Overview of the use of IAEA Safety Standards in Belgium

W. Blommaert
FANC
The Kingdom of Belgium

- member of the European Union and Euratom

Federal State:

- three regions:
  - Flemish region
  - Walloon region
  - Brussels Capital Region

- three communities:
  - Dutch speaking community
  - French speaking community
  - German speaking community
Competences

- **Regions**: matters linked to its territory, e.g. environmental protection (radiological aspects excluded), land use planning, ...

- **Communities**: matters linked to persons, e.g. culture

- **Federal state**: defence, foreign affairs, military, ... and matters related to the **nuclear fuel cycle** (radiological protection, nuclear safety and security)

**Note**: regions, communities and the federal state develop their own policy and regulations
Fuel Cycle facilities and NPPs in Belgium

- **7 NPPs on 2 sites** (Doel & Tihange):
  - 2 NPPs planned (?) to be shut down in 2015 (Doel 1 and Doel 2)
  - 1 NPP: lifetime extended up to 50 years (Tihange 1)

- **3 operating Research Reactors**: BR1, BR2, Venus

- **2 Research Reactors in decommissioning**: BR3 (already completed), Thetis

- Pre-licensing activities for a research reactor (MYRRHA)
Fuel Cycle facilities and NPPs in Belgium

- 1 central interim waste storage and treatment facility: Belgoprocess
- 2 on-site spent fuel interim storage facilities (wet and dry)
- 1 UO2 fuel fabrication facility: FBFC
- 1 MOX fuel facility in decommissioning
- 1 fuel reprocessing facility in decommissioning (since ’86)
- Pre-licensing activities for a L-ILW repository (surface)
Nuclear Regulatory Framework

- **Treaties** (Euratom, Paris, Chicago, ...)
- **Conventions** (CNS, JC, ...)
- **Decree FANC**
- **Policies and strategy notes**
- **Guidelines FANC**
- **Guidelines BelV**

**National**
- Constit. Law
- LAWS
- Royal and Ministrial Decrees

**Regional**
- Decisions
- Recommendations
- Resolutions

**International**
- IAEA
- OECD NEA
- ICRP
- USNRC
- WENRA
- HERCA
- ENSREG

**European Union**
- Treaties (Euratom, Paris, Chicago, ...)
- Regulations
- Decisions

**Norms**
- Intern. Transport regul.
- Industry Norms (IEC, ASME, ANSI, ...)

**Conventions**
- CNS
- JC

**Treaties**
- Euratom
- Paris
- Chicago

**Treaties**
- EURATOM
- PARIS
- CHICAGO
Regulatory system for safety

**FANC law of 1994**
- Protection of public and environment and establishing the authority and tasks of FANC as the Belgian nuclear regulator
- Article 24 charges FANC for making proposals for regulation

**GRR-2001**
- Licensing regime: classification, process, supervision
- Radiological protection, medical applications, consumer products
- Transport
- Surveillance of territory and emergency planning

**SRNI-2011**
- Generic safety requirements for all class I facilities
- Specific safety requirements for NPPs
- Under development: specific chapters for storage of waste, waste disposal facilities, decommissioning and research reactors

**Other**
- Import, transit and export (2009)
- Security (FANC law, law and RD of 2011)
Interfaces with other regulations

- Security and safeguards
- Protection of workers and conventional safety
- Human and veterinary medicine
- Carriage of dangerous goods
- Health care
- Regional regulations (environmental protection...)
Disposal: regulatory context

Federal

LAW
EUR DIR.

RD’s
- GRR
- SRNI
- “ARD”

Strategy note - guides
(surf. disposal, biosphere, RPC, seism, intrusion, groundwater, ext events) ; IAEA, …

Region
(decrete, …)

Protocol
CA

- EIA
- license
Extensive use of IAEA standards

as a basis for a.o.:

- the Safety Reference Levels for NPP and RR (SRNI;WENRA)
- the Safety Reference Levels for Decommissioning (SRNI;WENRA)
- the Safety Reference Levels for storage of Waste & SF (SRNI;WENRA)
- the Safety Reference Levels for Waste Disposal (SRNI;WENRA)
- FANC Guide on PSR
- FANC Guide for Long Term Operation of NPPs
- FANC Guide for Long Term Operation of Research Reactors
- FANC guides in pre-licensing for:
  - Surface Waste Disposal Facility
  - the MYRRHA Research Reactor
Royal Decree 30/11/2011 (« SRNI (WENRA) »)

On the way
- Section VI : Decommissioning
  - Ch. 4 : Disposal
  - Ch. 5 : Interim Storage
  - Ch. 6 : Research reactors
  - Revision RLs post-Fukushima

Extended application (Cl 1 non NPPs)

Ch 3: Specific Safety requirements for NPPs

Ch 4: Specific Safety requirements for disposal facilities

Ch 5: Specific Safety requirements for interim storage facilities for SF and solid waste

Ch 6: Specific Safety requirements for Research Reactors

Chapter 2 : Generic Safety Requirements

Section I - Safety Management
Section II – Design
Section III - Operation
Section IV – Safety verification
Section V – Emergency preparedness
Section VI – Decommissioning
Development of guides

Foreword (guides for surface disposal)

• The Technical Guides drafted by the FANC in the framework of the disposal of radioactive waste aim to form the technical basis for the regulatory framework to be established in these matters. This Technical Guide has been subject to the critical judgement of experts (internal, external and Scientific Council), during a verification and validation process. It is important to highlight that this document may be reviewed in order to take account of technological and/or regulatory changes, as well as any new facts.

• Some of the elements developed in this document may overlap with provisions of legislative or regulatory texts under development. The elements presented here are only intended to clarify the current expectations of the FANC on these subjects and do not in any way aim to replace the aforementioned legislative or regulatory texts. After their publication in the Belgian Official Journal, the aforementioned legislative or regulatory texts cancel and replace the elements dealt with in this guide.
Fields of application (examples)

- Long Term Operation (NPP and RR)
- Periodic Safety Review – PSR
- INES: convention with licensees to use INES
- Transport
- Project MYRRHA: prelicensing
- Surface disposal facility: pre-licensing (e.g. guides biosphere, RPC, seism, intrusion, groundwater, ext. events, ...)

Strategy note:

“Safety requirements standards of the IAEA establish requirements that must be met to ensure the protection of people and the environment, both now and in the future. In that context, general and specific IAEA safety requirements standards shall be followed by the designer to the extent of their applicability, i.e. taking into account the specificity of MYRRHA.”

References:

- IAEA SF-1 on Fundamental Safety Principles
- WENRA statement on safety objectives for new nuclear power plants
- WENRA Safety Objectives for New Power Reactors
- IAEA TECDOC-682 on Objectives for the development of advanced nuclear plants
- IAEA TECDOC-626 on Safety related terms for advanced nuclear plants
- ANSI/ANS-54.1-1989 on General safety design criteria for liquid metal reactor nuclear power plant
- IAEA NS-R-1 on Safety of Nuclear Power Plants: Design (now SSR-2/1)
- IAEA NS-R-4 on Safety of Research Reactors”
- WENRA Reactor Safety Reference Levels January
- IAEA-TECDOC-1624, Passive Safety Systems and Natural Circulation in Water Cooled Nuclear Power Plants
Prelicensing MYRRHA: Guides

• Categorization and assessment of accidental aircraft crashes:
  – IAEA NS-G-1.5 on External Events Excluding Earthquakes in the Design of Nuclear Power Plans
  – IAEA NS-G-3.1 on External Human Induced Events in Site Evaluation for Nuclear Power Plants
  – IAEA TECDOC 1347 on Consideration of external events in the design of nuclear facilities other than nuclear power plants, with emphasis on earthquakes
  – IAEA SSR-2/1 on Safety of Nuclear Power Plants: Design
  – IAEA SSG-2 on Deterministic Safety Analysis for Nuclear Power Plants
  – WENRA Reactor Safety Reference Levels
  – WENRA Statement on Safety Objectives for New Nuclear Power Reactors
  – WENRA Safety of new NPP designs
Guides for nuclear waste disposal facility

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Installation/Activities</th>
<th>Title of the document</th>
<th>Date</th>
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<th>Themes</th>
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<td>IAEA-SF-1</td>
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<td>Fundamental Safety Principles</td>
<td>2006</td>
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<td>radioprotection principles; justification; optimisation, limits; fundamental principles; robustness; management system; emergency preparedness and response; safety strategy</td>
<td>AR-PSIN-GEN, AR-PSIN-Disp; NS; GEN; GEOI; SUR; SAR; RPC-OP; RPC-LT; BIO; WENRA SRL;</td>
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<td>IAEA-GSR-Part1</td>
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<td>Governmental, legal, and regulatory framework for safety : General Safety Requirements Part 1</td>
<td>2010</td>
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<td>regulatory responsibilities; regulatory resources; regulatory management;</td>
<td>L-1994; AR-PSIN-GEN; WENRA SRL;</td>
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<td>IAEA-GS-R-3</td>
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<td>The Management system for Facilities and Activities: Safety Requirements N° GS-R-3</td>
<td>2006</td>
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<td>responsibilities, resources;</td>
<td>L-1994; AR-PSIN-GEN; WENRA SRL;</td>
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<td>IAEA-GSR-Part3</td>
<td>all</td>
<td>Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards INTERIM EDITION : General Safety Requirements Part 3 (Interim)</td>
<td>(2011)</td>
<td>N</td>
<td>radioprotection principles, limits; robustness; responsibilities; organisational structure; feedback; emergency preparedness and response; occupational exposure; public exposure; monitoring; safety case; safety assessment;</td>
<td>Doc FR-BE; AR-PSIN-Disp; RPC-OP; RPC-LT; GEN; SAR; WENRA SRL;</td>
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<td>IAEA-GSR-Part4</td>
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<td>Safety Assessment for Facilities and Activities : General Safety Requirements Part 4</td>
<td>2009</td>
<td>Y</td>
<td>responsibilities; resources; safety case content; timescales; timeframes; uncertainties; assessment models; indicators; criteria;</td>
<td>SAR; RPC-OP; RPC-LT; A-TOC; WENRA SRL;</td>
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<td>Predisposal Management of Radioactive Waste : General Safety Requirements Part 5</td>
<td>2009</td>
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<td>IAEA-GS-R-2</td>
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<td>Preparedness and Response for a Nuclear or Radiological Emergency: Safety Requirements N° GS-R-2</td>
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<td>organisational structure; emergency preparedness and response;</td>
<td>WENRA SRL;</td>
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<tr>
<td>IAEA-SSR-5</td>
<td>radioactive waste disposal</td>
<td>Disposal of radioactive waste : Specific Safety Requirements N° SSR-5</td>
<td>2011</td>
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<td>radioprotection principles; optimisation; robustness; demonstrability; feasibility; design; construction; operation; closure; decommissioning; characterisation; waste acceptance; safety case; safety assessment; safety case content;</td>
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<td>IAEA_WS-R-1</td>
<td>surface disposal</td>
<td>Near Surface Disposal of Radioactive Waste. Safety Requirements WS-R-1</td>
<td>1999</td>
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<td>safety requirements;</td>
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<td>IAEA-NEA_WS-R-4</td>
<td>geological disposal</td>
<td>Geological disposal of radioactive waste. Safety Requirement WS-R-4</td>
<td>2006</td>
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<td>IAEA-NEA_WS-R-5</td>
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<td>Decommissioning of Facilities using Radioactive Material. Safety Requirement WS-R-5.</td>
<td>2006</td>
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<td>IAEA_GSG-1</td>
<td>radioactive waste management</td>
<td>Classification of Radioactive Waste : General Safety Guide N° GSG-1</td>
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<td>Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency : General Safety Guide N° GSG-2</td>
<td>2011</td>
<td>Y</td>
<td>operation; emergency preparedness and response;</td>
<td>AR-PSIN-GEN;</td>
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<td>IAEA_GS-G-1.1</td>
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<td>Organization and staffing of the regulatory body for nuclear facilities : safety guide N° GS-G-1.1</td>
<td>01/08/2002</td>
<td>Y</td>
<td>regulatory management of competences; regulatory responsibilities; regulatory resources;</td>
<td>AR-PSIN-GEN;</td>
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<tr>
<td>IAEA_GS-G-1.2</td>
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<td>Review and assessment of nuclear facilities by the regulatory body: Safety Guide N° GS-G-1.2</td>
<td>01/08/2002</td>
<td>Y</td>
<td>safety case review; regulatory responsibilities; regulatory resources; regulatory management;</td>
<td>AR-PSIN-GEN;</td>
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<td>IAEA_GS-G-1.3</td>
<td>all</td>
<td>Regulatory inspection of nuclear facilities and enforcement by the regulatory body: safety guide N° IAEA GS-G-1.3</td>
<td>01/08/2002</td>
<td>Y</td>
<td>safety control; regulatory responsibilities; regulatory resources; regulatory management;</td>
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</table>
Process for developing regulation/guides

- Trigger (EU, REX, international bodies, on request)
- Regulation change request
- Note of approach
- Drafting text proposal
- Consultation of interested parties (e.g. scientific council)
- Consultation of advisory bodies (e.g. health council)
- Drafting final text
- Initiation of approval process
- Publication and information of stakeholders
Internal Monitoring System

Peer Review(s) (IRRS, OSART, IPPAS, ..)

Review Documents (IAEA, …)

Representatives WG, Committees (WENRA, EU, …)

Yearly Analysis by Process Owner

Action Programme

Gaps in regulatory framework

Analysis by respect. Process Owners

File Regulatory Initiatives

Feedback experience

Application Process PC005-02

Proposals update documents

Governm. Agency
Existing situation

• Extensive use of IAEA documents for guidance, in particular for pre-licensing activities

• In general, existing regulations cope with international standards

• National regulation (a.o. GRR-2001) to be brought in line with new EU BSS, by 2018

• Continuous improvement of the Belgian safety regulatory framework through a.o. WENRA. Also to comply with recent EU Directives.
Existing situation

• An inventory of regulation initiatives is kept and a process is available for the development of regulations with extensive consultation of interested groups.

• At present, guides are developed in a decentralized way.

• A process for systematic analysis of potential gaps is initiated.

• Clear communication of IAEA Safety Standards to stakeholders as basis for new projects or modifications.