FANC

FEDERAL AGENCY FOR NUCLEAR CONTROL

+

BEL V

7th Review Meeting of the Joint Convention

BELGIUM

Country Group 4

Wednesday June 29th, 2022

The Speakers

F. Hardeman

General Manager

FANC
FEDERAL AGENCY FOR NUCLEAR CONTROL

M. Demarche

General Manager

ONDRAF / NIRAS

OUTLINE

Part 1 – Belgian regulatory body (FANC + Bel V)

1. Basic information on the national programme
2. Developments since the 6th RM
3. Action on suggestions and challenges from the 6th RM
4. Current challenges

Part 2 – Belgian radioactive waste management agency (ONDRAF/NIRAS)

Same structure 1. – 4.

Part 3 – Concluding remarks (FANC & ONDRAF/NIRAS)

5. Good practices & areas of good performance

Basic Information on the National Programme

1.A	International context for Belgium
1.B	Belgian nuclear sites
1.C	Spent fuel & radioactive waste
1.D	Institutional framework
1.E	Legislative & regulatory framework
1.F	Surveillance of nuclear installations
1.G	Licensing process
1.H	Emergency preparedness and response
1.I	Current liabilities

1.A International Context for Belgium

Conventions

- Convention on Nuclear Safety
- Joint Convention
- Convention on assistance in the case of a nuclear accident
- Paris convention on nuclear third party liability and the Brussels supplementary convention
- Convention on early notification of a nuclear accident
- Convention on physical protection of nuclear material

European level

- ENSREG (Regulators of the EU)
- WENRA (Western European Nuclear Regulators' Association)
- HERCA (Heads of Radiation Protection Authorities)

International Organizations

- IAEA : Safety committees : NUSSC, WASSC, TRANSSC, RASSC, EPRESC
- OECD/NEA: Various committees (for example: RWMC)

1.A International Context for Belgium

Bilateral agreements

- **FANC** has bilateral agreements with safety authorities of (all) its neighbouring countries : France, The Netherlands, GD Luxembourg, Germany

Regulatory Body participation in international R&D projects (RW disposal)

- The SITEX network, the EURAD European projects and the IAEA projects GEOSAF and HIDRA
- The French laboratory in Tournemire, in collaboration with the **IRSN**
- Experiments in the Swiss underground laboratory at **Mont Terri**

Peer review missions

- **IRRS mission in June 2023**
- **ARTEMIS mission in December 2023**

1.B Belgian Nuclear Sites - Operating

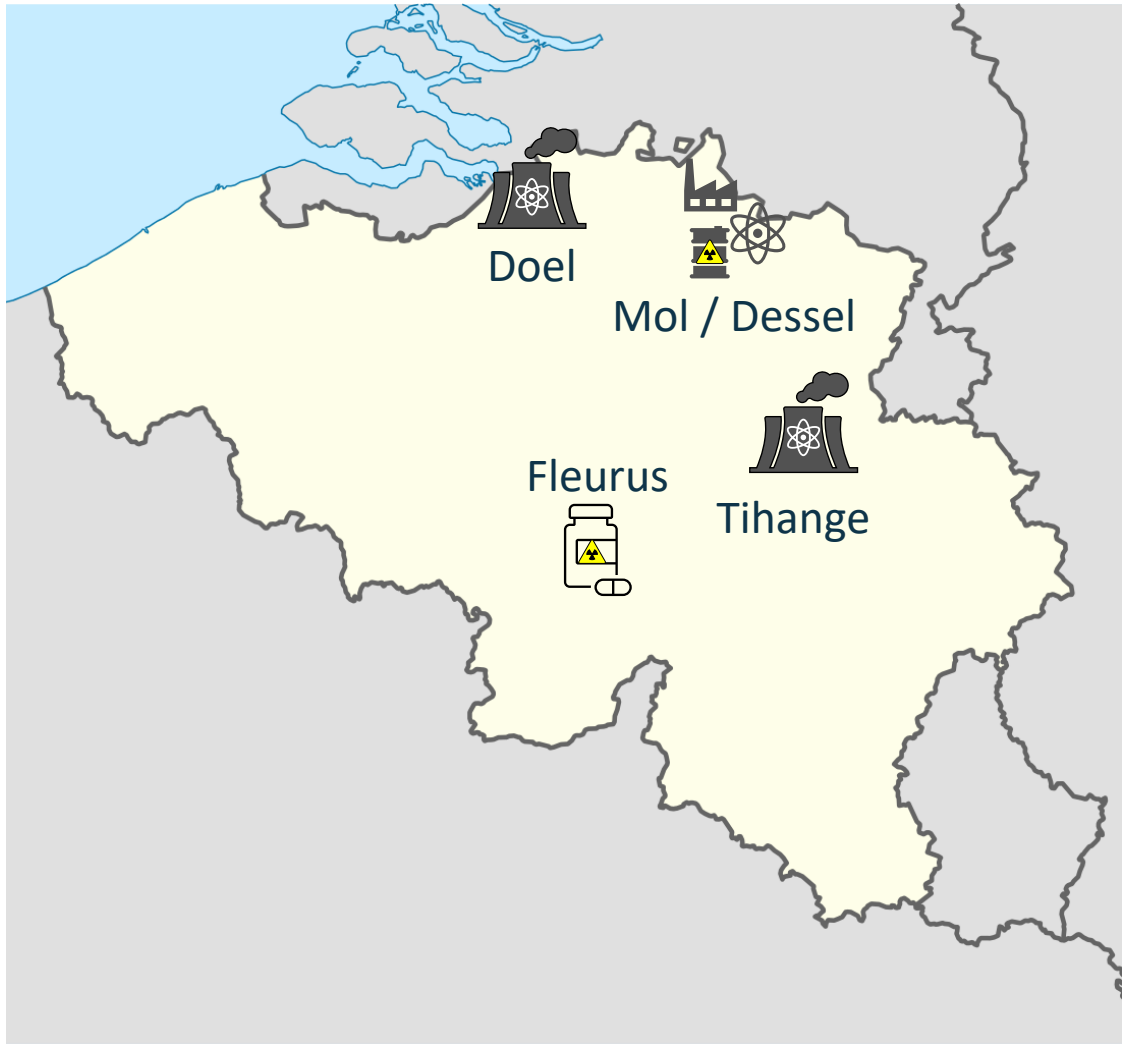
NPPs

Doel

- 4 reactors
- Centralized SF dry storage

Tihange

- 3 reactors
- Centralized SF wet storage



Other Class 1 Facilities

Mol / Dessel

- Belgoprocess (BP)
- SCK CEN
  Research Reactors
  + other facilities (e.g. hot labs)
- JRC Geel
  - R&D for European Commission

Fleurus

- IRE: Radio-isotope production for medical purposes

1.B Belgian Nuclear Energy Policy

2003 01-31
- Phase-out law for industrial electricity production from nuclear fission
- Lifetime of NPPs limited to 40 y

2013 12-18
- Modification law of 2003-01-31
- LTO Tihange 1 reactor: Lifetime extension to 50 y

2015 06-25
- Modification law of 2003-01-31
- LTO Doel 1&2 reactors: Lifetime extension to 50 y

2022 03-18
- **Government decision opening lifetime extension** for Doel 4 and Tihange 3

1.B Belgian Nuclear Sites – Decommissioning

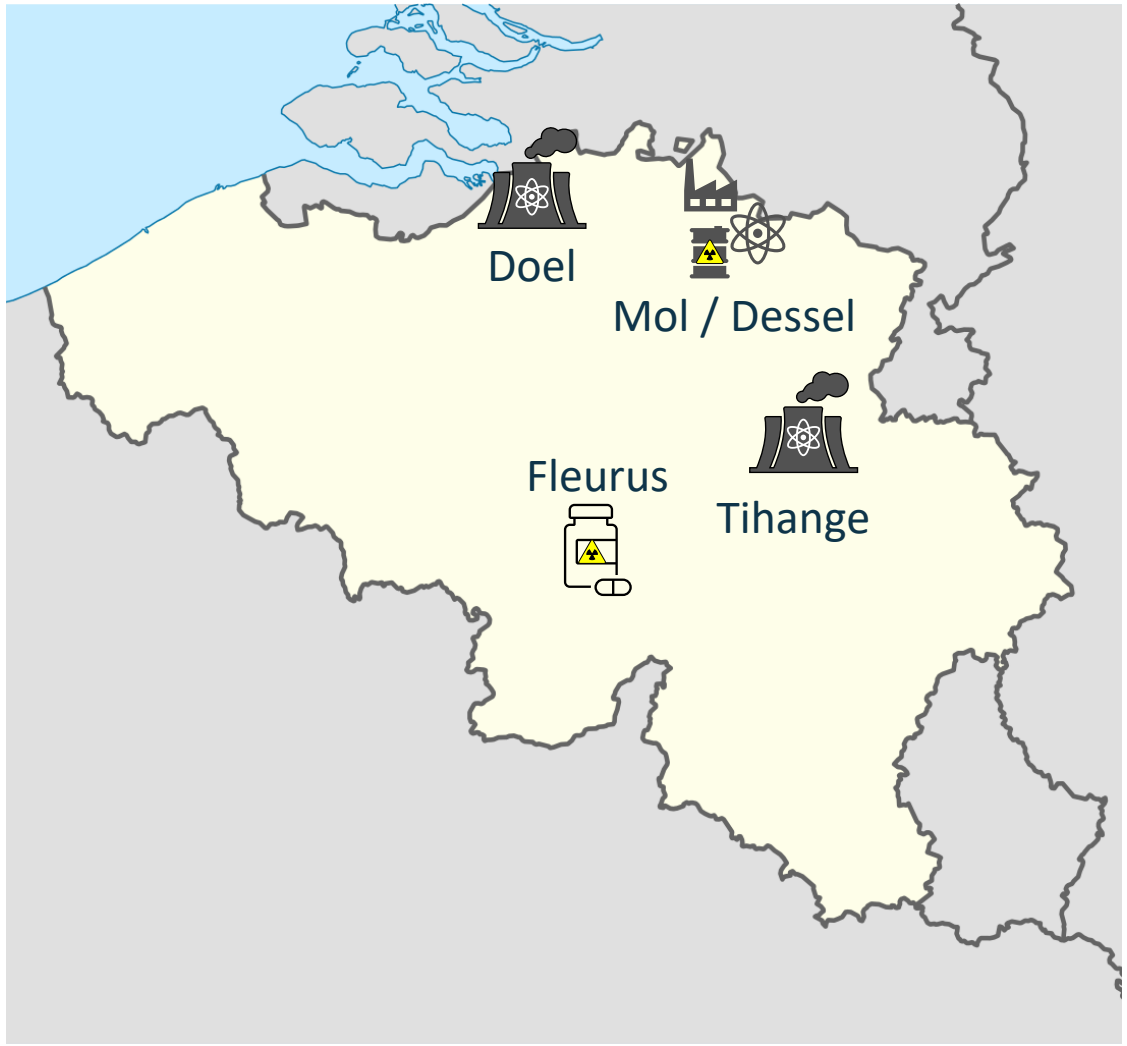
Under Decommissioning

Fleurus

- Best Medical Belgium
  - Managed by ONDRAF/NIRAS

Mol/Dessel

- Belgoprocess site 2 historical facilities
  - Managed by BP
- BR3 research reactor
  - Managed by SCK CEN



Decommissioning Completed (last 4y)

Mol/Dessel

- FBFC fuel assembly production facility

  Cleared from nuclear regulatory surveillance in March 2022

- Belgonucléaire fuel production facility

  Cleared from nuclear regulatory surveillance in December 2019

1.C SPENT FUEL AND RADIOACTIVE WASTE – STORAGE

SPENT NUCLEAR FUEL (SNF)

On-site storage

- Spent fuel pools at reactors
- Site-level storage for NPPs
  Dry storage (Doel) | Wet storage (Tihange)
  Additional dry storage facilities under construction (Doel & Tihange)

Off-site storage

- @ Belgoprocess
  SNF from Thétis research reactor (Univ. Ghent)
  SNF from BR3 research reactor (SCK CEN)

RADIOACTIVE WASTE (RW)

Short-term storage on site

- Managed by licensee
  Universities, hospitals, research centres, laboratories …
- LILW-SL ($\tau_{½}$ <6 month)
  "nearly complete" decay – min. 10 × $\tau_{½}$
- LLW-SL until clearance levels or conditional release
  Generally limited to 5y storage, except if authorized

Off-site or centralized storage

- @ Belgoprocess
- @ Umicore (Olen)
  Historical radium-bearing waste (see part 2)

1.C SPENT FUEL AND RADIOACTIVE WASTE – POLICIES

SNF MANAGEMENT

Reprocessing initially conducted

- Part of commercial SNF reprocessed
  Pu ⇨ MOX (66 t_{HM})
  Rep. U ⇨ ERU (132 t_{HM})
  ILW & Vitrified HLW: stored @ Belgoprocess

Revised strategy in 1990's

- Parliamentary resolution 1993-98
- Reprocessing suspended since 1993
  Decision upon proposition from SNF owner
  e.g. reprocessing resumed for BR2 SNF
- Safe interim storage (wet or dry)
- Direct disposal treated on equal foot

RW MANAGEMENT

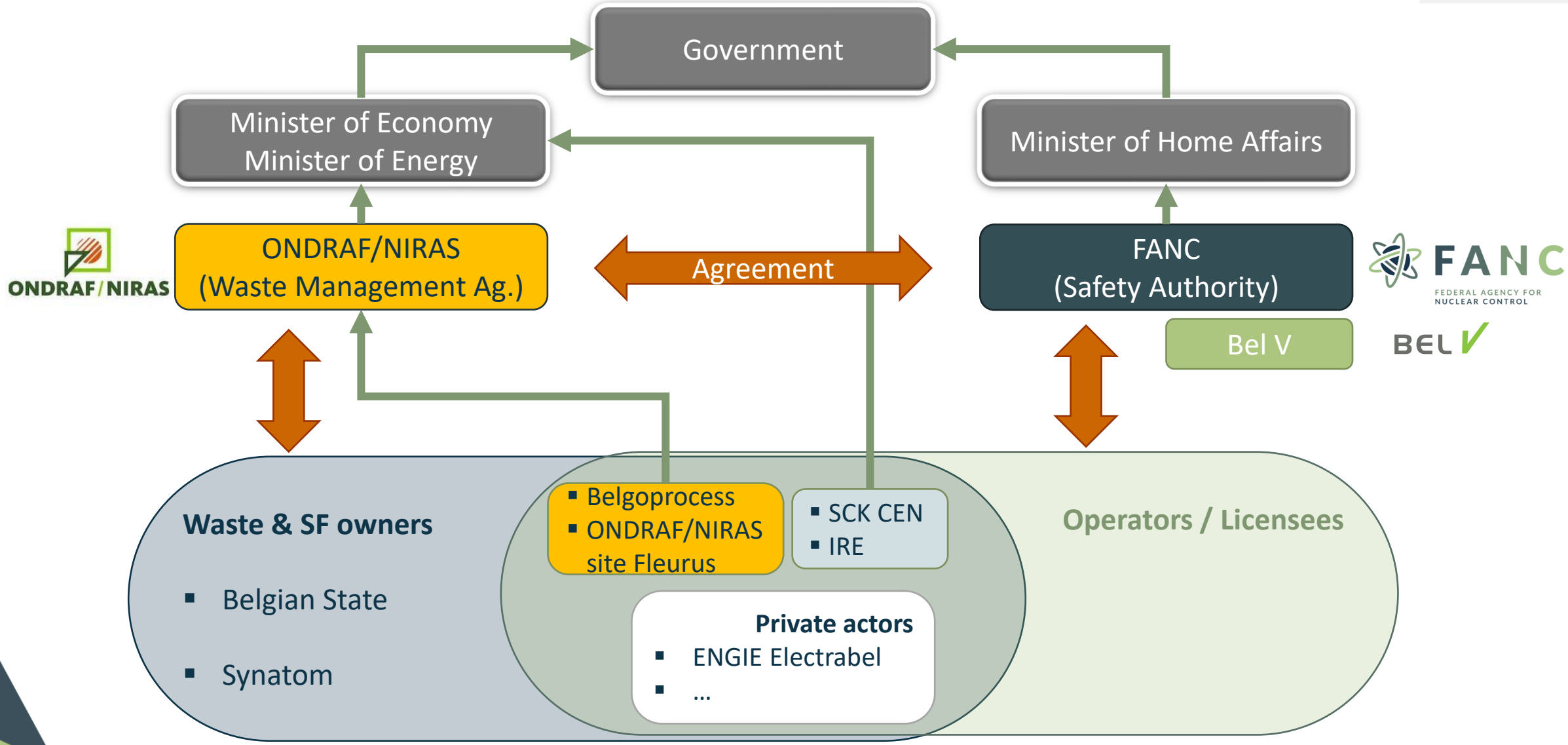
Clearance

- Dilution / mixing prohibited in general
- Clearance levels solid RW: annex IB of GRR-2001
- Discharge limits for releases: annex III of GRR-2001
- Conditional clearance: article 18 of GRR-2001
  Based on radiological impact assessment

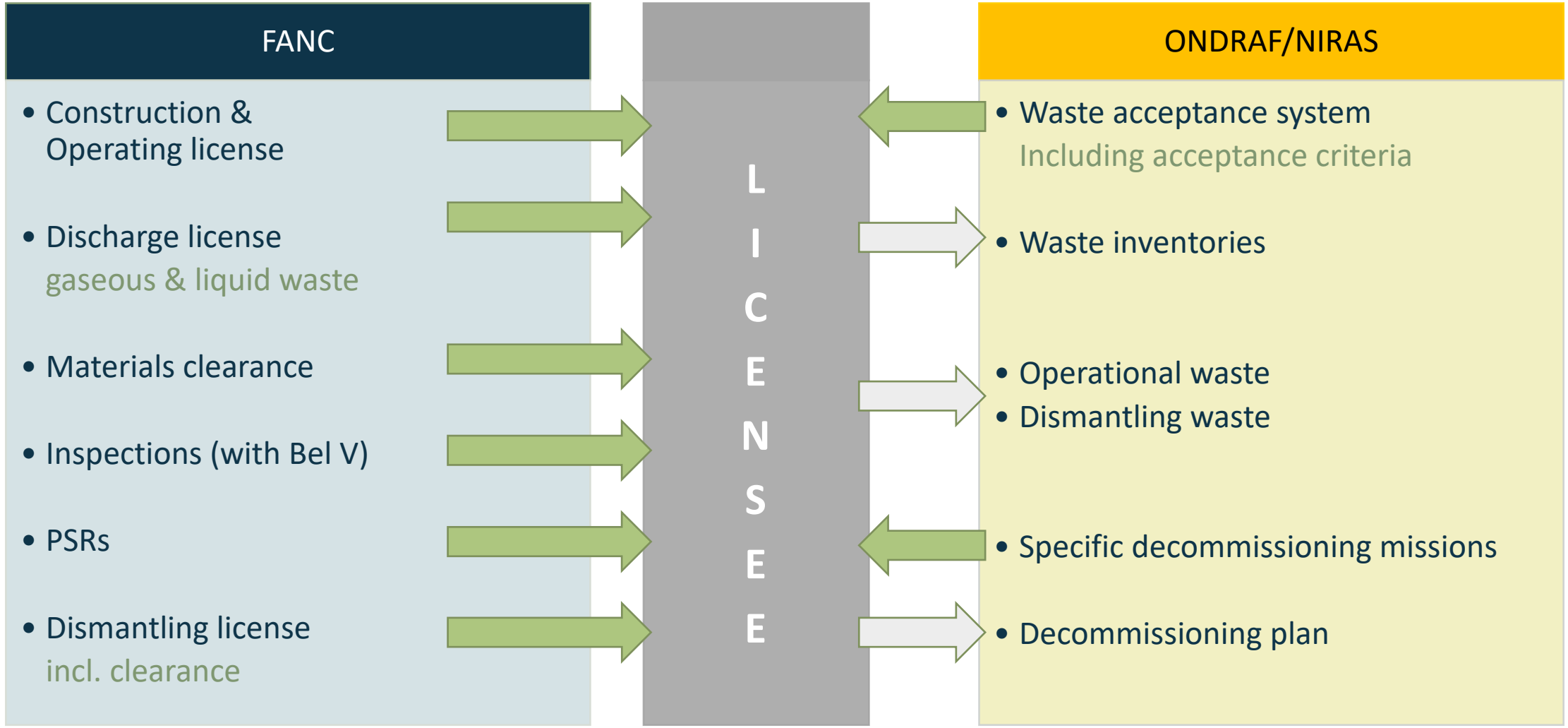
RW intended for disposal

- Treatment & conditioning + pre-disposal storage
  Belgoprocess (subsidiary of ONDRAF/NIRAS)
- LILW-SL: surface disposal | licensing process running
  ONDRAF/NIRAS

1.D Institutional Framework – Interactions



1.D Institutional Framework – Interactions



1.E Main Legislative & Regulatory Framework for Nuclear Safety

1994 — **The Law of April 15th, 1994**

Creation of the Federal Agency for Nuclear Control (FANC)

2001 — **The Royal Decree of July 20th, 2001 ("GRR-2001")**

on the protection of the workers, the public and the environment against the dangers of ionizing radiation

2011 — **The Royal Decree of November 30th, 2011 ("SRNI-2011")**

on the Safety Requirements for Nuclear Installations

2018 — **The Royal Decree of March 1st, 2018**

establishing the nuclear and radiological emergency plan for the Belgian territory

Regularly updated / amended

1.F Surveillance of Nuclear Installations

FANC FEDERAL AGENCY FOR NUCLEAR CONTROL + BEL V

FANC

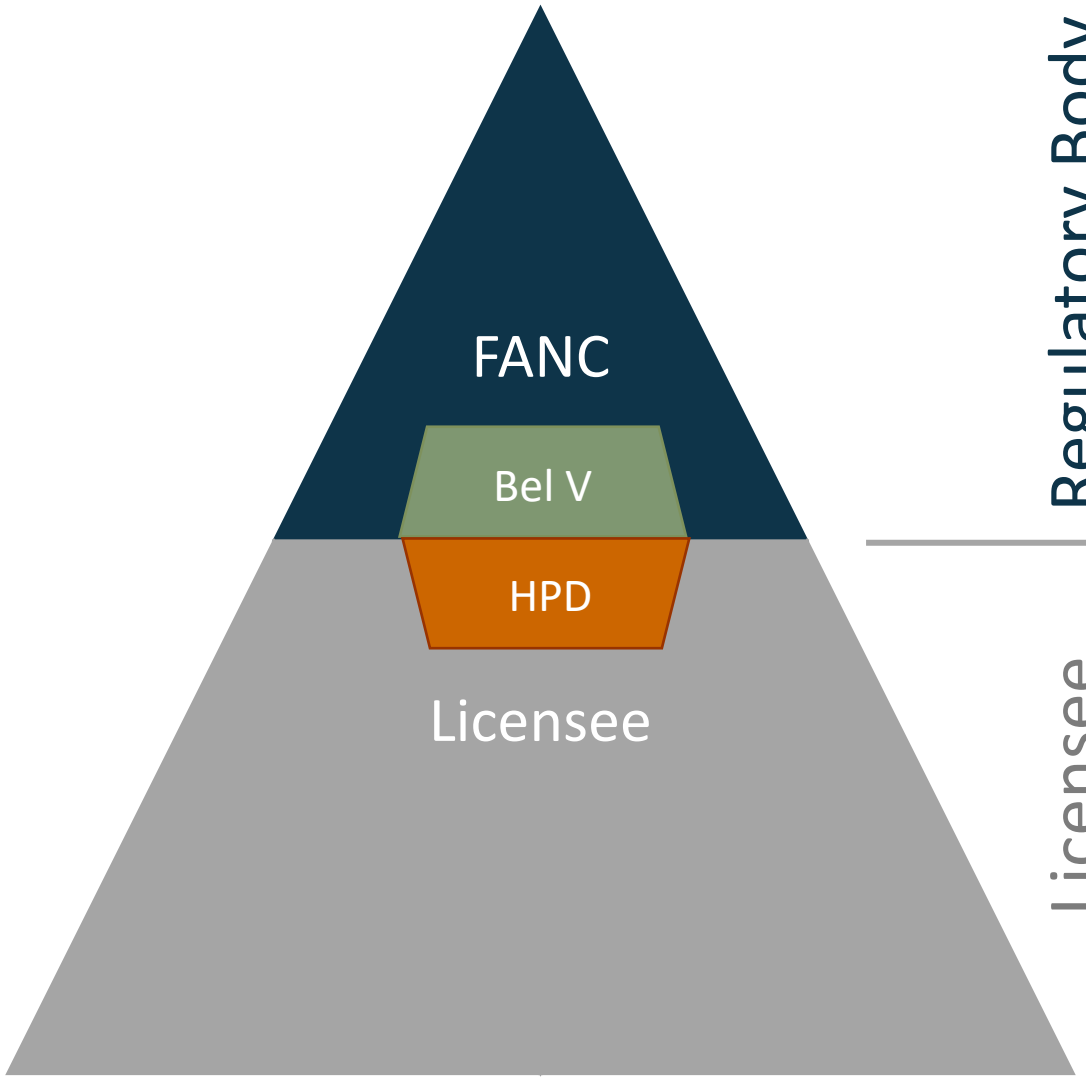
FEDERAL AGENCY FOR NUCLEAR CONTROL

- The **Safety Authority**
- **Regulatory / legislative** role
  - **License proposals** by Royal Decree (Government)
  - **Regulation proposals**
- **Regulatory compliance** missions
  - Performs **inspections** on specific thematic subjects
  - Has **enforcement power**
    close a facility, corrective actions, penalties …
- In charge of **communication to the public**

BEL V

- The **technical subsidiary** body of the FANC
- **Safety Assessments**
- **Controls of Class I and IIA facilities**

1.F SURVEILLANCE OF NUCLEAR INSTALLATIONS



Regulatory Body

FANC
Federal Agency for Nuclear Control
Federal Safety Authority

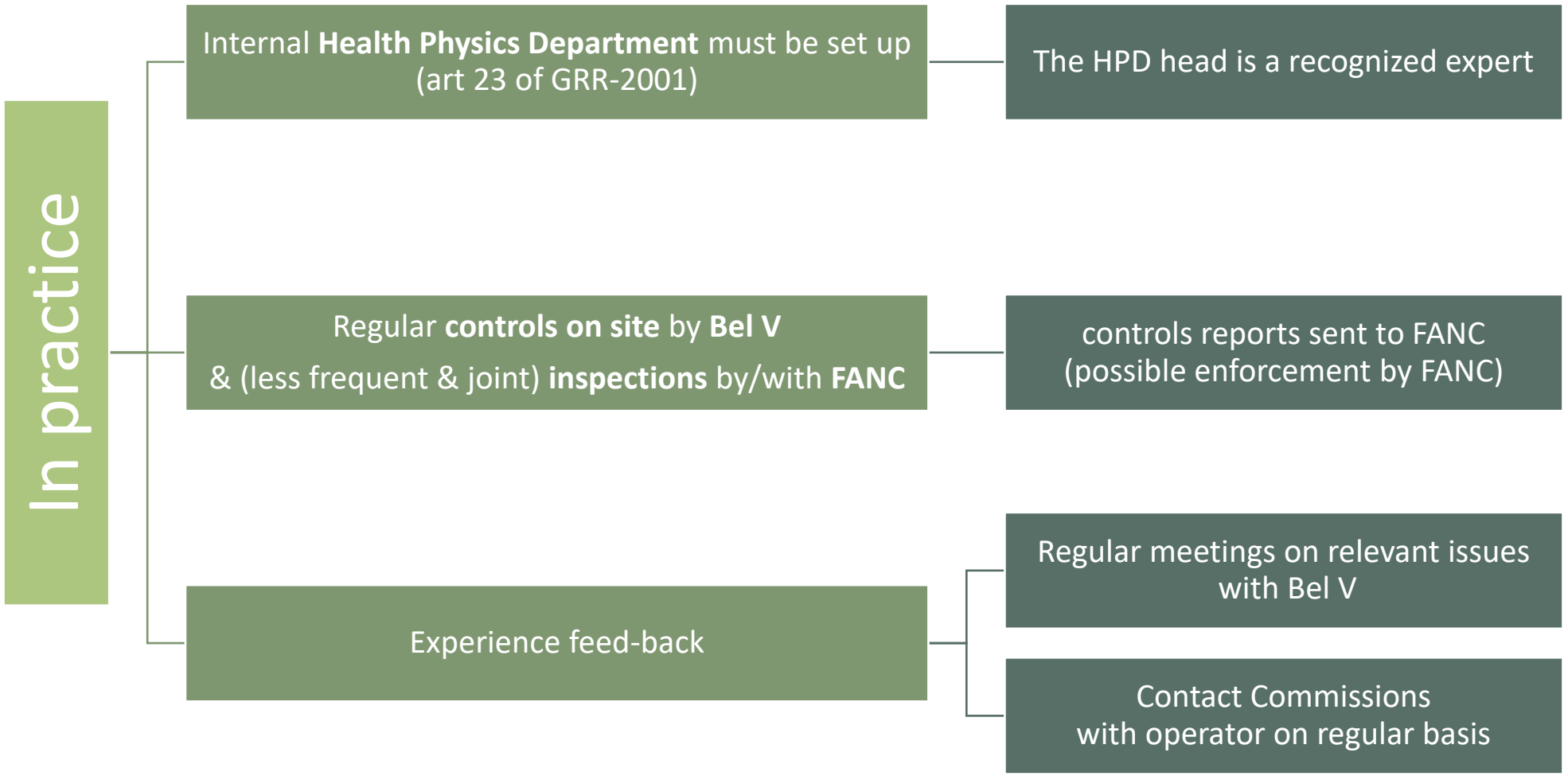
BEL V
FANC technical subsidiary Body

Health Physics Department

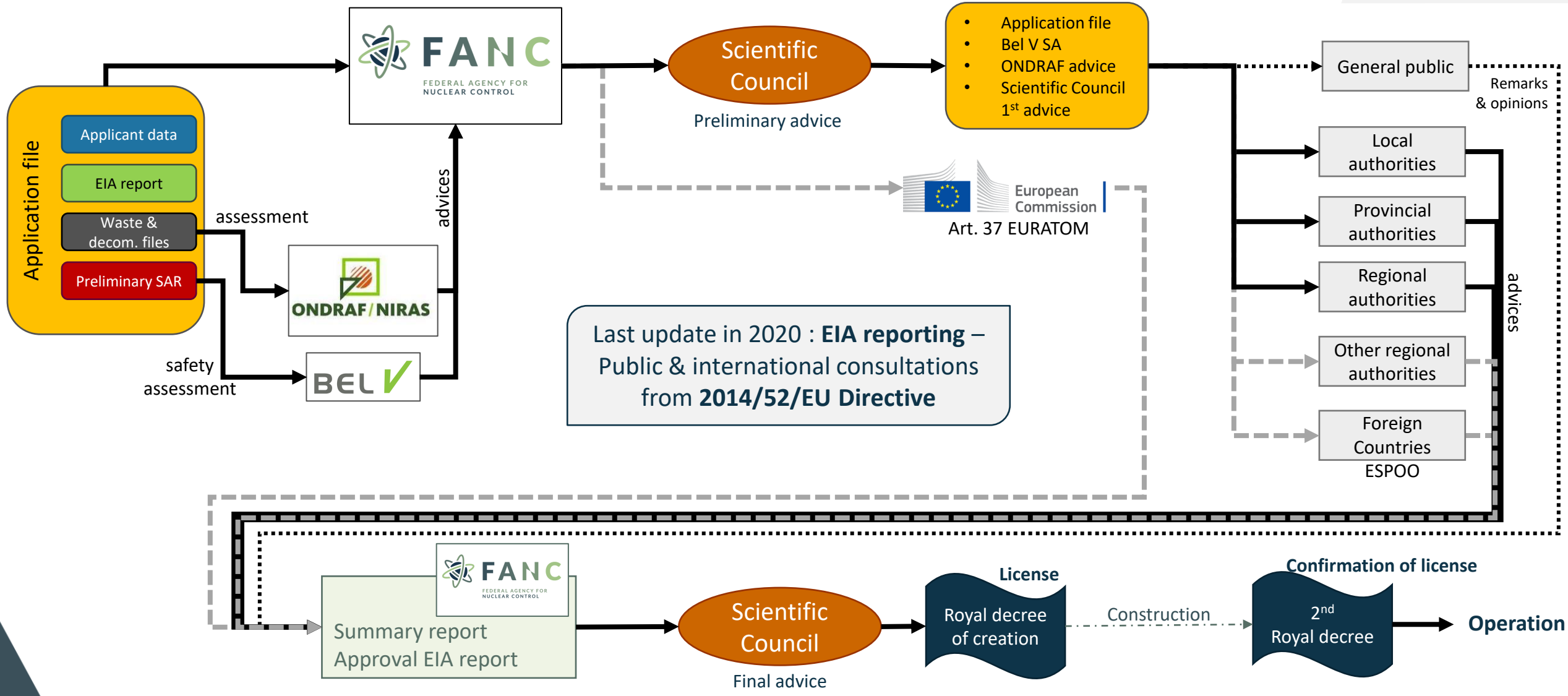
Licensee

Explicit prime responsibility
of the Licensee
(Law of 7 May 2017)

1.F SURVEILLANCE OF NUCLEAR INSTALLATIONS



1.G Licensing Process of Nuclear Facilities (GRR-2001)



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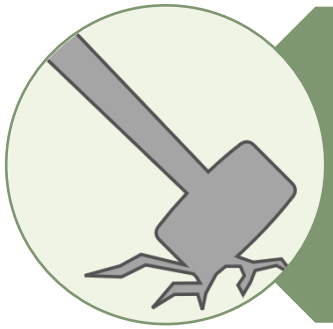


Dismantling license

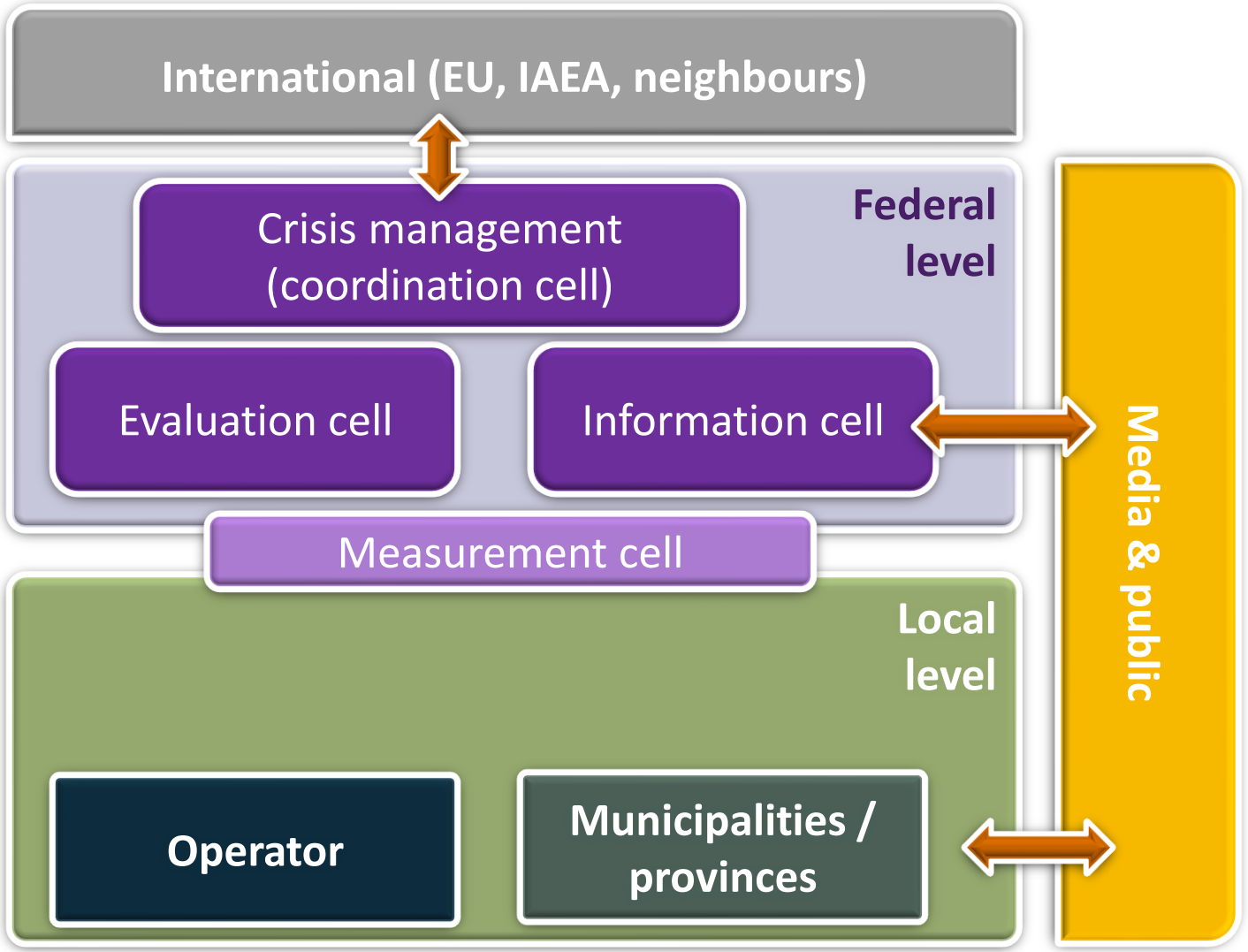
- Same licensing process as construction & operation license
- Advice ONDRAF/NIRAS **required** in the application file
- Includes clearance license

Licensing of disposal facilities

- Similar in essence to other types of facilities
- **! Timeframe is different !**
  - ⇨ Safety case: includes long-term safety assessment
  - ⇨ No decommissioning / dismantling, but closure of facility

1.H EMERGENCY PREPAREDNESS AND RESPONSE

- Harmonization wrt. IAEA classification
  - New organization since March 1st, 2018
- Minister of Home Affairs
  - Overall responsibility
- FANC
  - Chairs Evaluation cell
  - Chairs Measurement cell
- Bel V
  - Participate to Evaluation cell



1.I CURRENT LIABILITIES – SITUATION END 2020

Type of Liability	Current practices/ Facilities	Long-term management policy	Funding of Liabilities	Planned Facilities
Spent Fuel	• On-site **wet** and/or **dry storage** of spent fuel (SF) from NPPs • **Storage** (at Belgoprocess) or **reprocessing** of SF from research reactors	Long term management policy still **to be defined**: disposal of waste from **reprocessing** or **direct disposal**	• NPP operators contribute to the fund managed by SYNATOM; • Various funds fed by state for spent fuel of research reactors	**Geological disposal** still **to be confirmed** by policy decision. (disposal and pre-disposal facilities to be decided)
Nuclear fuel cycle waste	**Centralised storage** at Belgoprocess site of all SL-LILW, LL-LILW and HLW transferred to ONDRAF/NIRAS	• **SL-LILW** : Near surface disposal • **LL-LILW and HLW**: being defined	• **Producer pays**, contribution to the ONDRAF/NIRAS long-term fund; • Various funds for **historical liabilities** fed by state	• **Surface Disposal for SL-LILW** at Dessel, including the disposal facility and other facilities for waste packaging for disposal. (Gov. Decision taken in 2006, license application in 2013) • **Storage** building for the ASR **non-conform waste** at Belgoprocess • **Geological disposal** of LL-LILW and HLW still **to be confirmed** by policy decision. (disposal and pre-disposal facilities to be decided)

1.I CURRENT LIABILITIES – SITUATION END 2020

Type of Liability	Current practices/ Facilities	Long-term management policy	Funding of Liabilities	Planned Facilities
Non-power reactors waste	• **Centralised storage** at Belgoprocess site of all SL-LILW, LL-LILW and HLW transferred to ONDRAF/NIRAS • **Radium waste storage** at Umicore/Olen	• **SL-LILW**: near surface disposal • **LL-LILW**: policy being defined • **Radium waste** : policy still to be defined	• **Producer pays**, contribution to ONDRAF/NIRAS long-term fund; • **Insolvency fund**; • **Radium waste**: Producer pays	Idem as Nuclear fuel cycle (NFC) waste
Decommis-sioning Liabilities	Present projects : - **BR3** Research Reactor - **Eurochemic** reprocessing plant - Former **SCK CEN Waste Dpt.** (now Belgoprocess site 2) - Decommissioning of several cyclotrons (e.g. ex-BMB)	• **Responsibility of operator**; approval of decommissioning plan by ONDRAF/NIRAS • **SL-LILW**: near surface disposal • **LL-LILW** policy still to be defined	• NPP operators contribute to the fund managed by SYNATOM • various funds for **historical liabilities** fed by state • **Transfer of financial means to ONDRAF/NIRAS** (waste funds managed by ONDRAF/NIRAS) when waste is transferred to ONDRAF/NIRAS	Idem as NFC waste
Disused Sealed Src.	Return to supplier, decay storage or transfer to ONDRAF/NIRAS	Implementation of EU directive, recovery of orphan sources	If no return, holder has to set up **financial guarantee**	Idem as NFC waste

2. DEVELOPMENTS SINCE THE 6TH RM

2.A Updates of legal framework – EU Directives & WENRA

2.B Updates of Legal Framework – IRRS 2013

2.C European Stress-tests

2.D Impact of Covid-19

2.A TRANSPOSITION OF EU DIRECTIVES

Emergency preparedness and response plan — 2018-03-01

- < GSR-7, GSG-11, EU Directive 2013/59/EURATOM, HERCA-WENRA, national stakeholders

"Nuclear Safety" EU Directive 2014/87/EURATOM — 2018-10-09

- Enforces Vienna declaration (< NSC) within national legal framework

"Basic Safety Standards" EU Directive 2013/59/EURATOM — 2020-07-20

- Dose limits | Exemption and clearance levels
- Allows FANC to issue Technical Regulations

"EIA" directives 2011/92/EU & 2014/52/EU — 2018-12-06

- Environmental impact assessment of projects w.r.t. ionizing radiations
- Public consultation, transboundary aspects

Amendments to the licensing process for nuclear facilities — 2020-05-29

Law

Law modif.
April 15th, 1994 law

Royal Decree

RD modif.
GRR-2001

RD modif.
SRNI-2011

Technical
(non-policy)
regulation

Other

2.A WENRA – Updates of Legal Framework

Safety of storage facilities for spent fuel and radioactive waste — 2018-05-29

- < WENRA's Working Group on Waste and Decommissioning

Design of existing reactors + protection against natural hazards — 2020-02-19

- < WENRA 2014 RHWG reference levels

Interface Safety-Security — 2021-06-02

- < WENRA TF report

On-going projects in relation to WENRA reference levels — Exp. 2022 / 23

- WENRA reference levels for Research rectors
- WENRA 2020 – RHWG reference levels

Law

Law modif.
April 15th, 1994 law

Royal Decree

RD modif.
GRR-2001

RD modif.
SRNI-2011

Technical
(non-policy)
regulation

Other

2.B IRRS 2013 – UPDATES OF LEGAL FRAMEWORK

Law on Health Physics organization

2017-05-07

- Allows government to issue **national declaration** on **nuclear safety, security** & **radiation protection**
- Allows the **FANC to issue binding technical (non-policy) regulations**
- Clarifies **separation regulatory body >< licensees**

Health Physics organization and role of Bel V

2018-12-06

- Introduces Radiation Protection Officer/Experts (RPO, RPE) cf. 2013/59/EURATOM
- New status for Authorized Inspection Organizations (AIO)
- Delegation of certain regulatory functions to **Bel V**

National declaration regarding nuclear safety, nuclear security and radiation protection

2018-10-12

- **Continuous improvement | justification |defence in depth**
- **Safe management** of radioactive waste

Law

Law modif.
April 15th, 1994 law

Royal Decree

RD modif.
GRR-2001

RD modif.
SRNI-2011

Technical
(non-policy)
regulation

Other

2.B IRRS 2013 – UPDATES OF LEGAL FRAMEWORK

FANC FEDERAL AGENCY FOR NUCLEAR CONTROL + BEL V

Avoiding liabilities w.r.t. RW or installations to be dismantled

2018-05-29

- Handles **transfer of licences** for facilities and activities
- "**Radioactive Waste file**" + "**Decommissioning file**" as part of license application file
  < ONDRAF/NIRAS advice
- allows the FANC to order **evacuation of unused** (for 5y) **radioactive substances**
- Surveillance of the **filling degree** of on-site **waste storage** installations

FANC – ONDRAF/NIRAS Law

2021-12-02

- Binding advice of FANC on "**General Rules**" (basis for Waste Acceptance Criteria)
- **Roles & responsibilities** w.r.t. Waste Acceptance Criteria & their application

In progress (see part 2)

- National Policy for **disposal of HLW / LILW-LL**
- National Policy for disposal of **Ra-bearing waste**
- Law on the remediation of **sites contaminated** with radioactive materials

Law

Law modif. FANC law

Royal Decree

RD modif. GRR-2001

RD modif. SRNI-2011

Technical (non-policy) regulation

Other

2.C EUROPEAN STRESS-TESTS ACTION PLAN STATUS

Final (2020) Report NPPs – EN (available on FANC website)

Final (2020) report other Class I facilities – in FR (available on FANC website)

2.D IMPACT OF COVID-19

@ Licensees

- Constant monitoring
- Separation of teams
- Continuity of operations ensured
  - Facial masks mandatory on site
  - Cleaning measures

@ Regulatory body

- Continuity of operations ensured
  - with possible re-scheduling
- Essentially home-based work

Surveillance of installations

- Weekly follow-up COVID-19 situation
- Reduced inspection teams, on-line inspections (if possible)
- Reduced 'administrative' burden on hospitals

3. Actions on Suggestions and Challenges from the 6TH RM

Sugges-tions	3.A	**Financial guarantees** for all operators
	3.B	**Policy decisions** HLW disposal | Ra-bearing waste management | SNF management
Challenges	3.C	**Non-conformities**: “gel-drums”
	3.D	Clarification **status SNF**: reprocessing or direct disposal
	3.E	Prepare final **shutdown and decommissioning** of NPPs
	3.F	Consequences of **nuclear energy phase-out** on RWM process
	3.G	**Regulatory guidance** on decommissioning
	3.H	Licensing & construction of the **surface disposal facility**
	3.I	Approval & implementation **long-term management of HLW & LLW**

3. Actions on Suggestions and Challenges from the 6TH RM

Suggestions

- 3.A **Financial guarantees** for all operators
- 3.B **Policy decisions**
  - HLW disposal | Ra-bearing waste management | SNF management

Challenges

- 3.C **Non-conformities**: “gel-drums”
- 3.D Clarification **status SNF**: reprocessing or direct disposal
- 3.E Prepare final **shutdown and decommissioning** of NPPs
- 3.F Consequences of **nuclear energy phase-out** on RWM process
- 3.G **Regulatory guidance** on decommissioning
- 3.H Licensing & construction of the **surface disposal facility**
- 3.I Approval & implementation **long-term management of HLW & LLW**

Issues for the Regulatory Body

- [ ] Knowledge and experience on decommissioning activities and on waste
- [ ] Licenses and safety assessments
- [ ] Regulatory surveillance and inspections
- [ ] Waste, waste streams and waste management
- [ ] The final state: release of buildings and/or of site + end of regulatory control

Guidelines / technical regulation

- [ ] Phases of the decommissioning
- [ ] Cessation of activity and licensed activities in the post-decommissioning phase
- [ ] Standard conditions for a dismantling license
- [ ] Overlapping information to FANC & ONDRAF/NIRAS
- [ ] Clearance of buildings, nuclide specific clearance levels
- [ ] Release of sites
- [ ] End of regulatory control

3.E Prepare Final Shutdown and Decommissioning of NPPs

Discussions FANC – ENGIE Electrabel on decommissioning NPPs (<2018)

- Clarify strategic decisions on
  1) “post-operational phase”,
  2) preparation of the dismantling license
  3) design of new facilities (waste management)
     - ➢ needed on site to carry out the dismantling

Spent fuel & waste

- Securing liabilities (Synatom) – new proposal of law being developed
- Regular exchanges + common workshops ONDRAF/NIRAS – FANC – Licensee

Notification of permanent shutdown of Doel 3 (April 1st, 2022)

- Review by FANC ongoing
- The notification for Tihange 2 is expected to be send by August 1st, 2022

4. Current Challenges

4.A New RW management facilities

- storage facilities @Belgoprocess

4.B Decommissioning of NPPs and other facilities

4.C National policy HLW & LLW

- Including stepwise decisional process

4.D R&D programme on Partitioning and Transmutation

- as an alternative SFM (not disposal!) pathway

4.E Site remediation @Olen (Umicore | Ra-bearing waste)

4.F IRRS and ARTEMIS missions in 2023

THANK YOU FOR YOUR ATTENTION !

F. HARDEMAN

General Manager

FANC

FEDERAL AGENCY FOR NUCLEAR CONTROL

M. DEMARCHE

General Manager

ONDRAF / NIRAS

ONDRAF/NIRAS

7th Review Meeting of the Joint Convention

BELGIUM Part II

Country Group 4

Marc Demarche

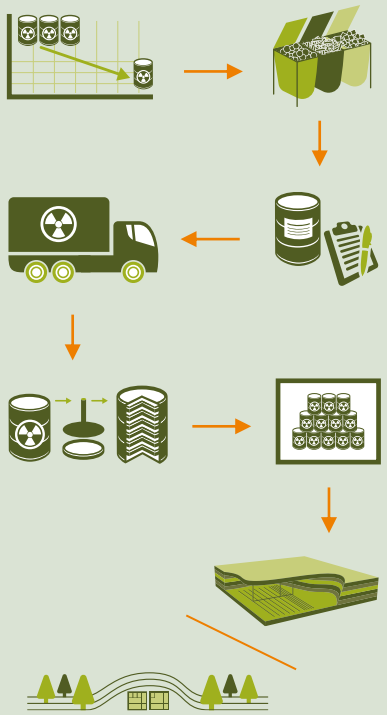
29 06 2022

Table of content

Summary of basic information

What does ONDRAF/NIRAS do?

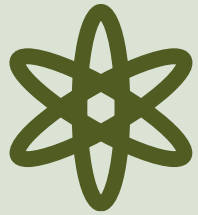
Radioactive waste management



Dismantling and remediation

Inventory

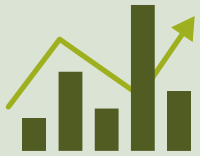
Enriched fissile materials



Scientific research

Preparation of policy

Socio-economic investments



Participation and involvement

Long-term financing

Sustainable waste management

Environment & Safety

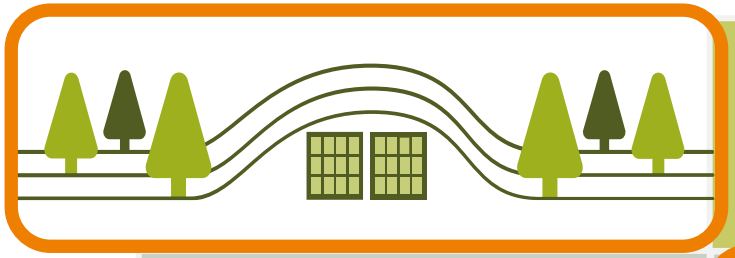
Science & Technique

Economy & Finance

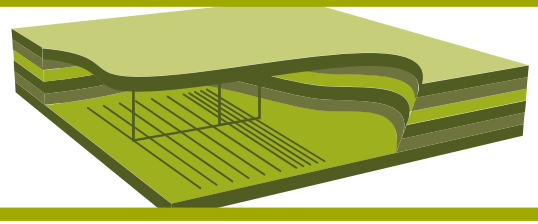
Ethics & Society

SUSTAINABLE WASTE MANAGEMENT

Long term management



	Low-level waste	Medium-level waste	High-level waste
Short-lived waste	Category A	Category A	Category C
Long-lived waste	Category B	Category B	Category C



Radioactive waste inventory - most recent estimates (2021)

For the current nuclear programme – expectations by 2075

- 3 NPPs 50 years lifetime and 4 NPPs 40 years lifetime
- Reference programme for spent fuel Synatom (= direct disposal of most spent fuel)

- **Category A** waste (LILW SL)
  - Conditioned in concrete boxes for surface disposal
  - Waste volume for disposal : ~ 53 500 m³ or 25300 monoliths

Radioactive waste inventory

- **Category B** waste (LILW LL)
  - Storage volume : **8700 m³**

- **Category C** waste (HLW & LILW LL)
  - Storage volume : **140 m³** (vitrified waste form reprocessing) and **9800 spent fuel assemblies**

Radioactive waste inventory

- **Radioactive radium-bearing waste** form historical radium-production activities at UMICORE in Olen (1920 – 1970)
  - Total volume of radium contaminated materials on site (storage facilities and landfills) : ~300 000 m³
    - Three licensed storage facilities
    - Two historical landfill sites
  - See **action plan on Olen site** below

UMICORE site in Olen

200 000 m³

20 000 m³

30 000 m³

9 000 m³

55 000 m³

National policies as in National Programme 2015

- Decay of very short-lived waste and **clearance of decayed waste**
- **Centralised short- and medium-term management** (waste processing and storage) of category A, B and C waste at the Belgoprocess site of ONDRAF/NIRAS (Mol & Dessel municipalities)
- **On site storage** of **spent fuel from the NPPs** (Doel & Tihange) followed by reprocessing or direct disposal
- Long-term management of **category A waste** in a **surface disposal** facility in Dessel
- **Specific policies** for the **spent fuel** from the various **research reactors** (reprocessing or storage or transfer to ONDRAF/NIRAS as radioactive waste)

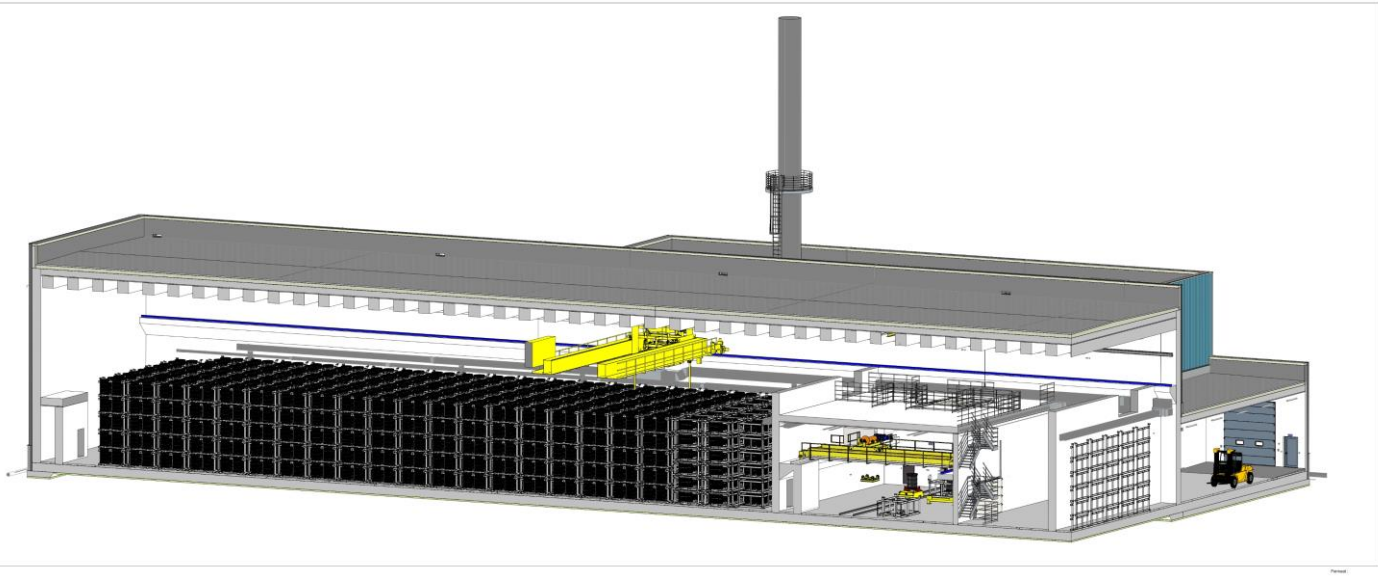
Developments since the 6th review meeting

Management of non-conform waste from NPPs

- Discovery of gel formation (Alkali Silica Reaction) on waste drums during routine inspections in storage buildings at Belgoprocess site in 2012
- No contamination measured in the storage facility
- Waste drums conditioned at the Doel NPP
  - Cemented sludges waste – mainly affected
  - Exchange resins waste
  - Filter waste
- At the time: potentially 10000 waste drums affected
- Waste conditioning stopped at NPP site
- Alternative conditioning processes being developed

Management of non-conform waste from NPPs

- ONDRAF/NIRAS road map to deal with this non-conform waste
  - All consequences: waste package inspections, RD&D, operational and long-term safety, waste acceptance system, …
  - Follow-up of action plan with FANC
- Short- & medium term : **dedicated storage facility** under construction
  - Target : in operation Spring 2024
  - Capacity: 7350 waste drums



Management of non-conform waste from NPPs

- Assessment of the options for long–term management
  - disposal (surface or deep) with or without design modifications or with reconditioning
  - Assessment of results with FANC in 2022 in order to decide on disposal path

Surface disposal of category A waste (1/5)

Communication centre

Local Fund

Employment and Nuclear know-how

Safety, Environment and Health

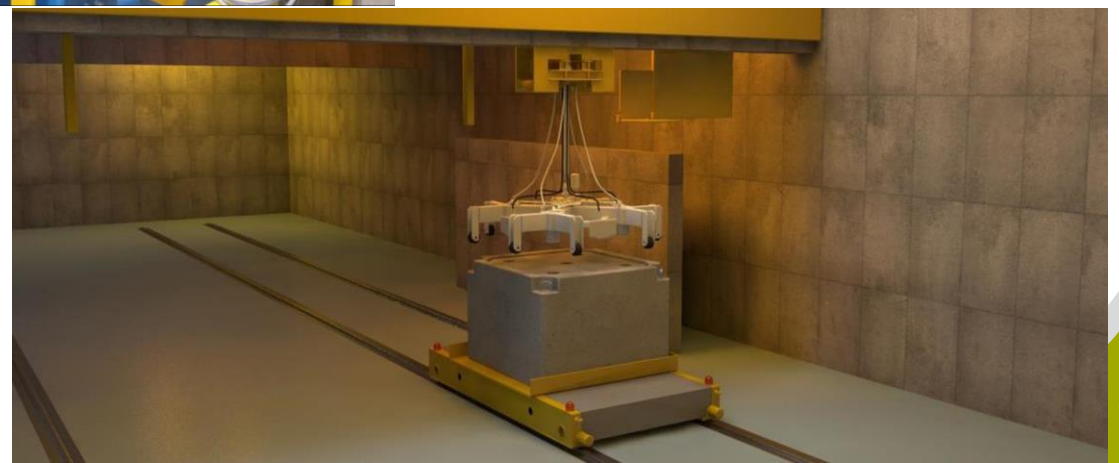
Spatial planning and Mobility

Involvement & Participation

- **Confirmation of societal support for the integrated project in 2019: ‘Societal contract’**

Surface disposal of category A waste (2/5)

- **Waste packaging facilities** for surface disposal
  - Caisson production facility – in operation end 2023
  - Facility for the production of disposal monoliths – in operation beginning 2024



Surface disposal of category A waste (3/5)

- **Disposal facility**
  - Construction & operation license expected mid 2023
  - Start construction : beginning 2024
  - Start operation : 2027
- Ongoing assessment of waste streams for surface disposal :
  - Systematic conformity check of waste drums in storage with disposal waste acceptance criteria

Surface disposal of category A waste (4/5)
Post-closure phase

Surface disposal of category A waste (5/5)
Visitors center TABLOO

ONDRAF/NIRAS waste acceptance system

- Operational waste acceptance system ONDRAF/NIRAS
  - Waste acceptance criteria established by ONDRAF/NIRAS
  - Waste acceptance = transfer of responsibility from producer to ONDRAF/NIRAS

- Extension of system to an operational disposal facility – surface disposal facility for category A waste

- Disposal license will define radiological and physico-chemical limits for acceptance criteria for surface disposal

ONDRAF/NIRAS waste acceptance system

- Legal and regulatory developments to extent acceptance system to disposal
  - End 2021 : modifications of the ONDRAF/NIRAS and FANC laws to clarify the responsibilities of both agencies
  - General rules for establishing the waste acceptance criteria to be fixed by Royal Decree – target second half 2022
    - Replacing the existing General Rules (1999)
    - On proposal of ONDRAF/NIRAS and binding advice of FANC (submitted to FANC for advice on 17/06/2022)
  - New Royal Decree to be prepared on the modalities of the waste acceptance system
    - Regulating the transfer of responsibilities for waste acceptance for storage and for disposal
    - To replace existing contractual arrangements

Agreement Belgium – GD Luxembourg

- Radioactive waste of industrial and medical activities of GD Luxembourg transferred to Belgium for management : waste conditioning, storage and disposal – surface & geological disposal
- Limited quantities (< 0,1 m³ / year)
- Intergovernmental agreement of July 4, 2016
- Law of March 10, 2019 to give assent to this Agreement, in conformity with EC Directive 2011/70/Euratom

Actions on suggestions and challenges from the 6th Review Meeting

Suggestion 1 : timeline for policy decision on HLW disposal and radium-bearing wastes management and SF management

- Category B & C waste : see challenge 3 below
- Radioactive Radium-bearing waste : see challenge 4 below

Suggestion 2 : implementing financial guarantees for all operators

- Task Force created by supervising Ministers in 2021
  - For revising legal framework “radioactive waste management”
  - Initiated by Governmental Agreement 2020 : Task Force should focus on financial issues among other things financial guarantees
  - First formal proposal by Task Force to supervisory authority in 2022
  - Covers enhancement of financial guarantees for operators other than NPPs

Challenge 1 - Dealing with major non-conformities of conditioned NPP waste

- See major developments since previous review meeting above
  - Waste processing
  - Dedicated waste storage facility in preparation
  - R&D programme for disposal of ASR non-conform waste

Challenge 2 - Clarification of status and policy for SF: reprocessing or direct disposal

- **Status of spent fuel** to be fixed in National Policy on proposal of ONDRAF/NIRAS and after consultation of the holders (see below)
- Holders of spent fuel have to regularly deliver to ONDRAF/NIRAS **reference programme** with waste types & quantities as a function of time
- ONDRAF/NIRAS has established a reference timing for deep geological disposal as basis of costing exercises and RD&D programme
  - Disposal of spent fuel not before 2100
- RD&D programme and design on geological disposal takes into account the disposal of both reprocessing waste and spent fuel, including MOX spent fuel

Challenge 3 - approval and implementation of policy for the long-term management of high-level and long-lived waste

- National Policies to be established by Royal Decree deliberated in the Council of Ministers, on the basis of a proposal by ONDRAF/NIRAS and after taking the opinion of the FANC
- National Policy Proposal “deep geological dispoal” subject of SEA procedure in 2020
  - Strategic Environmental Assessment
  - Public consultation (more than 20000 reactions)
  - Formal advices of institutional actors (e.g. Regional Governments and FANC)
- Proposal for deep geological disposal and participative & reversible decisional process submitted to Federal Government in September 2020 for adoption
  - Decision by Council of Ministers April 2022 to launch legal process for adoption

Challenge 4 - development of a plan for radium-bearing waste

- Radium-bearing contaminations (landfills) and waste (storage facilities) form historical radium-production activities (1920 – 1970) at the UMICORE site in the Olen municipality
- FANC and ONDRAF/NIRAS have issued a **common position** on the management of the radioactive contaminations and waste / materials on site (see next slide)
- An **action plan** was established to define all steps for site remediation and disposal projects
  - Phase 1 : preparatory works (2021), including inventory estimates
  - Phase 2 : completion of legal & regulatory framework (2022– 2024)
  - Phase 3 : preparation of projects for site remediation and disposal (incl. licensing) (after 2024)
  - Phase 4: project execution phase (timing to be defined)

Long-term management of radium-bearing wastes : indicative reference levels

< 0,5 Bq/gram 0,5 – 15 Bq/gram	Clearance or management as non-radioactive waste	- Main part on landfillls - Main part in storage facilities
15 – 1000 Bq/gram	Low-level long-lived radioactive waste	National disposal policy to be proposed by ONDRAF/NIRAS - Part of UMTRAP - Part of D1 landfill
> 1000 Bq/gram	Intermediate-level long-lived radioactive waste (category B waste)	Covered by national policy deep geological disposal - Part of UMTRAP

- **Total volume of radium-contaminated materials 300 000 m³**
- **Fraction to be managed as radioactive waste estimated at about 10%**

Challenge 4 - development of a plan for radium-bearing waste

- Phase 2 (2022 – 2024)
  - Completion of the legal framework for site remediation in case of radiological contaminations – see FANC presentation
  - National Policy proposal for disposal of radioactive radium-bearing wastes
    - Strategic Environmental Assessment (SEA)
    - Public consultation and formal advices by institutional actors
    - Policy to be established by Federal Government
    - Proposal to Government by 2024

Challenge 7: consequences of Nuclear Energy Phase-out on the waste management chain

- Decommissioning of NPPs → large quantities of category A and B waste
  - A waste → surface disposal in Dessel (till approx. 2045)
  - B waste → storage on ONDRAF/Belgoprocess site (till approx. 2035)
- Timing of operational surface disposal facility and facilities for conditioning waste for surface disposal in line with waste arisings from decommissioning of the NPPs
- Logistic chain of facilities and transports is being prepared in terms of responsibilities and interfaces

Challenge 8: Licensing and construction of the surface disposal facility

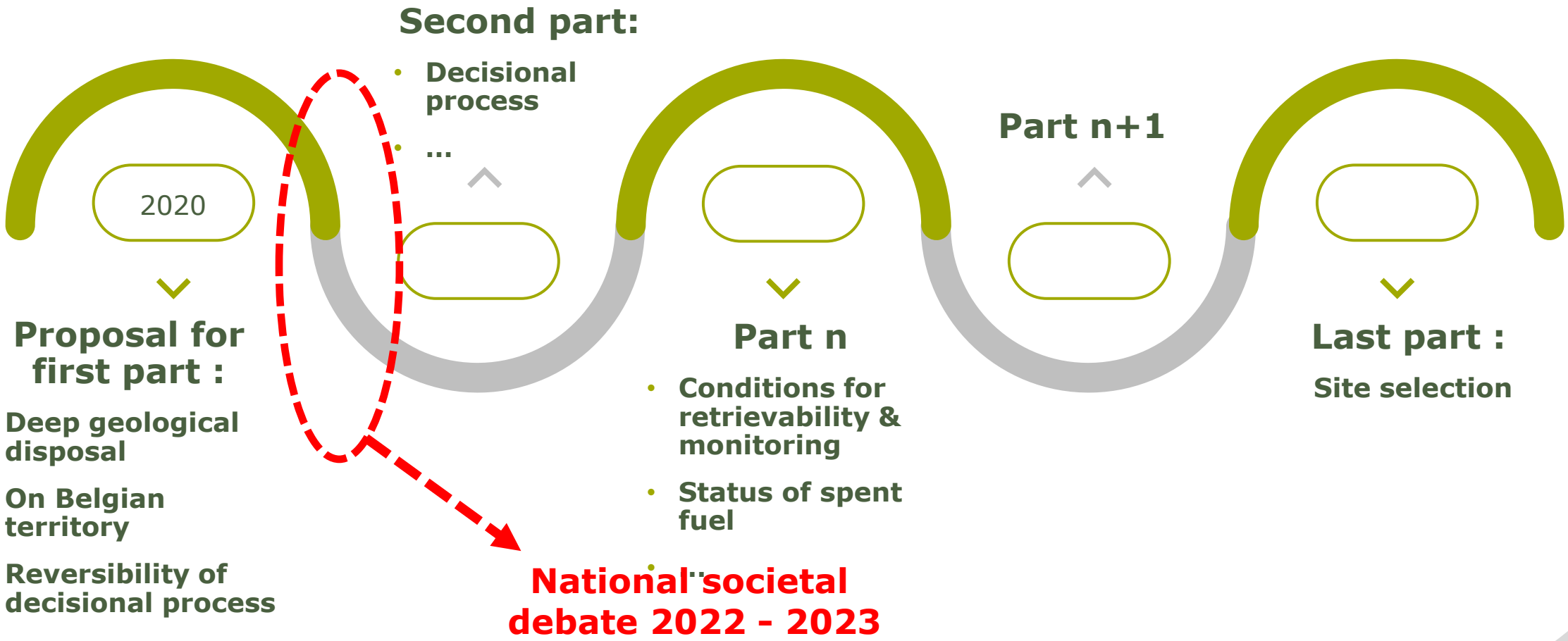
- See above

Current challenges

National policy for the long-term management of category B&C waste and spent fuel

- Legislative process for the establishment of a National Policy "deep geological disposal" ongoing since April 1, 2022
  - Federal Council of Ministers initiated legislative process
  - Policy to be established by Royal Decree
  - Deep geological disposal as first element of National Policy
  - Reversible decisional process to be established as second element
- A national societal debate to be organized by ONDRAF/NIRAS in 2022 – 2023 to :
  - Reconfirm deep geological disposal as National Policy
  - Provide recommendations for a proposal for a reversible & participative decisional process as second element of the National Policy

Stepwise establishment of National Policy long-term management of category B&C waste



Overview

Category A	Category B&C	Radium-bearing waste
Policy decisions January 1998 and June 2006	**Policy decision 1 2022** Policy decision 2, 3, …	**Policy proposal by 2024** Policy decision
License application January 2013	License application not before 2035	License application
Licensing by 2023 & construction (2024) and Operation (2027)	Licensing & construction and operation	Licensing & construction and operation

Concluding Remarks

F. Hardeman

General Manager

M. Demarche

General Manager

5. Areas of Good Performance

5.A Evolution in legislative framework

- Significant updates of the legislative framework for safety in relation to radioactive waste management

5.B Progress on national policies

- Significant developments i.r.t. B&C waste disposal policy
  With mandate to ONDRAF/NIRAS for societal debate
- Significant developments i.r.t. management of Ra-bearing contaminations & waste (Umicore site @Olen)

5.C RWM

- Joint inspections FANC – ONDRAF/NIRAS
- Role of FANC w.r.t. Waste Acceptance System
- Preparation dismantling NPPs & waste management by all stakeholders

5.D Commendable progress < 7th review process (Q&A)


France: on the clarification of **interrelations between ONDRAF/NIRAS & FANC**


USA: for developing a strong and structured **nuclear and radiological emergency plan** that integrates lessons learned, international requirements and involvement with stakeholders