

ASS	Rescue Services Agency
CBRN	Chemical, Biological, Radiological and Nuclear
CNA	Alert Group of the ASS - Division of Civil Protection
CNS	Convention on Nuclear Safety
CONVEX	Convention Exercises (Emergency drills and exercises in the frame of the Convention on Early Notification of a Nuclear Accident)
CORDIRPA	French working group on the management of a post accidental phase
DRP	Department of Radiation Protection within the Directorate of Health (Regulatory Body)
EU	European Union
EULUX	European Emergency Exercise – Grand Duchy of Luxembourg 2007
GPR	Radiological Protection Unit of the ASS - Division of Civil Protection
IAEA	International Atomic Energy Agency
INEX	International Nuclear Emergency Exercises
IRSN	Institute for Radiation Protection and Nuclear Safety in France
JINEX	Joined International Nuclear Emergency Exercises
KI	Potassium Iodide
NBC	Nuclear, Biological, Chemical
NEA	Nuclear Energy Agency
NPP	Nuclear Power Plant
OECD	Organization for Economic Co-operation and Development
RPO	Radiation Protection Officer
SELCA	System of Exchanges and Liaison between Cattenom and the public Authorities
SMS	Short Message Service
VAR	Various Attacks Response – Field exercise in 2008

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A - Introduction

Luxembourg signed the Convention on Nuclear Safety (CNS) on 20 September 1994. It entered into force on 6 July 1997 by ratification. Luxembourg actively participated in all four previous review meetings of the contracting parties. The CNS pair review is considered in Luxembourg as to be a highly valuable exercise not only because it allows gaining insight to relevant safety issues in other countries. Above, the aspect of being reviewed, having frank and open discussions with qualified experts while profiting from constructive advises is considered to be essential for a small country with a limited own nuclear expertise.

There is no nuclear power plant, no other fuel-cycle facility, no research reactor and no other nuclear facility in Luxembourg, nor is any such facility foreseen in future. Being situated between Belgium, France and Germany, Luxembourg may nevertheless be confronted with serious consequences in case of a nuclear emergency in one of the nuclear power plants (NPP) sites in its immediate vicinity. The French NPP “Cattenom” comprising four 1300-MWe reactors is situated at only 8.5 km south from the national border. A second French site, Chooz with two times 1450 MWe output is located at around 70 km west from the country and the three reactors (3 x 930 MWe) at Thiange in Belgium have a distance of 65 km north-west from the closest border point. It should be noted, that the last two sites exhibit a predominant wind direction towards Luxembourg. The closest operating German NPPs, Biblis and Philippsburg, are situated at around 150 km east of Luxembourg. Other operating NPPs, like Doel (Belgium), Fessenheim and Nogent-sur-Seine (France), Borssele (Netherlands) and Neckarwestheim (Germany) are at distances between 150 and 250 km.

The department of radiation protection (DRP) is responsible for the content of the present report. The aim is to demonstrate that Luxembourg meets its obligations of the Convention on Nuclear Safety. Similar to other non-nuclear contracting parties, it is only reported on Articles 7, 8 and 16.

The situation has practically not changed since the previous review meeting. The present report is nevertheless a stand-alone document. Some paragraphs have been revised for editorial reasons; others have not been significantly modified. Changes, achievements and new issues are assigned throughout the document by underlining the first words of a sentence.

The report is structured in conformity with the “Guidelines regarding National Reports under the Convention on Nuclear Safety” (INFCIRC/572/Rev.3). The following chapter includes the observations and comments that were addressed to Luxembourg during the last review session in 2008. The efforts Luxembourg made in order to respond to these challenges are described under the respective articles.

B - Summary

Luxembourg is a non-nuclear country with essentially radiation protection and emergency preparedness issues. This situation is reflected within the existing legal framework. The department of radiation protection (DRP) within the ministry of health is charged with the protection of the population against the hazards of ionizing and non-ionizing radiation, as well as with nuclear safety.

During the 4th review meeting, the efforts of harmonizing emergency measures with neighboring countries, the participation in international emergency drills and the close cooperation with professionals from neighbor countries were considered as good practices.

The rapporteur also pointed out, that Luxembourg should continue to invest on training within international emergency drills and to make use of benefices from exercises with realistic treats, for instance by making use of real radioactive contaminations. A lack of competence of the rescue agency, mainly due to an insufficient number of professionals, was seen as another challenge.

In order to improve safety, Luxembourg had planned to introduce a quality assurance program within the Regulatory Body in its laboratory of radiophysics via an accreditation according to ISO 17025. A further project was to adopt and implement the recommendations from the international cooperation on harmonizing Iodine prophylaxis and linked protective actions. It was also foreseen to publish an updated public information brochure in 2009.

Since the last review meeting Luxembourg has addressed these challenges and planed measures. Whereas in some areas good improvements have been achieved, the goals set in 2008 have not been reached in others. In particular public information remains challenging. Although some progress has been made, a new information brochure could still not be issued.

New challenges have recently arisen with the adoption of a European Directive on Nuclear Safety (2009/71/EURATOM). This directive sets forth a common basis for nuclear safety in Europe that shall apply in all Member States of the European Union. The implementation of such common rules, which specifically target states with an existing or emerging nuclear program, is certainly more delicate in a purely non-nuclear country.

The participation in the French project “CORDIRPA”, focusing on post-accidental measures after a nuclear emergency, revealed weaknesses in emergency preparedness. Luxembourg will intensify its efforts in this area.

C - Reporting Article by Article

Article 7. Legislative and regulatory framework

ARTICLE 7. LEGISLATIVE AND REGULATORY FRAMEWORK

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations.
2. The legislative and regulatory framework shall provide for:
 - i. the establishment of applicable national safety requirements and regulations;
 - ii. a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence;
 - iii. a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;
 - iv. the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation.

Establishing and maintaining a legislative and regulatory framework

In 1963, a framework law was enacted on the Protection of the Public Against the Hazards of Ionizing Radiation. This framework law was last amended in 1995. It is the legal basis for executive regulations and sets out the basic principles regarding radiation protection and nuclear safety.

The executive regulations are regularly amended in conformity with the EU directives on radiation protection and nuclear safety. The main regulatory act was adopted on 14 December 2000 to implement the Council Directive 96/29/Euratom of 13 May 1996 laying down basic standards for the health protection of the general public and workers against the dangers of ionizing radiation.

However being a non-nuclear country, Luxembourg does not dispose of a very detailed regulation on nuclear matters which would cover all aspects related to the operation of nuclear installations. A list with all relevant laws and regulations, including the ratification laws for international conventions, is given in Annex I.

With the adoption of the Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, the European Union provides a binding legal framework on nuclear safety.

All EU-Member States have the obligation to transpose the directive into national law by 22nd of July 2011. Luxembourg considers that a flexible approach as regards the degree of transposition is permitted in a country that neither operates nor plans any nuclear installation. It is understood, that similar to the CNS, essentially some general core obligations have to be addressed. These are:

Article 4 – legislative, regulatory and organizational framework

Article 5 – competent regulatory authority

Article 7 – expertise and skills in nuclear safety

Article 8 – information to the public

Article 9 – reporting, self assessments and peer reviews.

While several of these obligations are already included in the existing framework, some aspects still need to be addressed by amending some parts of the current legislation. Luxembourg believes at the present stage of the internal consultation process, that the existing laws offer a sufficient legal basis. A need remains for amending the regulation of the 14 December 2000.

Specifically the goal set by the directive to enhance the role and the independence of the competent regulatory authority is challenging for Luxembourg, with the regulatory body being part of a ministerial administrative structure. Independence from political decisions cannot be reached in such a constellation. The establishment of a dedicated agency or authority that is governed and controlled by an elected and independent Commission, is also not a realistic option in a country that has only minor obligations with regard to nuclear safety. In order to increase to some extent the independence of the existing regulatory body, it is foreseen to introduce a legal obligations to publish a number of administrative documents issued by the DRP and results from peer reviews. This shall allow the competent regulatory authority to assume its tasks without undue influence and to assure sufficient financial and human resources.

National safety requirements and regulations

The DRP is in charge with the preparation of laws, regulations and decrees in the field of radiation protection and nuclear safety. In case of a regulation, the legislative procedure mainly consists in submitting the draft to different institutions, such as the Chamber of Commerce and other Ministries for opinion. After approbation by the Council of the Government the regulation project will be submitted to the Council of State (Conseil d'Etat) for opinion after which it is send to the responsible Ministers and the Grand Duke for signature. It enters into force after publication or on a specific date specified within the regulation. The Ministers who signed the regulation are responsible, everyone within his field of competence, for execution.

In case of laws, a project undergoes additionally a first and a second vote in the parliament. Decrees are adopted directly by the competent Minister.

System of licensing

The Grand Ducal Regulation of 14 December 2000 concerning the protection of the population against the dangers resulting from ionizing radiation defines a system of licensing for nuclear installations. Any project to build and/or operate a nuclear installation is subject to prior authorization by the Government in council, preventing though the construction and operation of a nuclear installation without license. The application for a license has to be addressed to the Minister of Health, who is responsible for the formalities within the licensing procedure.

The Minister of Health transmits the administrative follow up to the DRP. All documentation relating to the enquiry is submitted for opinion to national, foreign and international specialized bodies. These bodies are not specified in the legislation and have to be chosen ad hoc in the specific case. The application and the written expert opinions are then submitted to a public enquiry organized by the mayors of the concerned municipalities. The enquiry consists of adequately announcing the license application to the public and depositing the complete documentation of the project at the mayor houses, where every interested person can consult it. All interested parties are heard and a written record of the proceedings at the enquiry is drawn up. The file is then transmitted to other involved Ministers, to the College of Medical Practitioners and to the Commission of the European Communities, according to

article 37 of the EURATOM treaty. The Ministry of Health collects all opinions. The Government in council lays down the conditions governing the granting of a license. If the license is refused, an explanatory statement must be given to the applicant. With the transposition of the directive on nuclear safety, it is intended to introduce an additional opinion issued by the DRP within the licensing procedure for nuclear installations.

The specific information to be supplied with the license application includes particulars of the applicant organization, the description of the installation, the site, the number of staff and their qualification levels, civil nuclear liability, plans of the installations and demographic, ecological, geological, seismological and meteorological details of the area within a radius of 25 km. The application must contain a safety report describing the most serious accidents that could occur in the installations, including an assessment of the probability and foreseeable consequences of each potential accident. The application must also contain full details of the expected radioactive effluents and on the management, purification and disposal of solid, liquid and gaseous radioactive waste.

System of regulatory inspection and assessment

Inspectors of the DRP follow an inspection program for all facilities holding radioactive material or X-ray emitting devices. The questionnaires used during inspections are derived from the IAEA-TECDOC-1526, "Inspection of Radiation Sources and Regulatory Enforcement".

Enforcement of applicable regulations and terms of the licenses

The inspectors of the DRP may impose appropriate measures in order to avoid potential incidents or accidents. Some agents of the DRP are further attributed with the legal power of police officers. This enables them to enter day and night to any building with a suspicion of any illicit or dangerous activity involving radioactive material. These agents are also entitled to report any incompliance directly to the prosecutor.

Article 8. Regulatory body

ARTICLE 8. REGULATORY BODY

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 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.
2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy

Establishment of the regulatory body

The legislative and executive competence in the field of radiological safety and radiation protection is attributed to the Minister of Health. The law of 21 November 1980 concerning the organization of the Directorate of Health defines a department of radiation protection (DRP) and allocates particular missions to all departments within the Directorate of Health. Similarly to a number of other small countries, the DRP centralizes as a single department all competence of radiation and nuclear safety. The organizational structure and missions of the DRP are summarized in figure 1.

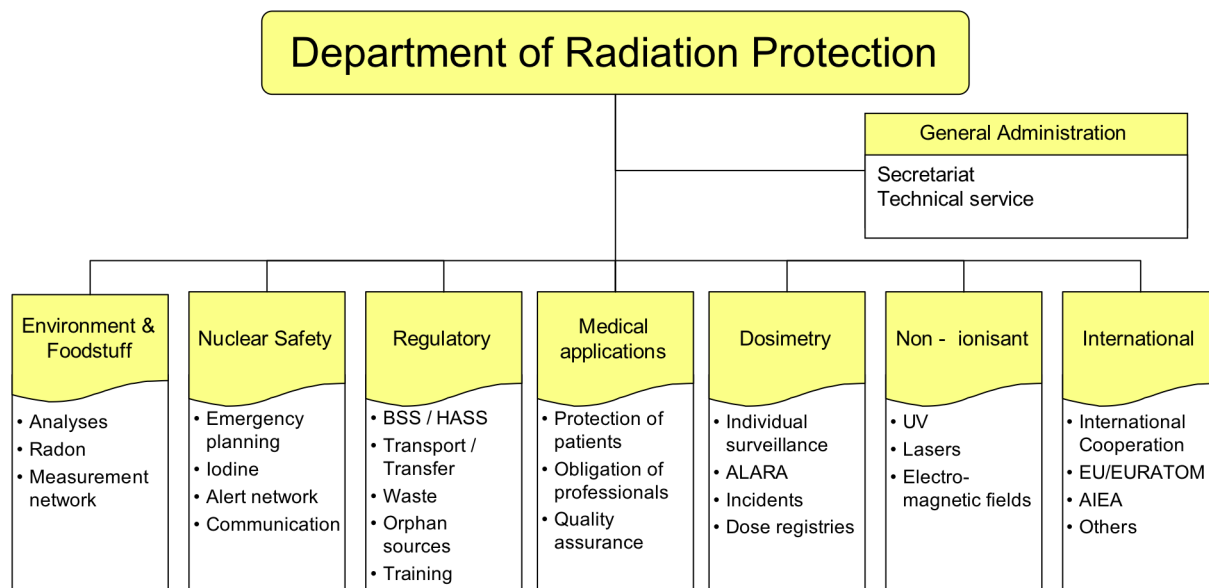


Figure 1: Organizational structure and missions of the DRP

The DRP is composed of 8 agents of higher education, specialized in radiation protection (1), medical physics (2), nuclear engineering (1), physics (1), geology (1), biology (1) and chemistry (1). For regulatory purposes, they rely on the lawyers of the Ministry of Health. One technical engineer, 2 technicians, 1 laboratory assistant and one secretary complete the department. Compared to the 1st January 2008, these numbers are stable. However, due to the permanent leave of one laboratory assistant, the DRP could upgrade this position and engage an additional a physicist in 2009.

Early 2010, the DRP has started with performance evaluation interviews. Part this individual exchange between the head of the department and each of his staff members is the

establishment of a personal training schedule. This measure is expected to maintain and to further develop competence.

All activities and projects of the DRP are financed via state budget, allocating predefined credits on a yearly basis. Some of these credits are non-limited to allow covering important non-predicable costs. This applies for example to expenses resulting from accidents and incidents. The budget of the DRP has usually been increased in the past about a 4% yearly rate in conjunction with the economic growth. Due to the economic crisis, the budget has however been frozen in 2010 on the level of 2009. Concerning the year 2011, a reduction of up to 10% is announced.

The financial and human resources of the DRP are not extensive, but they are felt to be adequate. It has always allowed the DRP to fulfill its obligations in an appropriate way. The DRP is also well prepared to overcome a short period of budgetary restrictions, without having to jeopardize any of its projects.

A first project of a quality management system was launched in 2007 within the laboratory of the DRP. The target, to be granted an accreditation according to ISO 17025, has been reached in July 2010.

On April 2009, the Ministry of Health launched a new Internet Portal. Under www.radioprotection.lu exists a direct link to the DRP. On this new site one may find relevant information on all aspects related to the missions of the DRP, such as relevant legislation, explanations and guides for RPO's, specific reports and information for the public on emergency preparedness. The homepage is regularly up-dated and expanded. With the transposition of the directive on nuclear safety it is also foreseen to introduce the publication of certain documents as a binding obligation of the DRP. This would concern all documents related to self-assessments and peer reviews, opinions issued by the DRP and assessment reports of emergency preparedness exercises.

Status of the regulatory body

The DRP is a department within the Directorate of Health. The head of the DRP reports via the Director to the Minister of Health. The Directorate of Energy, which is responsible for the promotion of electricity generating technologies, is placed under the responsibility of the Minister of Economy. This is an effective separation of the DRP from the public structures potentially responsible for the promotion of nuclear energy. With amendment of the licensing procedure as highlighted under article 7, the DRP would be additionally able to issue an independent opinion on any potential nuclear project.

Article 16. Emergency Preparedness

ARTICLE 16. EMERGENCY PREPAREDNESS

1. Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency.
2. For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body.
3. Each Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent authorities of the States in the vicinity of the nuclear installation are provided with appropriate information for emergency planning and response.
4. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency.

Competences and responsibilities

Concerning emergency preparedness, the competence for executing emergency measures lies with the Minister of Interior and the Minister of Health. The roles and responsibilities of each Minister are defined by the special intervention plan. Basically, the Rescue Service Agency (ASS) under the Ministry of Interior coordinates all rescue and protection measures, whereas the DRP is in charge with the evaluation of the situation from a radiological point of view. It is further defined that all state departments and administrations as well as the administrations of the municipalities are requested to cooperate by all possible means in order to realize the goals defined by the emergency plan.

During the last review, Luxembourg reported on the reorganization of the rescue services in Luxembourg that had taken place in 2004. The different divisions of the ASS were presented and the particularity that Luxembourg does not dispose of professional rescuers, but essentially relies on over 2000 volunteers, was highlighted. This was considered a challenging situation and Luxembourg was asked to reflect on introducing professionals into the rescue teams. Since early 2010, an independent international expert team has analyzed the situation and presented its first intermediate report in July 2010. The final report is expected for the end of 2010. In parallel, a first set of 13 professional rescuers have been engaged in spring 2010, a second set of 10 to 12 is scheduled for the autumn of this year. A total number of 60 professionals will be needed according to the preliminary recommendations of the expert group. Some of these shall also be specifically trained for deployment in CBRN incidents in support of the specialized intervention teams.

Two specialized intervention teams are mentioned in the context of the present report:

1. The approx. 30 persons of the Radiological Protection Unit (GPR) are trained for field interventions after nuclear or radiological accidents.
2. The 10 persons of Alert Group (CNA) are trained to assist establishing a radiological evaluation in the event of a nuclear accident.

Both groups continue to consist of essentially volunteer members. It should however be noted that several members of the DRP, who deal professionally with radiation protection, are members of the GPR. Concerning the CNA, volunteer members are selected according to

their professional experience. On 6 May 2010 a new regulation was issued on the missions and organization of the intervention teams. It prescribes among others the necessary training the requested competences for being accepted as a member of an intervention team.

Emergency Plan

Since the commissioning of the French nuclear facility in Cattenom in 1986, Luxembourg has set-up a special emergency plan, which is focused but not limited to an accident at the Cattenom-NPP. The original plan of 1986 has once been revised and amended on 2 December 1994, pursuant to a Government decision. Since 2000, a judicial basis for the setting and the execution of the nuclear emergency plan exists.

The Luxembourg special intervention plan draws upon the corresponding Swiss, German and French plans. It was submitted for examination and appraisal to the IAEA specialists in Vienna and to Swiss experts and was approved by both groups.

The special intervention plan is regularly activated and tested by the DRP and ASS in national, bilateral and international exercises.

The special intervention considers three accidental situations, susceptible to occur at the NPP Cattenom, each of which corresponds to appropriate alert and counter-measures plan. It further defines:

- organization and structure of the command post and evaluation cell;
- competences of the different actors;
- alerting of competent authorities;
- alerting of population;
- intervention levels.

It consists of a rather general model allowing for flexibility. More detailed internal procedures that need regular up-dates are either included in the annexes or exist within the responsible organization.

The annexes are regularly up-dated. Important modifications since 1994 are:

- Specific complementary Iodine prophylaxis program since end of 2001 (see “Iodine Prophylaxis” on page 14)
- Improvement of national alert systems (see “Information of the public “on page 15)
- Bilateral and international agreements (see “Communication and cooperation with neighboring states” on page 16)
- Implementation of lessons learned from exercises.
- Implementation of recommendations from harmonization efforts with neighboring countries on protective measures. (more information on page 16)

Particular emergency plans have to exist in most other administrations and key actors. These are not part of the special emergency plan. A good example is the responsibility of the police to establish and maintain a plan for organizing evacuations. If a command post were to decide the evacuation of a certain area, it would be the police to execute this decision. Luxembourg does not see a need of having all these plans integrated in the special nuclear emergency plan.

Radiological surveillance

In 1983 the Luxembourg Government decided to set up a national program for the systematic monitoring and the surveillance of the radioactivity on the national territory [1].

On the one hand, Luxembourg had to fulfill the requirements laid down in Article 35 of the EURATOM-Treaty, which attributes to member states the responsibility for the permanent control of the radioactivity in the air, water and soil on their national territory. On the other hand, in 1983, no bilateral or international agreements or conventions existed on the notification and the early exchange of information in the event of a radiological emergency and there was a need to run an independent warning system to face nuclear accidents occurring in neighboring countries.

This national monitoring program comprises an automatic measuring and warning network for the environmental radioactivity as well as the systematic measurement of environmental samples and samples of the food chain. Actually the network stands for a permanent surveillance of potential radioactive emissions from nuclear facilities and an early warning of the DRP in case of a radioactive release.

The DRP operates the monitoring network. It consists of each two independent computers for collecting and storing the data at the DRP and at the ASS, respectively. All alpha and beta monitors, as well as the online gamma-spectroscopy are subject of biannual calibrations, performed by the producer. The DRP ensures regular quality controls and maintenance of all the equipment and performs additional calibrations if needed. However the frequency of quality controls is not defined. Replacement of the instrumentation or parts of the instrumentation is decided on the bases of quality evaluations.

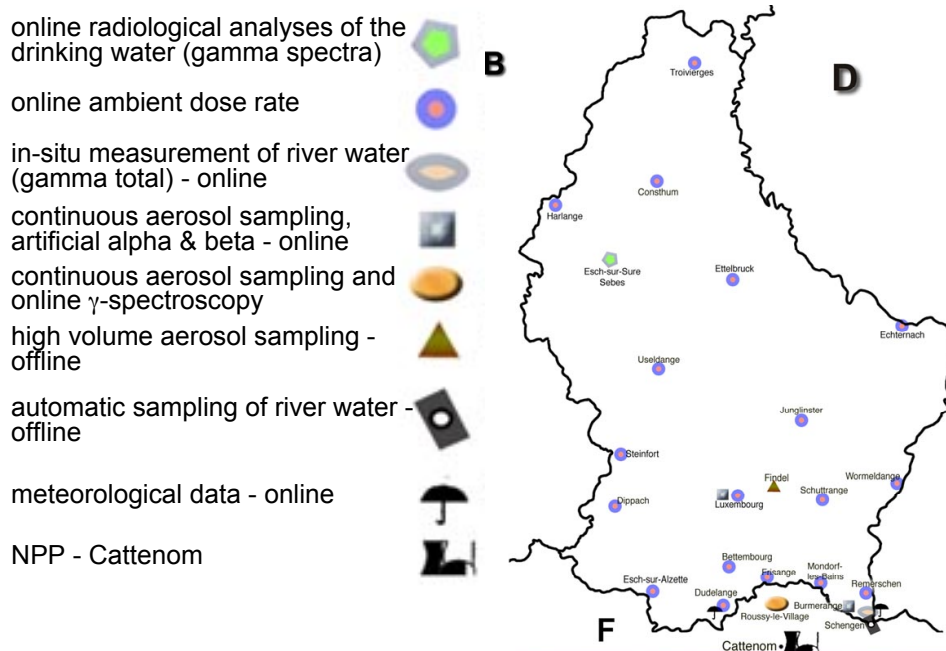


Figure 2: Monitoring network

The automatic measurement network (figure 2) comprises 18 monitoring stations for continuous gamma-dose rate in air, on-line. 8 of these stations are operational since 1984, others were installed in the years 1991 and 1994 and now completely cover the whole

territory of Luxembourg. In addition to gamma-dose rate in air, the national monitoring system further comprises the following measurements:

- 1 on-line station comprising measurements of the gross gamma-activity and iodine-131 activity in river water;
- 1 station for the automatic sampling of river water; operational since 1986;
- 2 on-line stations for continuous monitoring of airborne artificial alpha activity, artificial beta activity, Rn-concentration;
- 2 off-line stations for the sampling of aerosols;
- 2 on-line stations for meteorological data;
- 1 station for the continuous sampling of aerosols, gamma spectrometry, artificial alpha-activity, artificial beta-activity, Rn-concentration, iodine concentration (gaseous and particulate) gamma-dose rate; on-line; Operational since 1996, this measuring station is located on the French territory at the vicinity of the Cattenom nuclear power station (Luxembourg-French co-operation on nuclear security);
- 1 station for the continuous measuring gamma radiation in the main drinking water reservoir (operational since 2003), combined with an automatic sampling of raw drinking water at the same facility (operational since July 2007);

In normal situation the measuring cycle depends from the type of measuring station. After every cycle, the measured value is compared with the alert levels and the failure values of the different counters. The value is then saved as a momentary result. In normal operation several cycles are averaged and stored as an hourly measuring result to be transferred to the central computer system.

In alert situation two different threshold values are freely programmable to trigger alert levels. In case of alert level excess, the monitoring station transmits all stored results as well as the latest momentary value, which triggered the alarm, to the central computer system. During alert operation the measuring cycles are now averaged more frequently and stored in the memory for the next data transmission.

Since mid 2006, the network additionally notifies the duty agents of the DRP via email and SMS in the case of exceeding certain threshold values and/or errors within the network. The SMS system helps for the duty agent to easier analyze the situation from home, such as the possibility to recognize radon caused alerts. The more than 4000 yearly automatic notifications contain mostly technical information. This facilitates to operate the measurement network.

Iodine prophylaxis

In accordance with the special intervention plan, potassium iodide tablets (65 mg KI) are stored since 1986 in the municipalities situated at a distance up to 25 km from Cattenom. The mayor is responsible for setting up suitable distribution plans, to inform the population of his municipality of this plan and for the distribution of these tablets in case of a nuclear emergency. For the communities situated beyond this 25 km range, potassium iodide tablets are stored in the regional centers of the ASS.

Motivated by the significant increase of childhood thyroid cancer after the Chernobyl accident, the Minister of Health launched a complementary program of potassium iodide distribution at the end of 2001. This program targets mainly the most radiosensitive groups by achieving a better availability of the tablets for the groups in a sensible age. It consists of the following measures:

- KI stockpiles in all schools, including nursery schools;
- Pre-distribution to all newborns;
- Better availability of KI for nursing mothers.

In this context two aspects have changed. The complementary program had initially foreseen a pre-distribution to all children below five years old through pharmacies. This distribution is not further continued. It was indeed introduced as a five year transition period in order to cover the group of small children that were already born at the time when the distribution to newborn has started but who do still not go to school. A second aspect has recently arisen with the distribution to the newborns. Practitioners reported of several cases where parents administered the KI-tablets to their children instead of vitamins. These reports drastically reduced the willingness of the medical staff in the concerned hospitals to continue with the distribution program. In several meetings between the hospitals and the DRP during the first half of 2010, the reasons behind were analyzed and a new distribution standard has been developed. It turned out that within the multicultural population of Luxembourg many people do not sufficiently understand one of the official languages, leading thus to the misuse of the KI-tablets. From September 2010 on, the KI-tablets will be integrated into an additional box that is sealed. It will be clearly marked (in four languages) that the seal may only be broken in case of a nuclear emergency. In order to increase the level of information, especially for people with different cultural background, an information flyer consisting of 8 languages and explanative pictures is added. This flyer is based on the model developed by the international harmonization group [3] and may be consulted under www.radioprotection.lu.

Information of the public

A Grand Ducal regulation was promulgated on 11 August 1996 concerning the provision of information to the population on the applicable measures for the protection of public health and on the conduct to be adopted in the event of a radiological emergency.

This regulation stipulates that the government has to inform the population in advance about the sanitary prevention measures and the optimized behavior during a radiological emergency.

For this reason the Government published a brochure [2] to inform the population about the possible causes and effects of an accident that may occur in a NPP, about the various alarm signals and siren types, the prescribed protective measures and the appropriate behaviour to be adopted in case of alarm followed by the implementation of the special intervention plan. The brochure is distributed to all households. The most recent distribution of this brochure was in 2002.

A new edition of the brochure was scheduled for 2009. This target has however not been reached, partially because efforts in public information were concentrated in order to update the Internet site (see Article 8. Regulatory body). The other reason for postponing the edition of a new brochure is related to its content. The idea is to specifically develop information for young people and children. This is on one hand in response to recommendations from the international harmonization on iodine prophylaxis [3]. The elaboration of such specific information needs on the other hand to be well prepared, giving thus rise to a significant delay.

Since 1 of January 2008, a complementary information system via SMS became operational. It allows for transmitting specific information to a defined group of people, such as first responders or local authorities.

Communication and cooperation with neighboring states

Bilateral agreement with France

In the context of nuclear safety, Luxembourg signed an agreement with France in 1983, concerning the exchange of information in case of an incident or accident susceptible of having radiological consequences.

This agreement consists of the following clauses:

- Mutual information without time delay about incidents or accidents happening in one of the state territories which might have radiological consequences susceptible of affecting the territory of the other state;
- Creation of an appropriate information system that works 24/24 hours;
- The nature of the information that will be exchanged;
- Exchange of the liaison officers in case of executing the intervention plan.

In order to handle all the bilateral questions concerning nuclear safety, a Franco-Luxembourgish Commission has been created in 1994, as well as two technical groups having the aim to solve practical and technical issues. Regular meeting of these groups are organized. The 9th meeting of the Franco-Luxembourgish Commission will take place before the end of 2010 in Luxembourg.

To guarantee an efficient communication between the authorities and operator, a specific system for communication has been established. This “System of Exchanges and Liaison between Cattenom and the public Authorities (SELCA) connects the “Préfecture de la Moselle” and the Cattenom NPP to the competent authorities in Germany and Luxembourg.

The system consisted in the past of dedicated lines between the French and foreign authorities and it was fax-based. Since early 2010 the communication mode has changed. The dedicated phone and fax calls are now transmitted via a secured satellite connection. Two SELCA stations existed in the past in Luxembourg, at the DRP and at the ASS, whereas the new system is only installed at the ASS. The transmission of information to the DRP is however not compromised given that ASS is 24 hours over 24 operational and may reach the duty agents of the DRP at any moment.

Bilateral Agreement with Belgium

The government of the Grand Duchy of Luxembourg and the government of the Kingdom of Belgium concluded 28 April 2004 an agreement concerning the information exchange in case of an incident or accident, which might have radiological consequences. This agreement was approved in Luxembourg on 27 April 2006 by law.

International Cooperation on harmonizing Iodine prophylaxis and linked protective actions

The different strategies in iodine prophylaxis adopted by neighbouring countries could possibly result in inconsistent protective actions during a nuclear accident. As neighbouring country, concerned by a risk of exposure to radioactive iodine following an accident in a NPP in France or Belgium, Luxembourg consider it imperative to harmonize the preventive and protection actions well in advance. Therefore, Luxembourg participated in a group of experts from France, Belgium, Germany, Switzerland and Luxembourg that was formed in early 2006 with the goal to propose a harmonized strategy, focused on iodine prophylaxis linked with other protective actions. The main objective was to propose a voluntary agreed, flexible yet harmonized strategy. In July 2007 the group finalized a common report [3], that contained a number of recommendations. Luxembourg listed these recommendations in the previous national report.

In 2008 the common report was presented to the Minister of Health and the Minister of Interior. Both Ministers approved the recommendations and charged the DRP and the ASS to implement the recommendations according to their missions. Some recommendations did not need any modification to be implemented. The remaining issues have been addressed over the last 3 years as follows:

- One intervention level of thyroid-projected dose of maximum 50 mSv was recommended. This is already in agreement with the special emergency plan since it includes a flexible intervention level ranging from 30 to 250 mSv. It was thus only necessary to modify the internal procedures used by the evaluation cell and the command post.
- The above-mentioned ministerial approval also comprised the acceptance of source term assessment and initial dose assessment, including thyroid-projected dose to be provided by the country where the accident takes place.
- Several recommendations, such as,
 - to recommend in the early phase the population in the potentially affected area not to eat or drink food products possibly contaminated, regardless of any evaluation of contamination,
 - to decide on prophylaxis preparation on the basis of predicted dose assessment,
 - to decide on the issue and intake of stable iodine before release if possible,
 - to link iodine prophylaxis with sheltering and food bans,
 - to recommend taking into account the cautions and warnings of the package insert when recommending ingestion of stable iodine,have been integrated into the internal procedures used by the evaluation cell and the command post.
- A harmonized general public information handout has been finalized early 2010 and will be linked with iodine tablet boxes as highlighted on page 15.

Two recommendations remain and still need to be implemented:

1. Regular national information campaigns to be launched with emphasis on the critical group;
2. Harmonized answers for frequently asked questions.

Testing of emergency plans

National training and exercising policies

Following the clauses of the special emergency plan and according to the national legislation, the ASS and the DRP have to regularly organize national exercises or to participate in bilateral or international exercises on nuclear emergency.

Since more than twenty years, the authorities have regularly organized national exercises in order to train the specialized intervention teams of the Department of Civil Protection. All members of the GPR shall participate at the two yearly refresher courses on radiation protection. Additionally two national field-training days are organized per year for the GPR. Such training sessions comprise various elements, ranging from applying measurement techniques within a contaminated area, detection of radiation sources, rescue and decontamination of victims and coordination with other rescue teams. The ASS is licensed since 2007 by the Minister of Health to use radioactive sealed sources and to contaminate items or training areas with short-lived radioisotopes for training purposes.

The CNA holds about twelve meetings a year for refresher courses or for tabletop exercises. A specialized NBC team of the army is regularly trained of perform decontamination in case of a nuclear or radiological accident.

Given the relatively limited own resources and expertise, Luxembourg focuses its efforts on participating at international exercises. Such simulations of emergency situations have the advantage to face a higher degree of complexity and are thus more realistic. It also permits a mutual learning effect at all levels of participation.

Cattenom exercises

Focused on a nuclear emergency at the Cattenom NPP, trilateral exercises are organized every three years between the two German federal States, Sarreland and Rhineland-Palatinate, Luxembourg and France. The scenarios are prepared by the “Institut de Protection et de Sûreté Nucléaire” (IRSN) in France and generally simulate a serious incident with the probability of core melting.

The last exercise of this kind took place on the 8 and 9 April 2010. The exercise was split into two parts. On the first day the emergency phase was simulated, while the second day was dedicated to a tabletop exercise on post accidental protective measures.

The main goal of the emergency exercise was to test the coordination of all means to collect and evaluate radiological data in the participating region. Luxembourg set up a command post with evaluation cell and press office. The specialized units CNA and GPR were deployed for supporting radiological evaluation and for field measurements and sampling, respectively. The immediate analyses of the samples within the laboratory of the DRP were also a part of the exercise. However this part had been performed separately on 8 October 2009. All measured data from the GPR units and from the monitoring network were send to the IRSN in France. After receiving the data from Luxembourg, IRSN translated the data of 5 measurement stations into scenario data and transmitted these data to the French evaluation cell. This allowed establishing a global real time picture of the affected area. A final part of the exercise was the exchange of press releases between the countries. Following the exercise several meetings took place internally and with the German and French counterparts in order to evaluate and learn from the exercise.

The scenario of the exercise was rather demanding. It started with a small leakage within a primary circuit, followed by subsequent failures of nearly all safety barriers giving rise to radioactive releases in the course of the afternoon. Such an aggravation was not well anticipated. Despite of some confusion, the coordination of the countermeasures to be decided in the affected countries turned out to have much improved compared to previous exercises. The complete decision process within the French command chain was indeed accessible for the command post of Luxembourg. It also allowed to question and influence French decisions before they were taken. Some of the radiological measurements done in France have been made public on a dedicated homepage. This new feature allowed to follow the rise in dose rate in real-time. The exercise also revealed some weaknesses with a clear need for follow-up-actions. The main issues are as follows:

- Need to update the procedures on how to organize a press conference in case of a nuclear emergency.
- Need to develop a global radiological measurement plan for Luxembourg. Such a plan should include all existing procedures within a single document, which comprises the tasks of the GPR, the national measurement network and the laboratory of the DRP.

- Establish specific measurement procedures for nuclear and radiological emergency situations at the laboratory of the DRP.
- Continue the harmonization efforts with the neighboring countries, especially with regard to the implementation of harmonized and coordinated actions at a regional level. A subgroup with active participation of the DRP and the ASS has been set-up by the prefecture in Metz (France) to work on this issue.

On the second day, participants met at the training center of the Cattenom-NPP in order to test the organization and management of the post-accidental phase according to the policies established by the CORDIRPA. The previous day exercise served as a scenario. Accordingly, releases had taken place during several hours and contaminated areas in France, Germany and Luxembourg. Three working groups were established in order to translate the policies into actions for the given case:

1. Communication and transborder coordination
2. Management of contaminated territories
3. Management of the populations

It was the first exercise of this type in France. It mainly helped to familiarize the local and regional authorities with the particular problems arising in the long run after a nuclear accident. It clearly showed the need to further work on post accidental policies and to specifically aim at a harmonized approach across borders of the countries. Luxembourg will continue to participate at the CORDIRPA in France and will in parallel start to implement relevant policies in Luxembourg.

International exercises

Luxembourg has participated in almost all INEX exercises, organized by the NEA of the OECD, all CONVEX exercises launched by the AIEA, as well as in JINEX 1.

Since 2008 and in agreement with recommendations from the previous review meeting Luxembourg invested increasingly into international involvement of the first responders, by participation and organizing international drills for radiological emergencies. Several levels of cooperation have been set up.

In particular with regard to contamination of radiological contaminated persons, a close cooperation has been set up with specialized intervention teams in Belgium and in France. A dedicated two-day seminar was organized in November 2008 in Luxembourg. The goal was to analyze the lessons learned from the 2007 EULUX-exercise (see previous national report), to compare the capacities of each team and to plan future common activities. Other meetings in Belgium and in France followed. One of the main results was the set of criteria for a complete modular decontamination chain, including buildings, showers, changing rooms and accessories for mass decontamination. Luxembourg has purchased one decontamination chain early 2010. It is identical to the chains bought by French fire brigades and designed for valid and invalid victims during a biological, chemical or nuclear incident. A first common exercise with deployment of the French, Belgian and Luxembourgish decontamination chain is planned from the 8th to 10th October in Luxembourg. The goal will be to test the units qualitatively and quantitatively. This shall allow in a second stage to adopt identical working procedures.

In 2008 the GPR participated in international field training in France. The VAR (Various Attack Response) European Exercise took place at the military camp of Canjuers from 4th to 6th November 2008. This was an exercise involving civil protection corps from all over

Europe. "VAR 2008" goals were to test the emergency services reaction time, to evaluate their capabilities of detecting biological, radioactive and chemical agents and to assess the means of care for victims with their dispatching in European hospital according to the condition of the victim. The members of the GPR were integrated into French decontamination teams, which allowed a good insight into working practices of other nations.

A measurement exercise with the participation of teams from Germany, France and Luxembourg is scheduled for the 25 September 2010. It is foreseen to prepare measurement points in Germany and in Luxembourg. The teams of each country shall measure radiation rates at a given time on the defined measurement point and communicate the results to the common evaluation cell. The goal is to produce a regional mapping and evaluation of the situation across the borders.

Annex I

Laws

Law of 25 March 1963 concerning the protection of the population against the dangers arising from ionizing radiation.

Law of 21 November 1980 concerning the organization of the Directorate of Health.

Law of 28 March 1984 concerning the approbation of the agreement between the government of the Grand Duchy of Luxembourg and the government of the French Republic concerning the information exchange in case of an incident or accident which might have radiological consequences, signed in Luxembourg on 11 April 1983.

Law of 19 March 1997 concerning the approbation of the Convention on Nuclear Safety, adopted in Vienna on 20 September 1994.

Law of 28 July 2000 concerning the approbation of the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, adopted in Vienna on 26 September 1986.

Law of 28 July 2000 concerning the approbation of the Convention on Early Notification of a Nuclear Accident, adopted in Vienna on 26 September 1986.

Law of 12 June 2006 concerning the creation of the rescue services agency.

Law of 27 April 2006 concerning the approbation of the agreement between the government of the Grand Duchy of Luxembourg and the government of the Kingdom of Belgium concerning the information exchange in case of an incident or accident which might have radiological consequences, signed in Eischen on 28 April 2004.

Regulations and Decrees

Grand-ducal regulation of 27 November 1987 concerning the admissible levels of radioactivity in foodstuffs.

Grand-ducal regulation of 11 August 1996 concerning the provision of information to the population on the applicable measures for the protection of public health and on the conduct to be adopted in the event of a radiological emergency.

Grand-ducal regulation of 14 December 2000 concerning the protection of the population against the dangers arising from ionizing radiation.

Grand-ducal regulation of 6 May 2010, defining the specific missions, the composition, organization and operation of the department of civil protection of the rescue services agency.

National emergency response plan in case of an incident or accident in the nuclear power plant of Cattenom or in case of any other radiological or nuclear event. (adopted by the Government on 2 December 1994).

Annex II - References

- 1 The national program of monitoring the environmental radioactivity in the Grand-Duchy of Luxembourg, Radiation Protection Department, Luxembourg, September 2005.
- 2 What to do in case of a nuclear accident? Ministry of Interior – Ministry of Health, Grand-Duchy of Luxembourg, 2002.
- 3 Trans-border harmonization of iodine prophylaxis and linked protective actions in the first hours of a nuclear accident. Report written by: Dr Patrick SMEESTERS, Dr Lodewijk VAN BLADEL, Christian VANDECASTEELE, Agence Fédérale de Contrôle Nucléaire; Didier DEGUELDRE Association Vinçotte Nucléaire, Belgium; Philippe CHAPPE, Jean-Luc LACHAUME, Marc STOLTZ, Autorité de Sûreté Nucléaire, Karine HERVIOU, Sonia MASSET, Institut de Radioprotection et de Sûreté Nucléaire, France; Johannes KUHLEN, Uta PORTIUS, Federal Ministry for the Environment, Nature, Conservation and Nuclear Safety, Dr. Reimund STAPEL, Federal office for Radiation Protection, Germany; Dr Michel FEIDER, Administration des services de secours, Patrick BREUSKIN, Dr Patrick MAJERUS, Division de la Radioprotection de la Direction de la Santé, Luxembourg; Dr Monika BLÄTTLER, Nationale Alarmzentrale, Paul DIETSCHY Swissmedic, Switzerland, July 2007.