Luxembourg

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

"CONVENTION ON NUCLEAR SAFETY"

Fourth review meeting of the contracting parties in 2008

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Introduction

Luxembourg has signed the Convention on Nuclear Safety on 20 September 1994 and is a Party thereof since 7 April 1997. The Convention entered into force on 6 July 1997 by ratification. Luxembourg actively participated in all three previous review meetings of the contracting parties.

Luxembourg has no nuclear power plant, no other fuel-cycle facility and no research reactor on its national territory. However, being situated in the heart of Western Europe between Belgium France and Germany, Luxembourg has to be prepared for a possible nuclear emergency in one of the three nuclear power plant sites in its direct vicinity. Indeed, 8.5 km south from its national border is the French nuclear facility "Cattenom" comprising four 1300-MWe reactors, making a total output of 5 200 MWe. A second French site, Chooze 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 reactors, Biblis and Philipsburg, are situated at around 150 km east of Luxembourg. Also other European reactors are all at distances beyond 150 km.

Since the commissioning of the French nuclear facility in Cattenom in 1986, Luxembourg has had a special emergency plan, which will be implemented in the event of an incident or accident at the Cattenom facility. This emergency plan is also applicable in the event of a nuclear accident at another location.

Luxembourg has adopted laws and regulations on nuclear and radiological safety; these are in conformity with the provisions of the Euratom Treaty, to which Luxembourg is a party. They relate to the protection of the general population as well as to the protection of workers.

With regard of the situation of being a completely non-nuclear country, many requirements of the Convention do not apply to Luxembourg. Thus the present report will only address the applicable articles.

The present report is regarded as a stand-alone document. Nevertheless, it has been completely revised for editorial purposes and for increasing comprehensiveness compared to previous editions. New developments that have occurred since the last review meeting are clearly assigned throughout the document by underlining the first words of a paragraph, or by assigning it accordingly within the title of a paragraph.

By the following the report includes a section addressing observations and comments to Luxembourg during the last review session in 2005. It then passes to an article-by-article presentation of the applicable articles.

Observations and comments from the 3rd review meeting

As Luxembourg is a non-nuclear country, radiation protection issues and emergency preparedness were considered as only highlights during the 3rd review meeting. The discussions included mainly the national monitoring program of radioactivity in the environment, the emergency planning in cooperation with neighboring countries and exchange of information with the population.

Especially the last point was considered as a challenge due to the fact that close to 120000 trans-border commuters work in Luxembourg. To this is added an own population of 450000 consisting of nearly 40% foreigner with no common language. The challenge is indeed to reach all these people with adequate information during nuclear emergency.

As a general challenge, for small countries with no nuclear program, was stressed out the difficulty to find sufficiently qualified experts on nuclear power technology issues.

It was then requested from Luxembourg to report at the 4th review meeting on the possible use of modern communication systems, such as SMS and e-mail in the context of exchanging information and informing the population. Luxembourg should further demonstrate how it applies the lessons learned from international exercises. As a third point Luxembourg was asked to present its bilateral arrangement with Belgium.

Obligations under the Convention - article by article

As stated in the introduction, not all articles of the Convention on Nuclear Safety apply to Luxembourg, as no nuclear installations exist on its territory. For Luxembourg article 6 is thus not applicable. Luxembourg further declares articles 9, 10, 11, 12, 13, 14, 15, 17, 18 and 19 to be not applicable and will thus not report on them. These ten articles are only of relevance if nuclear installations are in construction or already operational. Luxembourg does not plan in the foreseeable future to become a nuclear country and to build nuclear installations on its territory. As a result Luxembourg has not established a detailed regulation covering all aspects with regard to nuclear safety. The current regulation describes comprehensively the responsibility of the license holder, assessments, quality controls and safety verifications of activities involving radioactive material, including radiological and nuclear emergency. In accordance with its national laws and regulations, if a nuclear installation were to be designed and built, Luxembourg would comply with the provisions of these ten articles, respectively.

The remaining articles of chapter 2 of the Convention will be dealt with in detail in the following sections.

Article 4. Implementation measures

In 1963, a framework law was enacted on the Protection of the Public Against the Hazards of Ionizing Radiation, which established general principles. This framework law clearly attributes competence concerning all aspects involving ionizing radiation to the Minister of Health, including nuclear safety.

The law of 21 November 1980 concerning the organization of the Directorate of Health defined a department of radiation protection and attributed the competences of all questions concerning the protection against hazards of ionizing and non-ionizing radiation and nuclear safety to this department.

These principles formed the basis for executive regulations, which were regularly amended in conformity with the EU directives on radiation protection and to govern the various aspects of nuclear safety. The current regulation constitutes the basic text governing radiation protection in Luxembourg. This regulation was adopted 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. The Luxembourg current regulation is complying with the provisions of the EU directives on radiation protection. The last amendment of the regulation was put into force on 21 July 2006 with the transposition of the Council Directive 2003/122/Euratom of 22 December 2003.

The various laws and regulations, building a solid legal framework, are listed in Annex I.

Article 5. Submission of reports

The present report constitutes the compulsory report referred to in Article 5.

Article 7. Legislative and regulatory framework

Presently no nuclear program exists in Luxembourg, neither is such a program foreseen for the future. Nevertheless, in order to be in conformity with the European Council directive on basic safety standards, Luxembourg established a legal framework to govern the safety of nuclear installations.

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 with regard to nuclear installations. Any project to build and/or operate a nuclear installation is subject to prior authorization by the Government in council. 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 department of radiation protection. 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 now transmitted to the other interested Ministers, to the College of Medical Practitioners and to the Commission of the European Communities, according o 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.

The specific information to be supplied in 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.

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. The legal framework concerning emergency preparedness is described under article 16 hereafter.

According to the Luxembourg laws and regulations, the operator of an installation is responsible for:

- Safety and security of the installation;
- Radiation protection;
- Strict control of the working conditions of the workers and their exposure to ionizing radiation;
- Set-up of clear working procedures and procedures for the case of incidents and accidents;
- Designation of the responsibilities within the installation and the designation of qualified experts and radiation protection officers;
- Appropriate training of exposed workers;
- Maintaining the protection of environment and population.

Article 8. Regulatory body

The regulatory body is the Ministry of Health. In the case of a project to establish a nuclear installation, the Minister of Health is given the financial and human resources necessary for the fulfillment of the responsibilities assigned to him (cf. notes on Article 7 above). He is granted appropriate powers and jurisdiction in accordance with the applicable legislation.

Concerning emergency preparedness the competence, with regard to responsibility for executing the plan lies with the Minister of Interior and the Minister of Health.

Within the Ministry of Health, the department of radiation protection of the Directorate of Health is charged with all practical and administrative aspects, as it is the Rescue Services Agency for the Ministry of Interior. It is further defined that all departments and administrations under the competence of the Government and the administrations of the Municipalities are requested to cooperate by all possible means in order to realize the goals defined by the emergency plan.

Modification since the last review: The rescue services in Luxembourg were restructured in 2004 and all rescue teams were brought together within the newly created Rescue Services Agency (ASS). The management of the Agency is ensured by 25 state employees and the Emergency Assistance Centre, known as “112”, is run by 16 operators.

The Agency's Division of Civil Protection is composed of 2 232 volunteers who are based in 25 regional centers. It includes ambulance personnel and rescue workers as well as the groups responsible for provisions. Furthermore this Division includes specialized units, such as the Alert Group, the Canine Rescue Unit, the Psychological Support Unit, the Radiological Protection Unit, the Chemical Unit, the Rescue Divers Unit and the Humanitarian Intervention Teams.

The Division of Fire and Rescue Services ensures on a national level the coordination of the local fire brigades. The Administrative, Technical and Medical Division is, amongst others, in charge of the management of the Agency's human and financial resources and the management, maintenance and organization of equipment, vehicles and infrastructures.

The Radiological Protection Unit (GPR) consists of about 30 persons and is trained for practical intervention, such as to proceed to ambient dose rates measurements, to detect contamination, to take samples from the environment (rain, aerosols, grass, soil, etc.), to identify and to recover lost sources and to manage accident response with radiation sources. It should be noted that the Radiological Protection Unit is the follower of the former NBC (nuclear biological chemical) group, whereas the chemical and biological competences now lay within new groups.

The Alert Group comprises ten persons (CNA). This team is mainly trained to assist the competent authorities to evaluate the situations in the event of a nuclear accident. In accordance with its range of competence, this team is called upon to gather radiological data, to evaluate the general radiological situation, and to give advice on the preventive or the protective measures to be taken in case of a radiological or nuclear accident.

Article 16. Emergency Preparedness

Regarding the situation of Luxembourg, having several nuclear power reactors at a close vicinity to its borders, Luxembourg considers emergency preparedness the most important issue within the scope of the Convention on Nuclear Safety. This is also why a major part of the present report is dedicated to emergency preparedness, including a brief overview concerning the fulfillment of the obligations. For clarity in reading the present chapter is subdivided according the different aspects of emergency preparedness.

Obligations under the Convention

As soon as the French nuclear facility in Cattenom, 8.5 km from the Luxembourg border, was commissioned in 1986, the Luxembourg Government adopted a special intervention plan. The original plan of 1986 has subsequently been revised and amended; the most recent amendment was effected 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 activated and tested by the competent authorities of the Ministry of Health (department of radiation protection) and by the Rescue Services Agency, in national, bilateral and international exercises.

The special intervention plan further defines:

- The execution of broadcasting alert by the authorities with predefined messages;
- The different measures of prevention and protection to consider or to take, in case of a nuclear emergency;
- The intervention levels for the execution of the different measures of prevention and protection.

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

The measures of protection concern most of all the population living in a range of 25 km around the site of Cattenom are extended, beyond the zone of 25 km if necessary.

Emergency teams have been formed to assist in the event of a nuclear disaster, and refresher courses are held periodically.

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 competent authorities in case of a radioactive release.

The automatic measurement network 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);

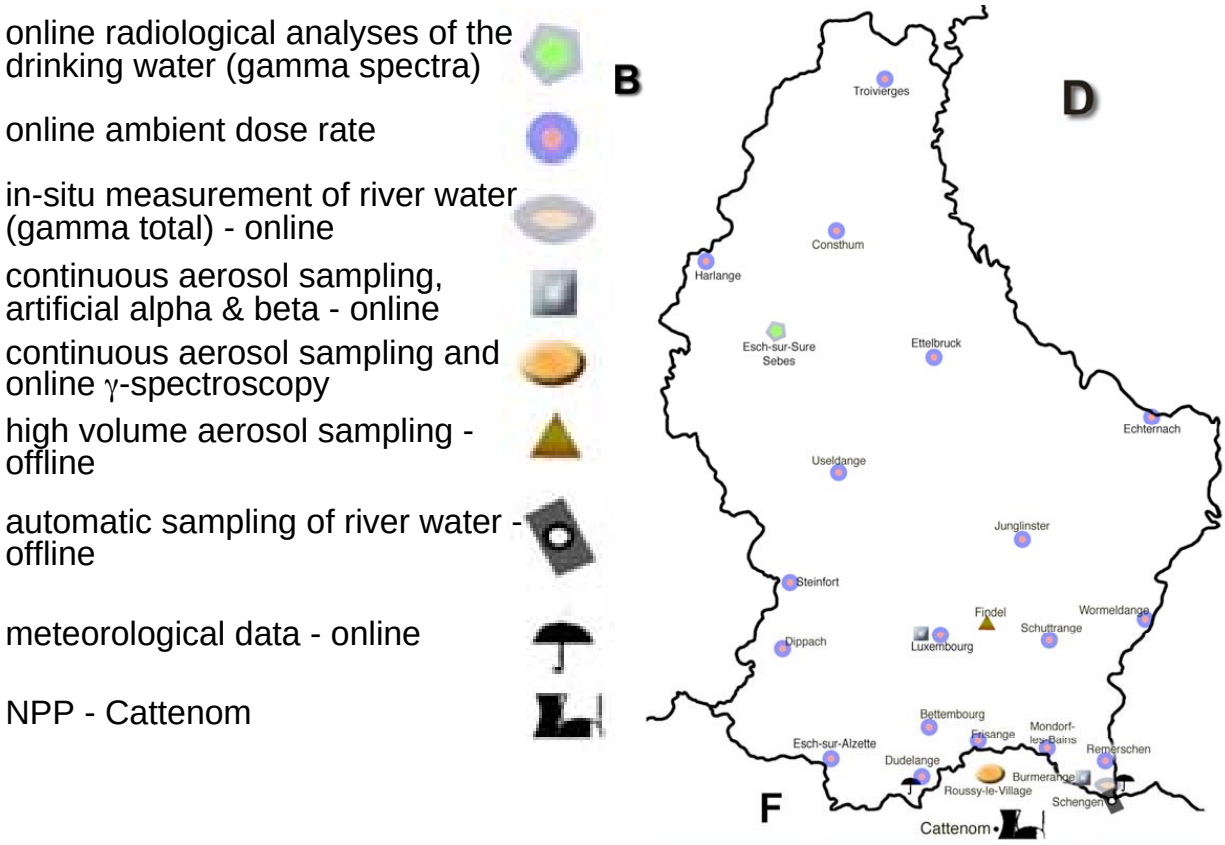

Figure 1: Monitoring network

The department of radiation protection operates the central computer system. It consists of each two independent computers at the department of radiation protection and at the Rescue Services Agency, respectively.

In normal situation the measuring cycle is depending from the type of measuring station. After every cycle the measured value is compared with the alert levels, the failure values of the different counters and finally stored 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 department of radiation protection via SMS in the case of exceeding certain threshold values and/or errors within the network.

Information to 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 (see Annex I).

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 is planned for the year 2009. The entire brochure is also available at the homepage of the Government (www.gouvernement.lu) and of the department of radiation protection (www.drp.etat.lu). These homepages additionally contain a detailed description of the nuclear emergency planning in Luxembourg, as well as a list of frequently asked questions.

In the case of a nuclear emergency, a network of sirens installed all across the whole country achieves the alert of the population. This system allows it to trigger the signals of the sirens in each sector and even in each locality separately. This selective system makes it possible to limit an alert to the affected zones. The modulation of the signals of the sirens is indicated in the information brochure distributed to the public, but can also be found in every telephone book.

During alarm state, the population should listen to the national radio stations or watch television in order to get the necessary information broadcasted by the authorities. It should also be pointed out that seven different standard messages to the population, printed in five languages, are contained in the nuclear emergency plan. These are stored at the National Broadcasting Centre and will be revised and adapted as required before being broadcast.

Current activity: Currently a pilot project is running for additionally alerting local authorities, such as mayors and/or security agents of schools via SMS. By this additional system it is foreseen, that depending of the type of accident, local authorities might prepare preventive actions before general alert is given. It further allows transmitting very effectively specific information to a special group of people. This could for example help to prepare the distribution of stable Potassium Iodide at the different distribution places before asking the population to pick up their Iodide tablets.

It is also foreseen to re-organize the homepage of the Ministry of Health. It is expected that the available information will then be easier acceded by the public. This project will be linked with an up-date of the information.

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. In case of a nuclear emergency, the mayor is responsible for the distribution of these tablets in his respective municipality and for the preparation of such a distribution in advance.

For the communities situated beyond this 25 km range, potassium iodide tablets are stored in the Civil Defense Centers.

Motivated by the significant increase of childhood thyroid cancer after the Chernobyl accident, the Minister of Health lunched 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;
- Pre-distribution to all children below five years old through pharmacies;
- Better availability of KI for nursing mothers.

Concerning the intervention levels, Luxembourg has adopted a rather flexible approach, to be able to assure the best protection for the public and in order to harmonize during emergency situations the counter measures engaged by the border country where the accident happened. The goal is to avoid contradictory countermeasures during an emergency across country borders. The very large range of intervention levels from 30-250 mSv for thyroid dose (children during 7 days; cloud passage; worst case scenario) reflects this philosophy of being able to harmonize more or less ad hoc the intervention levels and countermeasures with the concerned neighbouring country.

Two intervention zones are distinguished, the primary zone up to 25 km from the NPP in Cattenom (Fr) and the second zone above the 25 km covering the rest of the country. The alarm, protection and rescue measures are primarily focused on the population living in the first zone. These measures are extended to the second zone when needed.

Current activity: The department of radiation protection lunched a campaign in 2005 aiming at verifying the effectiveness of the complementary iodine prophylaxis program with focus on the KI stockpiles in schools. The aim was to find out if the involved persons are sufficiently informed about their responsibility. During this campaign it was found that frequent rotations of the responsibilities in educational institutions are regularly problematic in terms of follow up issues. Awareness of the importance of this complementary program was further revealed to be one of the main topics that could indeed seriously affect an effective distribution during an emergency. The perception ranged from “We will anyway die” over suspiciousness, indifference up to being well informed. The extremely sceptical people and the well informed groups were generally good up to extremely well organised. The main problem was revealed with “indifferent” group of people, who did not answer to the questionnaires and in some extreme cases had even lost their stockpiles.

From these findings it was decided to increase the collaboration between the department of radiation protection and the municipalities. The main idea is to recommend the designation of a safety agent in each municipality, responsible for organizing both the regular and the complementary iodine prophylaxis program at the local level. This contact is supposed to be

helpful for additionally enhancing the flow of information in both directions, as well in normal and in emergency situations.

International communication and cooperation

Bilateral agreement with France

In the context of nuclear security, 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.

To guarantee an efficient communication between the authorities and operator, a specific system for communication has been established. This direct line "SELCA" (System of Exchanges and Liaison between Cattenom and the public Authorities) connects the "Préfecture de la Moselle" and the Cattenom NPP to the competent authorities of the Ministry of Health and to the Rescue Services Agency of the Ministry of Internal Affairs in Luxembourg. In the first stage of an accident at Cattenom NPP, SELCA would be used to inform the above-mentioned authorities about the incident that has occurred. SELCA would further serve to exchange all measured and ensured data between the parties connected to SELCA and to coordinate the counter measures. It should also be mentioned that the SELCA fax contact undergoes a monthly testing.

Presently it is planned for the fax system to be replaced by a more modern Internet system, making a more efficient and faster exchange of information as well as the exchange of complex graphical documents possible, without loss of time.

Bilateral Agreement with Belgium (New development)

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 approbated in Luxembourg on 27 April 2006 by law.

The agreement has the goal to ensure a mutual information exchange in case of an incident or accident on the territory of one of the parties, which leads to or might lead to a release of radioactive substances and susceptible of affecting the neighboring country. The system for information exchange has the aim to complete the existing international and European tools, ensuring a more direct transmission between the two countries. The exchange system can under no circumstances endanger the correct execution of the internationally established tools.

The modalities of the information exchange have to be specified by a letter exchange between the "Service National de la Protection Civile du Ministère de l'Intérieur" in Luxembourg and the "Centre Gouvernemental de Coordination et de Crise du Service Public Fédéral Intérieur" of Belgium, which is presently under preparation. The system for mutual information has to use a transmission network focusing mostly on the national centers for alert and has to be able to transmit information twenty-four hours a day, including periodical testing.

The agreement further foresees:

- Exchange of information concerning measures taken or planned for the protection of the population in the involved country, the evolution of the situation, the information transmitted to the media and destined for the population;
- Exchange of liaison officers;
- Common exercises aiming the execution of the agreement;

International Cooperation on harmonizing Iodine prophylaxis and linked protective actions (New development)

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 nuclear power plant 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], which gives the following main recommendations:

- Use of common references:
  - One critical group: the population group aged between the unborn child and 18 years old;
  - One intervention level: thyroid projected dose of maximum 50 mSv for the critical group. This dose is estimated for a child of one year exposed for the duration of the release or 7 days without sheltering (intervention levels are not binding limits);
  - Source term assessment: given by the country where the accident takes place;
  - Initial dose assessment: a map is given by the country where the accident takes place with the expected affected areas and projected doses, as a common basis for the early stage.
- Use of common health and safety recommendations with emphasis on the critical group:
  - To have recommendations 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 (when release becomes unavoidable or is highly probable);

- 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,
- To utilise tablets of potassium iodide (tablets of 65 mg KI);
- To recommend the same dosage for the administration of tablets.

- Use of a basis of common preventive action:
  - Preventive distribution at least up to 5 km around the nuclear power plants (other nuclear installations may have different radii);
  - A radiological emergency plan containing pre-distribution and/or stockpiling and distribution system in order to ensure an adequate supply in a timely manner for the critical group at least up to 20 km around the nuclear power plants;
  - Availability up to 100 km of stable iodine by stockpiling or any other means, for the critical group;
  - Regular national information campaigns to be launched with emphasis on the critical group;
  - Harmonized general public information handouts linked with iodine tablet boxes;
  - Harmonized answers for frequently asked questions.

In Luxembourg, most recommendations concerning iodine prophylaxis and information of the public presented by this report will be adopted without any major modifications, as emergency planning in Luxembourg always allowed a very flexible approach. Nevertheless the experts from Luxembourg who participated in the above described group plan to bring this document to a political level in order to obtain an official agreement of both the Minister of Interior and the Minister of Health. Assuming political agreement, the Rescue Services Agency and the department of radiation protection will then proceed to implement these recommendations in its nuclear emergency planning and consider this agreement between the five countries when elaborating its next public information brochure in 2009. The proposed information handout will probably accompany the complementary iodine prophylaxis program from 2008 on.

Testing of emergency plans

Routine exercises

Following the clauses of the emergency plan and according to our national legislation, the Rescue Services Agency and the department of radiation protection have to regularly organize national exercises or participate in bilateral or international exercises on nuclear emergency.

Since more than twenty years, the authorities of Luxembourg have regularly organized national exercises in order to train the specialized intervention teams of the Department of Civil Protection. These trainings and exercises range from the evaluation of a radiological situation to the rescue of victims. Twice a year the GPR has to take practical training. Once a year this same team takes refresher courses on radiation protection basics. 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.

Since 1990, trilateral exercises have been organized every three years between the two German federal States, Sarreland and Rhineland-Palatinate, Luxembourg and France. Some of these exercises were simple communication or radiological data exchange exercises; others are more complex and aimed the execution of the national emergency plans.

The scenarios are prepared by the "Institute de Protection et de Sûreté Nucléaire" in France and generally simulate a serious incident with the probability of core melting. These exercises are done in real time, with a real alert by the authorities and with real metrological conditions. The goals of these safety exercises are:

- Alert transmission and the initial warning,
- Setting up of the crisis center;
- Setting up of the media group for information and the press and the real time establishment of communiqués;
- Execution of the communication procedures;
- Exchange of information concerning the diagnostic and the prognostic of the installation and the radiological situation;
- Exchange of liaison officers;
- Exchange of information concerning the decisions taken and those under consideration;

The last exercise of this kind took place on 7 December 2006. The scenario described the loss of an auxiliary cooling circuit. The main goal of the exercise consisted in testing an alternative communication system on email bases to the well established fax based SELCA-system. Luxembourg participated only on a communication level to this exercise. As main conclusion, it was found that an email system has indeed advantages in speed, in the amount of data possible to exchange, including pictures and in the further use of information, as it is immediately electronically available. The main disadvantage though is the reliability of an Internet based system; the Internet connection indeed collapsed in the course of the exercise. Thus it was decided to use at the present stage emails only parallel to the existing SELCA until a more reliable electronic communication is proven.

Furthermore, 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. The INEX and CONVEX exercises had a fundamental impact on the planning of the emergency plan. As a result of these exercises, the structure of the command post as well as the organization for communication with the media was modified. All exercises have helped to:

- Improving the communication procedures and strategies, both on a national and international level;
- Establishing new communication technologies, giving preference to web technologies for the information of the administrations, the media and the foreign partners;
- Improving the coordination between the different partners in the information of the media. As example it was revealed that regular information messages of the actual situation have also to be transmitted to national authorities and services, which are not directly connected to the foreign crises centre. Also the specific technical

language used for the exchange of information has to be revised in order to avoid misunderstandings;

- Installing and improving the different communication devices and using these devices in real time (log-file);
- Creating appropriate structures that guarantee that in the case of an emergency, the information is also available in English
- Introduction of a hot line, other than the emergency line of the civil protection, to satisfy the needs of the individual.
- Sharing the responsibilities between several agents in the aim to reduce the dependency on individual persons. (This represents a major issue for a small country like Luxembourg with limited human resources.)
- To recognize that measures taken to protect the population have to be harmonized between the concerned countries.

European Emergency Exercise in Luxembourg (exceptional activity)

Each year the European Commission co-funds one or more simulation exercises in the context of the Community Mechanism for Civil Protection. In 2005 Luxembourg, Belgium, France and Germany decided to organize together such a simulation exercise to take place in the south of Luxembourg.

The size of the Grand-Duchy of Luxembourg is such that it supports a realistic ground for the exercise. As the country is small, the need for assistance in case of a major incident or nuclear emergency, requiring more intervention teams than the country's capacities can provide, is very plausible.

The exercise, called EULUX 2007, took place from 6-9 June 2007. It was the first time that an exercise was organized by four countries in collaboration. Apart from the four organizing countries, there were four participating countries, namely Hungary, the Netherlands, Poland and Portugal, each taking part in the exercise with intervention teams and/or experts.

EULUX 2007 consisted of a radiological and chemical scenario, including rescue training. For the radiological scenario an explosion leads to a fire as well as to the destruction of part of the infrastructure and of a radiological source that had been standing in close proximity of the explosion's blast. As a consequence some workers are injured and possibly contaminated.

The deployed intervention teams included a Command Post (Germany and Luxembourg), firemen (Luxembourg), two decontamination modules (Belgium and France) and several search and rescue teams, specialized on radiological hazards management (France, Poland, Netherlands).

Except for a few people at the Command Post the GPR did not participate at the exercise, as its members were involved in the organization of the scenario and animation of the exercise. However, this exercise led to valuable conclusions for enhancing preparedness for nuclear emergencies, in terms of organizing exercises and coordination between intervention teams. Given that the final report with the analyses of the exercises is still under preparation, the following list of main conclusions and lessons learned is not complete:

- The organization of the dosimetry for the intervention teams needs clear procedures;
- The timely decontamination of an increased amount of victims and intervention teams seems impossible. A maximum of 5 victims per hour and unit was decontaminated. Need for clear indications with regard to priorities and "acceptable" contamination;
- The management of the radioactive waste on the site needs to be addressed;
- The cooperation between Command Posts an Intervention Teams from different countries is difficult due to different approaches to reach the same objective and due to different spoken languages;
- Need for smaller bilateral exercises of intervention teams.

Planned activities

Given the size of the country and the very moderate program concerning nuclear safety, Luxembourg does not know significant modifications from review meeting to review meeting. However Luxembourg is determined to constantly consolidate, up-date and improve its dispositions with regard to legislative bases and emergency preparedness. This is a constant process. Presently several small projects are running or in preparation, as it was highlighted throughout the present report. The following shortly summarizes these issues:

- Updating of the information to the public concerning emergency preparedness on the new homepage of the Ministry of Health;
- Expansion of the information system via SMS;
- Establishment of an Internet based information exchange system with France;
- Implementation of the bilateral agreement with Belgium on information exchange in case of an incident or accident which might have radiological consequences;
- Adoption of the recommendations from the report on harmonizing iodine prophylaxis;
- Elaboration of a new public information brochure;
- Adoption of a new regulation on the organization, formation and training of the rescue teams;
- Organizing bilateral exercises of the intervention teams.

Annex I - Legislative

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 an 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 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.

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 - GLOSSARY OF ABBREVIATIONS

ASS	Administration des Services de Secours (Rescue Services Agency)
CGCCR	Centre Gouvernemental de Coordination et de Crise du Service Public Fédéral Intérieur (Governmental Coordination and Crisis Centre of the Public Federal Service of Interior, Belgium)
CNA	Centre National d'Alerte (Alert Group of the Division of Civil Protection)
CONVEX	Convention Exercises (Emergency drills and exercises in the frame of the Convention on Early Notification of a Nuclear Accident)
DRP	Division de la Radioprotection (Department of Radiation Protection)
EULUX	European Emergency Exercise – Grand Duchy of Luxembourg 2007
GRP	Groupe de protection radiologique (Radiological Protection Unit)
IAEA	International Atomic Energy Agency
INEX	International Nuclear Emergency Exercises
JINEX	Joined International Nuclear Emergency Exercises
MS	Ministère de la Santé (Ministry of Health)
NBC	Nuclear, Biological, Chemical
NEA	Nuclear Energy Agency
NPP	Nuclear Power Plant
OECD	Organization for Economic Co-operation and Development
SELCA	Système d'Échanges et de Liaisons entre Cattenom et les autorités (System of Exchanges and Liaison between Cattenom and the public Authorities)
SMS	Short Message Service
SNPC	Service National de la Protection Civile du Ministère de l'Interieur (Former Directorate of Civil Protection of the Ministry of Interior. Now transferred to ASS)

Annex III - Alarm signals emitted by the civil-defence sirens

Standby

Warbling tone continuing for one minute

Listen to the radio and follow the instructions given by the authorities

Nuclear alert

Warbling tone continuing for one minute, interrupted by two twelve- second pauses

Take shelter in buildings and cellars

All-clear signal

Steady tone continuing for one minute

Danger over

Annex IV - 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.