# Luxembourg

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

# "CONVENTION ON NUCLEAR SAFETY"

to the

# Sixth review meeting of the contracting parties in 2014

This report was produced by the Department of Radiation Protection (DRP) on behalf of the Government of Luxembourg

# List of Acronyms and Abbreviations

| | |
|---|---|
| ASS | Rescue Services Agency |
| AFCN | Belgian Nuclear Safety Authority |
| 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 |
| CSPN | High Level Council of National Protection |
| DRP | Department of Radiation Protection within the Directorate of Health (Regulatory Body) |
| ENSREG | European Nuclear Safety Regulators Group |
| EP&R | Emergency Preparedness and Response |
| EPZ | Emergency Planning Zone |
| EU | European Union |
| EU-BSS | EU Council directive laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation |
| HCPN | High Commission of National Protection |
| HERCA | Heads of the European Radiological protection Competent Authorities |
| 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 |
| NEA | Nuclear Energy Agency |
| MFA | Ministry of Foreign Affairs |
| 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 |
| SIP | Public relations office of the government |
| WENRA | Western European Nuclear Regulators Association |

# Table of Contents

# 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 five previous review meetings of the contracting parties.

No nuclear power plant, no other fuel-cycle facility, no research reactor and no other nuclear facility is operated or planned in Luxembourg. In its immediate vicinity, at only 8.5 km south from the national border EDF operates the French NPP "Cattenom" comprising four 1300-MWe reactors. A second French site, Chooz with two times 1450 MWe output is located at around 70 km west from Luxembourg and the three reactors (3 x 930 MWe) at Tihange in Belgium have a distance of 65 km north-west from the closest border point. The closest German NPPs, Biblis (shutdown since March 2011 under the German phase-out policy) and Philipsburg, are situated at around 150 km east of Luxembourg. Other operating NPPs, like Doel (Belgium), Fessenheim and Nogent-sur-Seine (France), Borsele (Netherlands) and Neckarwestheim (Germany) are at distances between 150 and 250 km.

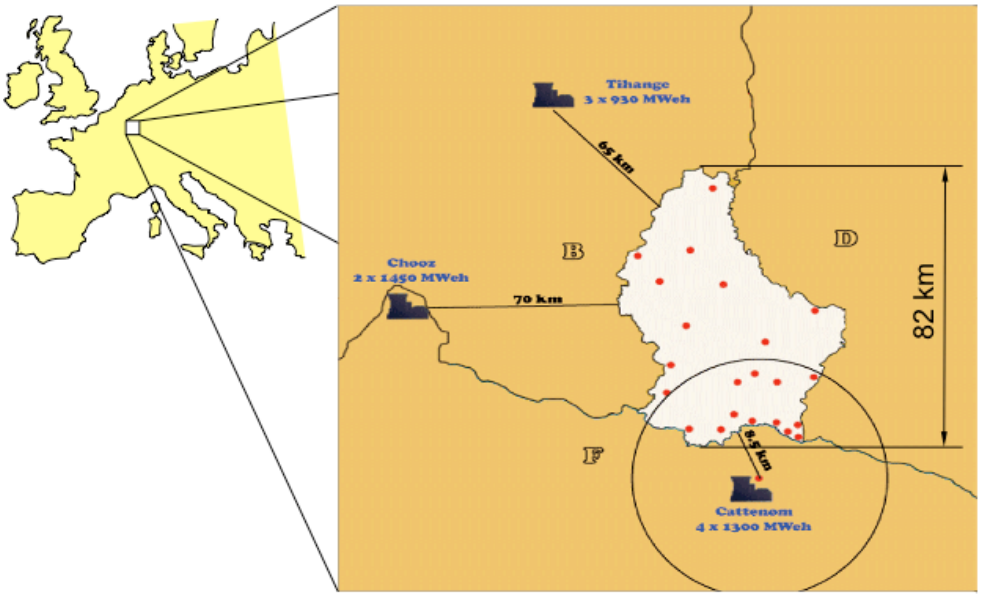


**Figure 1:** *Situation of Luxembourg. The image indicates the location of the 3 closest NPP's in France and Belgium, respectively. The red dots on the map show locations where automatic radiation monitoring stations are installed.*

Since the construction of the French NPP Cattenom late 70s, the public perception of nuclear power has only deteriorated and all succeeding governments have declared their critical attitude towards nuclear energy, the latest official declaration being from 2009. The recent accident in Fukushima Dai-ichi in 2011 has initiated a more intensive debate at political level. Consequently, the House of Representatives has adopted unanimously several motions in April and May 2011 and in February and March 2012, requesting the government to take position against nuclear power in international meetings and to take concrete actions with regard to NPP's operated in the vicinity of Luxembourg. In particular, the government should intervene at the French and Belgian governments with the aim of a permanent shutdown of the NPP's in Cattenom and Tihange, respectively. The government has responded to those parliamentarian motions with various interventions at several occasions through diplomatic and political channels.

The department of radiation protection (DRP) represents Luxembourg at the review meetings. Luxembourg considers the CNS pair review as a highly valuable exercise. It allows for a small country with limited nuclear expertise to gain insight to relevant safety issues in other countries. Besides the aspect of being reviewed, having frank and open discussions with qualified experts while profiting from constructive "nearly cost-free" advice is extremely useful. Luxembourg has certainly proven its commitment to the CNS by accepting leading responsibilities at the past meetings of the contracting parties.

However, Luxembourg is concerned that established routine of those repeating review meetings has resulted in a decline of the necessary questioning and challenging attitudes of CP's reviewing each other. As a result, officers, in particular the rapporteur's are frequently in a position to be the main reviewer, with only little input from the individual CP's peer review, basically through a more or less statistical evaluation of the written questions by the coordinator. In order to enhance the process with the aim of having a better peer review process, Luxembourg is thus of the opinion that the common responsibility of the reviewing CP's should be strengthened. Luxembourg will be supportive in any initiatives promoting those goals in the 6th review meeting, and would invite all CP's to already focus during the present review on more challenging questions ("Ask in a nice and friendly way, but do not only ask nice and friendly questions").

The DRP is responsible for the content of the present report. The report is a stand-alone document, structured in conformity with the "Guidelines regarding National Reports under the Convention on Nuclear Safety" (INFCIRC/572/Rev.4). In the preparation of the report, the DRP also took the relevant "issues to be considered" as listed under the paragraph 23 of the summary report of the Extraordinary Meeting into account.

The aim is to demonstrate that Luxembourg meets its obligations of the Convention on Nuclear Safety. Since there is no nuclear installation planned or in operation in Luxembourg, only Articles 7, 8 and 16 are applicable. With the aim of demonstrating commitment to the principles of the CNS, the present report will additionally present information on activities covered by Articles 9, 10 and 15. The nuclear accident at Fukushima-Dai-ichi, also influenced activities on more technical grounds in Luxembourg[1]. The present report has as a result substantially evolved compared to the previous reports.

[1] Besides the purely political aspects briefly mentioned on page 4

# B - Summary

Luxembourg is a non-nuclear country with, according to the provisions of the CNS, essentially radiation protection and emergency preparedness issues. This situation is reflected within the existing legal framework. The department of radiation protection (DRP) within the Directorate of Health of the Ministry of Health is the acting regulatory body charged with the protection of the population against the hazards of ionizing and non-ionizing radiation, as well as with nuclear safety.

Following the nuclear accident in Fukushima, the interest of the public, NGO's, media and politicians on issues related to nuclear safety has dramatically increased. With the DRP as nearly only body with the necessary expertise[2], its agents have been highly solicited over an extended period. Additionally the Government has asked the DRP to increase efforts on nuclear safety and nuclear emergency preparedness, including the request to participate actively in the European stress test.

Already in March 2011, the Government decided to review the national nuclear and radiological emergency response plan and asked the high commissioner for national protection to coordinate the review of the existing plan. Besides, the Executives of the Greater Region[3], meeting in Extraordinary Summit in Metz (France) on 20 April 2011, agreed to strengthen cooperation in the establishment and implementation of operational management plans relating to nuclear accidents. The result was a joint project entitled "Nuclear Exercices Project 3 in 1", which aimed to improve national and international cooperation in the Greater Region and, hence, the coordination of emergency measures in case of a nuclear accident at the NPP Cattenom. This series of exercises were held between June 2012 and June 2013.

In response to the accident in Fukushima Daiichi, the Ministry of Foreign Affairs (MFA) has asked the Rescue Services Agency (ASS) and the DRP to assist them in establishing an emergency kid for diplomatic missions. This kit has been finalized by end of March 2012 and was distributed to the concerned embassies.

On a larger international scale, the DRP is committed to enhance emergency preparedness and response measures through active international cooperation, e.g. via the HERCA association. In particular, a new approach for harmonizing protective actions along national borders and a mechanism for better use of national expertise during an emergency is presently developed under the chairmanship of the DRP[4].

Considering those additional activities, the DRP has officially requested in June 2011 for increasing permanently its staff in the order of 2 additional experts. One post was granted and a candidate with expertise in nuclear physics could be engaged as of 1st of January 2012.

At the 5th review meeting, the rapporteur challenged Luxembourg with:

- The transposition and implementation of the EURATOM directive on nuclear safety (2009/71/EURATOM), hereafter referred to as nuclear safety directive,

[2] Nuclear experts are neither in any administration in Luxembourg, nor has the University of Luxembourg any activities in the nuclear field, not even some basics within the faculty of physics.

[3] The Greater Region is composed of Luxembourg, Lorraine (France), Saarland, Rhineland-Palatinate (Germany), Wallonia (Belgium), and the German-speaking community of Belgium.

[4] HERCA working group "emergencies.

- The review of the national nuclear emergency plan under the light of the lessons learned from the accident in Fukushima Dai-ich,
- To continue efforts on public information.

Additionally the rapporteur considered the cooperation with neighboring countries as exemplary and a good practice. Luxembourg continued its efforts in that area and a new bilateral agreement with Belgium was signed (see also article 7.1b).

Luxembourg has addressed those challenges. The transposition of the above EU directive entered into force on 24 July 2011. The review of the emergency plan has been performed and resulted in a proposal of a new plan. This new plan has however not yet been adopted by the time this report was submitted. In parallel to the work on the emergency plan, the public relations office of the government (SIP) established a new communication and public information concept. The implementation of the concept is in preparation. The present report addresses those issues in more detail under the relevant articles (7 and 16).

At present, the workload due to the additional activities that emerged as a consequence of the accident in Fukushima Dai-ichi is certainly one of the main challenges. At first, when starting discussions on the review of the emergency preparedness, it became very fast evident how little expertise was available. Indeed, only a couple of people within the DRP and the ASS had adequately been involved in nuclear emergency issues. Over the past 2 years, through many meetings for reviewing the plan and 3 large-scale exercises (preparation, exercise, lessons learned meetings) involving all concerned public actors (ministries and administrations), the situation could be significantly improved. All those responsible actors were indeed highly motivated with constructive inputs and effective progress was achieved in a relatively short time frame.

Those time taking activities came in addition to the regular jobs of the involved people from the various administrations. The challenge will now be to keep this engagement at appropriate level after the end of the nuclear exercise “3 in 1” (see article 16) and after adoption of the new emergency plan and its operational procedures. From the experience following the accident in Chernobyl, the activities related to nuclear emergency preparedness and in particular the number of people involved decreased significantly while the years were passing. Will we be able to do better this time?

Another challenge remains the information of the public (see also article 16). Though there is progress, it remains difficult to transmit independent messages on the risks of radiation to the public. The fact of not disposing of a nuclear department at faculty of physics at the University of Luxembourg, who could independently contribute to a factual scientific dialog in the public domain, increases these difficulties.

Activities planned for the next reporting period are the following:

1. The validation of the new emergency preparedness arrangements following the adoption of the new plan, including the elaboration of the associated operational procedures and the organization of a related public information campaign.
2. The elaboration of a national plan focusing on post-accidental management. This work will start in 2014 and will be based on the French CORDIRPA-doctrine. A timeline for this work has not yet been set.
3. The Proposed EU Council Directive laying down the requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption will be adopted very soon. With a transposition period of two years, this is subject to be reported in the next national report of the CNS.

4. Transposition of the EU Council directive laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation (EU-BSS) that will probably be adopted after the summer break of 2013.
5. Negotiation at the EU-Council and transposition of the new nuclear safety directive.

# 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.

### Art 7 (1): Establishing and maintaining a legislative and regulatory framework

Art 7 (1a): Overview of the primary legislative 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 concerning all types of uses of ionizing radiation emitting products. It sets out the basic principles regarding radiation protection and nuclear safety, it defines competences for ad-hoc decisions in a radiological or nuclear emergency situation and sets the frame for enforcement.

The law of 21 November 1980 concerning the organization of the Directorate of Health establishes the regulatory body by attributing the competences concerning the protection against hazards of ionizing and non-ionizing radiation, as well as nuclear safety to the department of radiation protection (DRP).

In some areas, such as maximum permitted levels of radioactive contamination of foodstuffs, specific EU-Council regulations are directly applicable in all EU member states. Those acts are not listed in the present report.

Art 7 (1b): International Conventions and bilateral agreements

Luxembourg further ratified all international conventions relevant to nuclear safety and concluded several bilateral agreements. Those ratifying acts are listed in the appendix. Though not directly linked to the CNS, it is worth to mention that the conventions on nuclear liability were never ratified by Luxembourg.

The most relevant bilateral agreement has been signed on 11 April 1983 with France, concerning the exchange of information in case of an incident or accident susceptible of having radiological consequences. This agreement consists of the following main 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;

- Definition of a set of key information that will be exchanged;
- Modalities for the exchange of a liaison officer 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 11th meeting of the Franco-Luxembourgish Commission took place on 22 November 2012 in Luxembourg.

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 ratified in Luxembourg on 27 April 2006 by law.

More recently, on 14th May 2013, the Belgian Minister of Interior and the Luxembourgish Minister of Health signed, in the name their respective Governments, a cooperation agreement on nuclear safety and radiation protection. It established a Belgo-Luxembourgish Commission of nuclear safety and radiation protection that shall meet once per year for discussing issues of common interest, in particular:

- Exchange of information related to the NPP Tihange.
- Cooperation on the radiological protection of workers, the population, patients and the environment.
- Organization of environmental monitoring.

National contact points for the agreement are the AFCN for Belgium and the DRP for Luxembourg. The agreement entered into force with its signature. A first meeting of the Belgo-Luxembourgish Commission is foreseen before the end of the year 2013.

### Art 7 (2) (i): National safety requirements and regulations

Art 7 (2) (i)a: Overview of the secondary legislation for nuclear safety

Luxembourg, as a non-nuclear country, does not dispose of a very detailed set of regulations, decrees or ordinances on nuclear safety matters. In particular, aspects related to the operation or decommissioning of nuclear installations are not addressed. A list of all relevant acts and official agreements is given in the appendix. Those executive regulatory acts are regularly amended in order to comply with the EU Council directives.

The main regulatory act, covering most of the aspects relevant to nuclear safety 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. An amendment of that act was done in the context of the transposition of the Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, hereafter nuclear safety directive. The amendment entered into force on 24 July 2011. Relevant changes concern in particular:

- Regular assessment the national nuclear emergency plan, including the publication of the assessment.
- Strengthening of the need to maintain competences concerning nuclear safety matters within the regulatory body through international cooperation.

- Obligation to organize every 10 years at least a self assessment in order verify whether the competent regulatory authority is given the legal powers and human and financial resources necessary to fulfill its obligations in connection with the national framework. The result of the auto-evaluation shall be published.
- Obligation to invite every 10 years at least an international peer review of the competent regulatory authority, the relevant segments of the national framework and national emergency preparedness arrangements. Outcomes of any peer review shall be reported to the Member States, the Commission and the public, when available.

Other important principles of the nuclear safety directive, such as the designation of an appropriate regulatory body or the prohibition of operation of nuclear installations without a license were already in place prior to the adoption of the directive. Also, the level of detail concerning for instance the obligations of the license holder were already felt appropriate[5].

On 30th July 2013 the latest amendment of the regulatory act of 14 December 2000 was promulgated. The amendment served to transpose the COUNCIL DIRECTIVE 2011/70/EURATOM of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, hereafter referred to as "waste directive". Luxembourg will report on that amendment in the context of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management

During the next years it will become necessary to transpose the EU Council directive laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation (EU-BSS) that will probably be adopted after the summer break of 2013 and eventually of the new nuclear safety directive. This second proposal is from 13 June 2013 for a Council Directive amending Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations. Given the proposed transposition period of 4 years for the EU-BSS and depending on the outcome of the discussions in the EU-Council on the new nuclear safety directive, the transposition of both directives could be achieve either just before the next national report is edited or not too long after. At the moment following an initial assessment, the intention of the DRP is to propose to the Government a more in-depth review of the main national framework, including the regulatory act of 14 December 2000 and eventually the framework law of 1963. The first act has indeed been frequently amended in the past years due to the transposition of various EU-Council directives. A complete review of its structure would certainly help for clarity of the text. At the moment, the continued suitability of the 50 year's old text in a context that has substantially evolved over the past years is assessed. Following the assessment, the DRP would address the adequate proposal to the next government (elections are in October 2013). Those frequent obligations to change the regulations in an area, Luxembourg does not dispose of a sector to be regulated, can certainly also be considered as a challenge.

Art 7 (2) (i)b: Guides issued by the regulatory body

The only guides that have been issued by the DRP refer to the regulatory supervision in the non-nuclear sector (see also article 10).

[5] As stated in the preamble of the nuclear safety directive, national circumstances are to be taken into account when developing the appropriate national framework.

Art 7 (2) (i)c: Overview of the process of establishing and revising regulatory requirements

The initiative for any legislative act or its amendment lies either within the parliament or at the competent Minister. It is worth to mention that the parliament has used its right for initiative only in few cases. It never did so in the area of nuclear safety or radiation protection, where over the last 20 years, the incentive for changing the national framework came in all cases from a EU council directive with the obligation to be transposed into national law.

In practice, the DRP is at the technical level in charge with the preparation of draft text for those laws, regulations and decrees. These drafts are then submitted to the department of legal affairs of the Ministry of Health for the coordination of the legislative procedure. In case of a regulatory act, the draft is as a first formal step submitted to different institutions, such as the Chamber of Commerce and other relevant Ministries for opinion. Taking those opinions into consideration, the text of the proposed regulatory act goes through approbation by the Council of the Government and subsequently to the Council of State (Conseil d'Etat) for opinion. In case of a positive opinion, the responsible Ministers and the Grand Duke may adopt it by 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, the legislative project undergoes additionally a first and a second vote in the parliament. Decrees may directly be adopted by the competent Minister.

### Art 7 (2) (ii): 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, prohibiting thus 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 of 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 competent authority (DRP) issues its opinion. 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 with the license application needs to comprise particular data 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.

Other licensing procedures are defined for the non-nuclear sector. Those are not part of this report.

### Art 7 (2) (iii): 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 partially derived from the IAEA-TECDOC-1526, “Inspection of Radiation Sources and Regulatory Enforcement”.

### Art 7 (2) (iv): Enforcement of applicable regulations and terms of the licenses

The inspectors of the DRP are entitled to impose appropriate measures in case of non-conformity. 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 and report any incompliance directly to the prosecutor. Penalties are laid down in the framework law from 1963.

## 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

### Art 8 (1): Establishment of the regulatory body

Art 8 (1a-d): Overview – Status, Missions, responsibilities and organizational structure

The 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. Similarly to a number of other small countries, the DRP centralizes as a single department all competence of radiation and nuclear safety, both the regulatory and the technical expertise aspects. For instance the national laboratory for radiation physics is part of the DRP. The organization chart and missions of the DRP are summarized in figure 2.

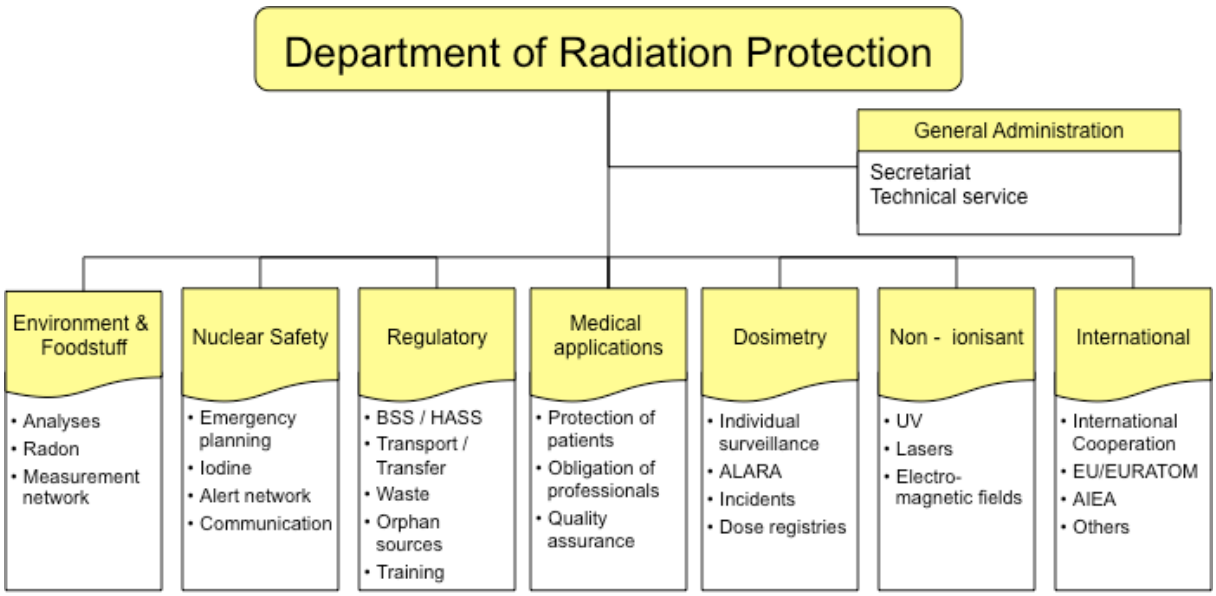


**Figure 2:** *Organization chart and missions of the DRP*

Art 8 (1e): Human resources

The DRP is composed of 9 agents with master degree, including 4 with PhD, specialized in radiation protection (1), medical physics (2), nuclear physics and engineering (2), physics (1), geology (1), biology (1) and chemistry (1). The permanent staff of the DRP is further composed of one bachelor engineer, 2 technicians, 1 laboratory assistant and a secretary. Compared to the previous national report, this is an increase of one person, since a candidate with expertise in nuclear physics could be engaged as of 1st of January 2012. Following the

nuclear accident in Fukushima, Government has indeed asked the DRP to increase efforts on nuclear safety and nuclear emergency preparedness. In order not to be forced to neglect its other "routine" missions, the DRP has then officially requested in June 2011 for increasing permanently staff which in return was positively advised by the Government.

Art 8 (1f): Maintaining competence

The DRP profits from the training offers provided by the national institute of public administration to all public administrations in Luxembourg. Their offer has well enhanced in recent years, both in quality and in the variety of topics offered. It further includes the possibility to follow competence cycles, such as project management. It is also possible to ask them to organize training on specific topics. The DRP has used this possibility for getting specific training of laboratory accreditation and the ISO Norm 17025. All agents of the DRP are encouraged to set up an own multiannual training program and to schedule 1 to 2 weeks of training per year. In particular technical areas a participation in training courses offered mostly in neighboring countries is possible. This is however less frequent with around one or two training course per year for the whole DRP. Priority is given to those agents who start their career at DRP.

Another important factor of maintaining competence in the nuclear safety domain is the active involvement in international activities. The professional exchange in meetings, such as the CNS-review meetings, ENSREG or WENRA is highly beneficial for a small body like the DRP. This principle of active international cooperation as a means to maintain competence has also been confirmed by a new paragraph in the regulatory act of 14 December 2000 during its amendment in the context of the transposition nuclear safety directive.

Art 8 (1g): Financial resources

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 since 2010 remained relatively stable around the same amount. Small variations were due to particular expenses. A similar evaluation can be reported on the travel budget post. Since however this particular post is common for all the departments of the Directorate of Health, the DRP could use approximately double in the years 2011 trough 2013 compared to the years before the accident in Fukushima Dai-ichi. This enabled the DRP to be more active in the international context.

Art 8 (1h): Adequacy resources

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.

Art 8 (1i): Quality management system

The laboratory of the DRP has established a quality management system in July 2010 (preparations started in 2007) within the laboratory of the DRP, with an accreditation according to ISO 17025.

Art 8 (1j): Transparency and information of the public

In April 2009, the Ministry of Health launched a new Internet Portal. www.radioprotection.lu gives a direct link to the DRP with relevant information on all aspects

related to the missions of the DRP, such as legislation, explanations and guides for RPO's, specific reports, results of the environmental survey and information for the public on emergency preparedness. The homepage is up-dated and expanded at regular intervals. While the DRP is responsible for the content, a department of the ministries defines the layout. Improvements of the structure are under discussion. So far only a French version exists, though some of the documents that can be downloaded, such as the present report, may be provided in other languages.

The general public and the media were strongly interested on the European reassessment of the safety and the safety margins of reactors (commonly called "stress-test "), in particular with regard to the NPP Cattenom. Together with the federal states Rhineland-Palatinate and Saarland (Germany) a common independent assessment has been performed on the basis of documents received from the ASN and through participation as observer at a dedicated inspection conducted by the ASN in August 2011 at the NPP Cattenom. On 31 October, the DRP and its German homologues have submitted a first opinion on the operator's report to ASN. ASN took that opinion into due consideration for its general deliberations (ASN opinion 2012–AV-0139 of 3 January 2012). This work was concluded by the publication of a common final report (in German and French) on 5th March 2012.

In the same context, the DRP took part in the two public meetings on the Post-Fukushima - Stress Tests Peer Review. Both meetings were organized by the European Nuclear Safety Regulators Group (ENSREG), the European Commission and the Stress Test Peer Review Board[6]. The DRP has both times invited interested stakeholders groups from Luxembourg to the meeting. The DRP was also actively involved in the second ENSREG conference on 11-12 June 2013 and again invited interested stakeholders from Luxembourg.

On the other hand, the DRP has not yet fulfilled its obligations that result from the transposition of the nuclear safety directive with regard to publish its assessement concerning the review of emergency preparedness arrangements and the lessons learned form past exercices. This is partially due to the fact that this is still an ongoing activety as is reported under article 16 but also because those activeties were done in close cooperation with other state bodies, who are not submitted to the same obligations with regard to transperency.

The DRP also publishes on its Internet page the CNS-National Reports and the questions received with the answers immediately after their respective submittion to the CNS restricted website.

Art 8 (1k): External technical support

A specific unlimited budgetary article allows the DRP in well-justified cases to engage external technical support. This was used in the past in the frame of specific licensing procedures and more recently to acquire an independent technical view on nuclear projects in the vicinity of Luxembourg's national borders (e.g. Stress-test or the French project for a geological repository of high level radioactive waste).

### Art 8 (2): Status of the regulatory body

The DRP is a department within the Directorate of Health. The DRP reports via the Director of Health to the Minister of Health. The Ministry of Health is not involved in any energy policy activities, which fall under the competence of the Directorate of Energy of the Minister of Economy. This builds an effective and functional separation between the

[6] A member of the DRP had the honor to chair those meetings.

functions of the DRP and those of any other body or organization concerned with the promotion or utilization of nuclear energy.

On the other hand, a competent authority placed within the structures of a Ministry is subjected to ministerial instructions that may potentially be of a purely political nature and not founded on sole objective and verifiable safety-related criteria; though it is important to point out that this has never happened so far in the context of the DRP's fulfillment of its regulatory tasks. It is also clear that the DRP has no real autonomy in the implementation of the allocated budget, neither any competence in the decisions for the appointment and dismissal of staff. Those elements may at least indirectly question the effective independence from undue influence in its regulatory decision making as prescribed by the nuclear safety directive. Luxembourg is however confidant that the existing structure is proportionate with the national circumstances taking into account the fact that Luxembourg does not have nuclear installations to regulate.

## Article 9 - Responsibility of the license holder

ARTICLE 9. RESPONSIBILITY OF THE LICENSE HOLDER

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.

The sum of the regulatory requirements of grand-ducal regulation of 14 December 2000 attributes the full responsibility for the respect of all regulatory provision to the license holder. With the amendment of that regulatory act in the context of the transposition of the waste directive, this principle was further strengthened by a more direct formulation, as follows: “The licensee is responsible for the safe management of radioactive sources”.

The operational obligations of the licensee are in line with the provisions of the EU-BSS directive. All licensees are submitted to regular inspections by the DRP. No obligation exists for the license holder to maintain communication with the public.

## Article 10 – Priority to safety

ARTICLE 10. PRIORITY TO SAFETY

Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

With regard to the use of radioactive material, the principle of safety first is met by the sum of the regulatory requirements, although it is not explicitly laid down. In the context of the transposition of the waste directive, a new provision brings additional clarity.

The licensee has to demonstrate that internal procedures concerning the management of radioactive substances exist, are adequate and correctly applied. The DRP also developed some guides to help the licensee to establish those internal procedures (Guide to implement general procedures on radiation safety, Guide to perform risk assessments, Guide on internal intervention planning).

## Article 15 – Radiation protection

ARTICLE 15. RADIATION PROTECTION

Each Contracting Party shall take the appropriate steps to ensure that in all operational states the radiation exposure to the workers and the public caused by a nuclear installation shall be kept as low as reasonably achievable and that no individual shall be exposed to radiation doses which exceed prescribed national dose limits.

By the regulatory act of 14 December 2000, the limit of the annual effective dose for exposed workers (including women of child-bearing age, apprentices and adult students) is fixed to 10 mSv. The working conditions for pregnant women have to guarantee, that the equivalent dose to the unborn child will not exceed 1 mSv. Nursing women are not allowed to work in conditions bearing high risks of contamination. For apprentices and students aged between 16 and 18 years who are obliged to use radioactive sources, the annual effective dose is fixed to 3 mSv. For members of the public and for apprentices and students below the age of 16 years, the maximum annual effective dose is fixed to 1 mSv.

The current regulation describes the operational rules to protect workers, outside workers, apprentices and students exposed to radiation. In particular, working areas are divided into "controlled areas" and "supervised areas" and workers are categorized. The regulations further impose a certain number of obligations, including the implementation of radiological monitoring of workers and workplace, as well as medical supervision, procedures regulating access to different areas, appropriate information of workers and training in the field of radiation protection.

The provisions relating to exposure of the public and workers take into consideration the ALARA principle.

## 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. 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.
2. 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.
3. 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.

### Art 16 (1): Emergency Plan

Art 16 (1a): Overview of the arrangements and regulatory requirements for off-site emergency preparedness

Since the commissioning of the French nuclear facility in Cattenom in 1986, Luxembourg has set-up a special nuclear emergency response plan, which is focused but not limited to an accident at the Cattenom-NPP.

Laws define the competences of the Minister of Health and the Minister of Interior concerning the elaboration and execution of the response plan. For instance the law of 25 March 1963 attributes in its article 3 special competences to the Minister of Health for deciding ad-hoc measures for protecting people from radiation. Also the regulatory act of 14 December 2000 contains several provisions with regard to interventions in case of radiological or nuclear emergencies, as well as for long lasting exposure situations. Those form the legal basis for the existing special emergency plan of 2nd December 1994 and for deciding protective actions during a crisis.

Following the terroristic attacks of 9/11 in New York, the Government decided to put in place a High Commission of National Protection (HCPN) under the responsibility of the Prime Minister. Main missions of the HCPN are the coordination of crisis management during any crisis of national importance. A new law is proposed, but not yet adopted, who defines those missions and competences in more detail. With these changes a review of the existing emergency plan became necessary. Above the nuclear accident in Fukushima initiated the Government to decide on starting that review in April 2011.

A first critical analysis of the existing plan of 1994 was done by the high commissioner. That assessment was than discussed during several meetings in 2011 within a coordination task force composed of all relevant public bodies. The main conclusions were:

- Lack of efficient coordination between the different ministries at the national level.
- Some organizational changes of key governmental organizations are not fully implemented into the plan.
- Insufficient implementation of the operational aspects (ex: preparedness of local authorities and critical infrastructures, such as hospitals).

- Post-accidental not included.

In June 2011, the coordination task force started works on the main body of a new emergency response plan in case of a nuclear accident. The organizational structure of the crisis cells, alerts and communication channels, phases of an accident from first alert to post-accidental, planning zones and definitions of possible counter measures were reviewed and where necessary up-dated. It was foreseen to present a draft of an emergency response plan in case of a nuclear accident by June 2012 for adoption. This target could however not be met. One of the main difficulties was a lack of experience on nuclear emergency preparedness principles within the coordination task force. Only several experts of the DRP and the ASS were sufficiently familiar with those principles, including for instance standard reference documents such as the IAEA safety guide GS-G-2.1.

The second part of the exercise "3 in 1" (see below) was then used to test the initial element of an unfinished new plan. With the lessons learned from that exercise and the experience gained by all participants of the exercise it became possible to optimize the draft plan. The draft plan was accepted by the High Level Council of National Protection (CSPN) on 15th May and submitted in June 2013 to the Government Council for approval. At the moment when this report was written, the new emergency response plan in case of a nuclear accident has not yet been approved.

Art 16 (1b): Overview and implementation of main elements of national plan for emergency preparedness, including the role and responsibilities of the regulatory body and other main actors, including State organizations

The new draft emergency response plan in case of a nuclear accident is the result of some thirty meetings involving key players in this field, namely:

- Department of State - HCPN - Press and Information Service (SIP);
- Ministry of the Interior and the Greater Region - ASS - Police;
- Ministry of Health - Department of Health - DRP;
- Ministry of Foreign Affairs - Army;
- Ministry of Finance - Customs;
- Ministry of Family and Integration;
- Ministry of Sustainable Development and Infrastructure;
- Ministry of Agriculture, Viticulture and Rural Development;
- Ministry of National Education.

Compared to the current plan (version 2 December 1994), the new draft plan contains main new or modified provisions in the following areas:

*On a technical level*

- Definition of different phases of the accident, namely the emergency phase and the post-accident phase, the first being subdivided into a threat phase and a release phase and the second into a transition phase and a long-term consequences management phase. This is now independent of the severity of an accident.
- New Emergency Planning Zones (EPZ) are proposed for evacuation, sheltering and iodine prophylaxis.
- The decision of a protective action will be based on defined intervention levels while taking into account the principles of proportionality and effectiveness of each of the proposed measures. This flexibility shall mainly allow for ad-hoc

coordination of the protective actions with the neighboring states along national borders.

- The draft emergency response plan focuses on emergency phase, including the phase immediately after the accident, in particular the first few weeks after the release. The management of long-term consequences, including waste management, will be dealt with in a specific plan for the post-accident phase.
- National planning for crisis management in the event of a nuclear accident now also includes the development of two categories of operational emergency procedures, operational procedures per measure (OPM)[7] and operational procedures per responsible actor (OPA). The deadline set for finalizing those operational procedures is set on the 1st November 2013, depending however on a rapid approval of the new draft emergency response plan in case of a nuclear accident. It belongs to the ministries, departments and services concerned to finalize the respective operational procedures based on their assigned missions.

*Organizational and legal aspects*

- Implementation of the plan fall now under the responsibility of the Prime Minister, Minister of the Interior and the Greater Region and the Minister of Health.
- In the event of an imminent risk or the occurrence of a nuclear crisis potentially affecting the territory of Luxembourg the Prime Minister activates the crisis cell. Members of the cell are alerted trough the HCPN mechanism. Under the authority of the Government, the crisis cell initiates, coordinates and monitors the implementation of all measures to cope with the crisis and its effects, respectively, promotes the return to normal. It prepares the necessary decisions. The crisis cell is composed of 12 permanent members and 9 topic related members.
- Regarding the legal basis, the plan provides a comprehensive survey of laws and regulations that apply in the context of nuclear emergency, including Article 32, paragraph 4 of the Constitution that provides for the case of an international crisis particular competences to the Grand Duke.
- A commission composed of representatives of HCPN, the DRP, the ASS and the SIP shall meet at least once a year to make any adaptation of the plan as appropriate and depending for example experience feedback from exercises or knowledge acquired during the development and updating of the respective operational procedures.

The main responsibilities of the regulatory body (DRP) in the emergency preparedness remained mostly unchanged. It is worth to notice the national program for the systematic monitoring and the surveillance of the radioactivity on the national territory, assuring permanent control of the radioactivity in the air, water and soil on the national territory.

[7] Eighteen measures are considered within the draft emergency response plan in case of a nuclear accident for which a dedicated OPM is being developed (1 Radiological Evaluation, zoning; 2 Individual protection measures; 3 Distribution of potassium iodide tablets; 4 Sheltering; 5 Access control to affected areas; 6 Evacuation; 7 Reception Centers; 8 Decontamination of people and goods; 9 Foodstuff; 10 Agricultural products and feeding stuff; 11 Internal Communication; 12 External Communication; 13 International Collaboration: mutual assistance; 14 Hospitals & healthcare; 15 Social infrastructure (e.g. nurseries, retirement homes); 16 Schools; 17 Transport Management; 18 Water Management)

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.

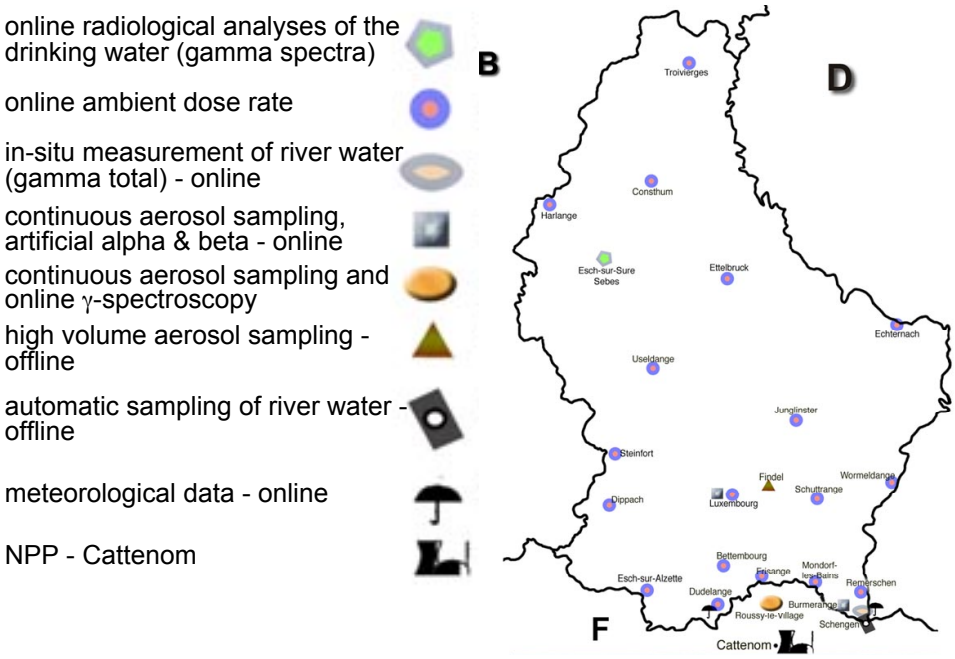


**Figure 3:** *National radiological monitoring network operated by the DRP*

Potassium iodide tablets (65 mg KI) are stored since 1986 in the municipalities situated at a distance up to 25 km from Cattenom. For the communities situated beyond this 25 km range, potassium iodide tablets are stored in the regional centers of the ASS. A complementary program has been implemented since 2001 by the DRP, targeting an increased availability of potassium iodide to the most radiosensitive groups. 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 order to increase the level of information on iodine prophylaxis, the DRP issued in August 2010 an information flyer consisting of 8 languages and explanative pictures. Following the accident in Fukushima Dai-ichi, the public debate in Luxembourg and also the questions received from the professional sector (e.g. pharmacies, hospitals, practitioners) made it clear to the DRP that additional information on the governing principles of iodine prophylaxis is needed. The DRP then worked on an additional leaflet with easy to understand information on how iodine prophylaxis works, explanations concerning the justification of recommending the intake of stable iodine and the availability of iodine tablets in Luxembourg. It has been issued in November 2012 in 3 languages (French, German and English). Both guides may be consulted under www.radioprotection.lu.

Art 16 (1b): Training and exercises, evaluation activities and main results of performed exercises including lessons learned

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 twice per year organized small-scale national exercises in order to train the specialized intervention teams of the Department of Civil Protection.

Given the relatively limited own resources and expertise, Luxembourg focuses its efforts on participating in 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.

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 last exercise of this kind took place on the 8 and 9 April 2010.

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 participating in and organizing international drills for radiological emergencies. The last larger scale common exercise with deployment of the French, Belgian and Luxembourgish decontamination chain and approximately 200 participants was hold from the 8th to 10th October 2010 in Luxembourg. The goal was to test the units qualitatively and quantitatively with the aim develop second stage identical working procedures for facilitating mutual assistance.

The Executives of the Greater Region[8], meeting in Extraordinary Summit in Metz (France) on 20 April 2011, agreed to strengthen cooperation in the establishment and implementation of operational management plans relating to nuclear accidents. The result has been the joint project entitled "Nuclear Exercices Project 3 in 1", consisting of a series of three exercises with one continuous scenario.

The exercises should focus on regional and international consistency of the organization of crisis management and crisis structures on the basis of national and international regulations and emergency plans around the NPP Cattenom. Key points were to assure continuous flow of information depending on the situation, and on the mutual information of decisions taken to maintain public order and measures in the field communication and public relations.

The first exercise organized by the participating German federal states took place during the last week of June 2012 with a simulation of the alert phase up to first releases in real time over 16 hours. The second exercise, organized by Luxembourg, was held from 5 to 6 December 2012 with focus on the release phase. The last exercise organized in June 2013 by France did permit to simulate over 3 to 4 days several aspects of the post-accidental situation.

It is worth to mention that the operator of the NPP Cattenom actively participated in the preparation and execution of the exercises. For example the detailed scenario for the second exercise has been prepared in close cooperation between the operator and the DRP. This was

[8] The Greater Region is composed of Luxembourg, Lorraine (France), Saarland, Rhineland-Palatinate (Germany), Wallonia (Belgium), and the German-speaking community of Belgium.

felt very positive, since for the first time Luxembourg could influence the type of scenario chosen for such an exercise. It was also the first time that an exercise was held during a release phase with a simulated radiological impact on the territory of the French neighboring countries in Germany and Luxembourg.

On the regional scale a very active participation of all involved actors permitted to simulate a number of operational issues that have hardly been tested before, as for example traffic management in and around the region, setting up of reception centers and coordination of the hospitals of the region. On the other hand, the regional character of the exercise series also signified that important national authorities in France and in Germany were not involved in all cases. Relevant information exchanges with those bodies were thus not always guaranteed. During the exercises those missing partners were simulated through a common exercise animation cell.

After each exercise lessons learned meetings were held, both at national level in Luxembourg and with the partners of the Greater Region. Following the last exercise from June 2013, France will organize in September a common meeting for the exchange of the lessons learned of the 3rd exercise. This occasion will also serve to set up a list of priorities for further strengthening the cooperation in the Greater Region on nuclear emergency preparedness.

From the Luxembourg perspective, selected main results of the first two exercises are as follows:

- The crisis cell and radiological evaluation cell are situated in distinct places. Possibilities will be elaborated to physical bring both cells together.
- The operation of the crisis cell over a longer period remains difficult.
- Regular situation reports were introduced at the second exercise. This very usefully complemented the log file for keeping participants informed that were not permanently present in the crisis cell. It also helped for the information exchange with the participants of the neighboring countries.
- The direct information on the situation of the reactor between the regulatory bodies, respectively its TSO of neighboring countries, including from the operator, is essential. The exercise has again shown that the transmission of such type of information through an intermediate state body fails, because of time delays among others.
- Language barriers within the region remain an issue.

### Art 16 (2): Information of the public

Art 16 (2): Overview of the arrangements for informing the public in the vicinity of the nuclear installations about emergency planning and emergency situations

A regulatory act 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 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. During the recent years update of such information was based on providing additional information through the website of the DRP (www.radioprotection.lu).

In conjunction with the elaboration of a new emergency response plan, the SIP developed a new communication strategy including inter alia the establishment of a dedicated website for crisis related information. The strategy has been approved by the CSPN in January 2012 and will be implemented. It is in particular proposed to perform during the 1st half of 2014 an information campaign on the nuclear accident emergency response plan, and the health protection measures, emergency measures provided in order to alert, protect and assist the population to behave in the event of a nuclear emergency, as well as the basics of radioactivity and their effect on humans

**Art 16 (3): Emergency Preparedness form the perspective of a non-nuclear state and international arrangements.**

Art 16 (3a): Measures for the preparation and testing of emergency plans that cover the activities to be carried out on their territory in the event of such an emergency

Given the fact that the French NPP Cattenom is with 8.5 km relatively close to the border of Luxembourg, most obligations on off-site emergency preparedness are identical for Luxembourg than for a Contracting Party with nuclear installations. For that reason the present report describes those elements under article 16.1 above.

However, a few issues are particularly related to the circumstances of having no own nuclear installation. Worth to mention are for instance:

- The national emergency response plan does not comprise action levels that would be triggered by the operator. Those "automatic" protective actions are in France based on a fast kinetic scenario with limited radiological consequences and concern only a couple of kilometers around NPP's and do not reach op to the border of Luxembourg. Implementing such type of reactions in Luxembourg would thus mean to create an inconsistency along the border with France.
- Luxembourg does not perform an own situation assessment, neither an own radiological prognosis but has concluded agreements with France for sharing their assessments. All exercises have indeed shown a high degree of uncertainty and margins of interpretation. Assessments done by 2 countries thus always result in decisions for protective actions that are inconsistent along borderlines.
- The size of Luxembourg having borders with three neighboring countries in the range of potentially affected territories of a nuclear accident explain why the DRP has always been in favor of harmonizing emergency preparedness in Europe. Therefore, the DRP and the ASS participated in a group of experts from France, Belgium, Germany, Switzerland and Luxembourg from early 2006 to July 2007 who developed proposals for a harmonized strategy, focused on iodine prophylaxis linked with other protective actions. Luxembourg implemented those recommendations in the following years. However differences still remain, in particular with regard to Germany and Belgium; to a lesser extend with France.
- The DRP continues the efforts through active participation in the association of the Heads of the European Radiological protection Competent Authorities (HERCA). The DRP chairs the working group "emergencies" with the goal to elaborate a new operational approach for achieving better consistency of

protective actions between neighboring European Countries during a nuclear emergency in Europe or elsewhere.

- The DRP also participates in the core group of the EP&R Project on the review of off-site EP&R in EU member states.

Art 16 (3b): International arrangements, including those with neighbouring States

Through the Franco-Luxembourgish Commission (see also under article 7) several information exchange procedures have been elaborated and approved. Those guarantee for Luxembourg to receive relevant information on the nuclear situation during an emergency directly from the operator and the ASN, respectively IRSN. On the regional scale a specific system for communication between the authorities and operator 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.

# Appendix – Laws, regulatory acts and degrees

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 11 april 1995 concerning the approbation of the Convention on the Physical Protection of Nuclear Material, opened for signature in Vienna and New York on 3 march 1980.

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 20 June 2001 concerning the approbation of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, adopted in Vienna on 5 September 1997

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.

Law of 28 July, 2011, 1) approving the Amendment to the Convention on the Physical Protection of Nuclear Material, adopted at Vienna, July 8, 2005; 2) amending the amended law of 11 April 1985 approving the Convention on Physical Protection of Nuclear Material, opened for signature at Vienna and New York dated March 3, 1980.

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 3 march 2009 on the supervision and control of

shipments of radioactive waste and spent fuel (transposition Council Directive 2006/117/EURATOM of 20 November 2006).

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).

Agreement of 14 May 2013 between the Minister of Health, Luxembourg in the name of the Government of the Grand Duchy of Luxembourg and the Minister of Interior, Belgium in the name of the Government of the Kingdom of Belgium on the organization of the bilateral cooperation on nuclear safety matters and radiation protection.