FANR
الهيئة الاتحادية للرقابة النووية
Federal Authority for Nuclear Regulation

United Arab Emirates

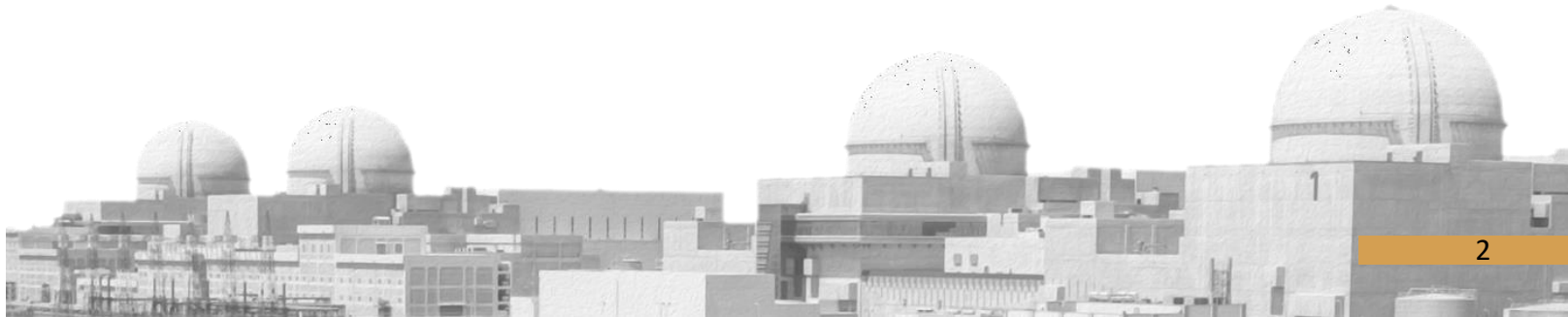
"Establishing legal and regulatory frameworks for DGR development through early interaction between regulators and implementers."

28 May 2024

Sana Bilal
Federal Authority for Nuclear Regulation

Outline

1. Background
2. UAE Nuclear Regulatory Framework
3. Regulatory Independence and Engagement with Waste Disposal Implementer
4. Conclusion



Background

FANR
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Federal Authority for Nuclear Regulation

United Arab Emirates

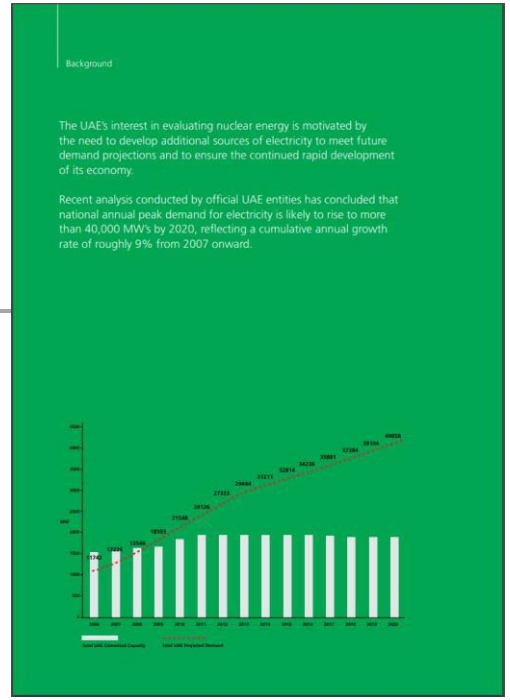
The Federal Authority for Nuclear Regulation (FANR), have been instrumented in the development of the United Arab Emirates' (UAE) . For more than 14 years, the nuclear energy has evolved to meet the country energy demand for clean energy.

FANR has achieved remarkable success in the UAE's peaceful nuclear programme through transparency in its operations and a dedication to sustainability through the capacity-building of Emiratis in the nuclear sector at FANR. Furthermore, FANR has also gained international recognition as a competent regulatory body and for its close cooperation with the International Atomic Energy Agency (IAEA).

Nuclear Policy

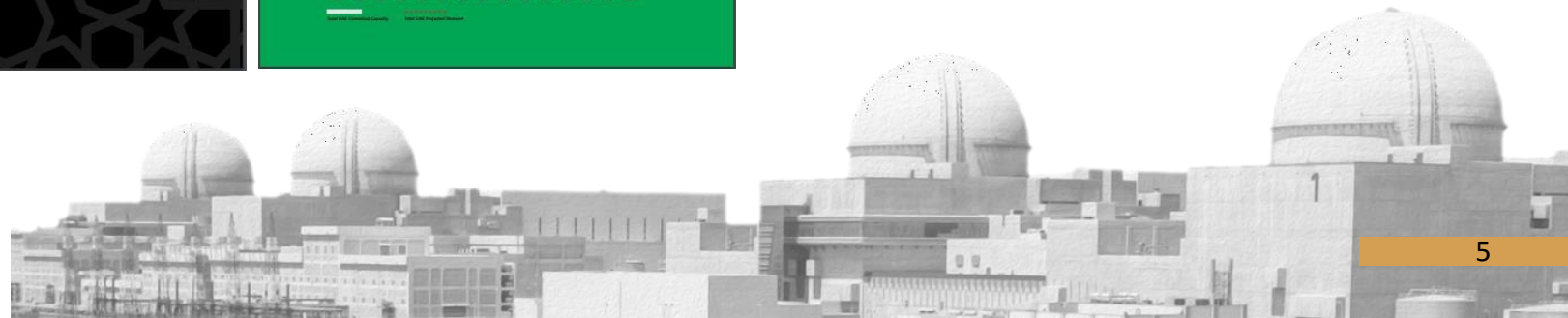
- The Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy

2008 — 2009



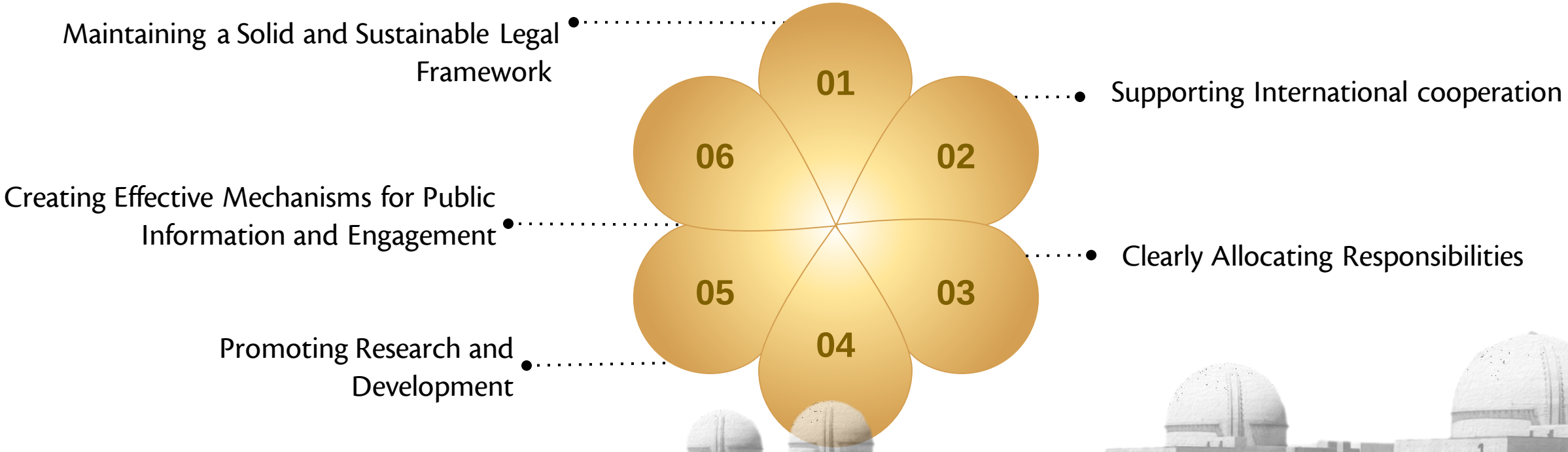
The policy outlined a series of strategies and commitments:

- Develop a comprehensive radioactive waste management system that reflects the highest standards
- Create a dedicated decommissioning and waste disposal fund



Radioactive Waste Policy (Draft)

All activities related to spent nuclear fuel and radioactive waste management in the UAE shall be conducted in a manner that adequately protects human health and the environment, now and in the future and shall be guided by the following approaches:



UAE Nuclear Regulatory Framework

Role of The Regulator (FANR)

2008

- The Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy

2009

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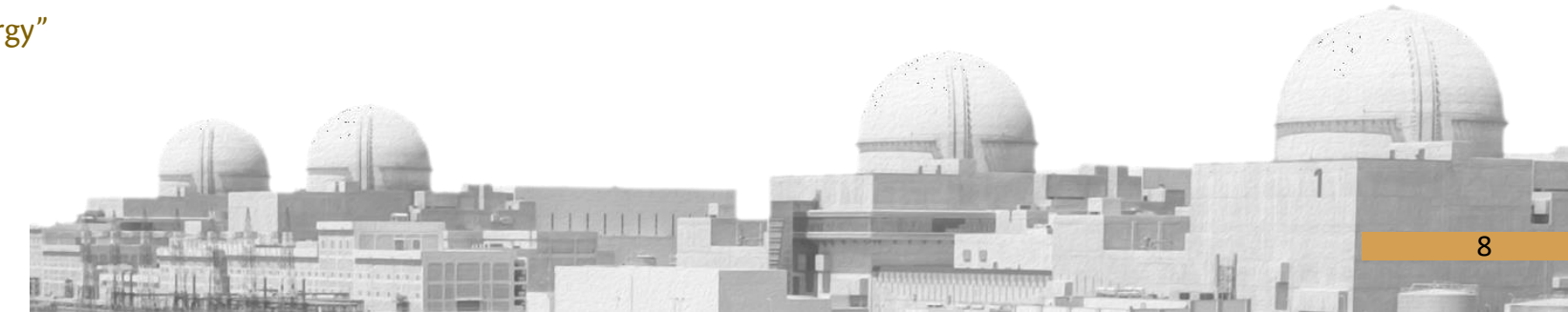
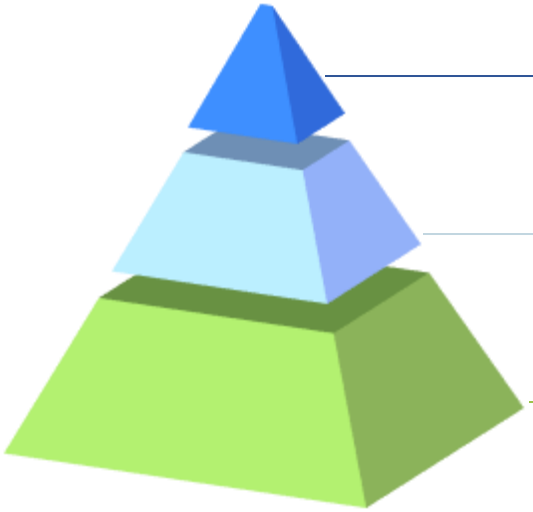
Federal Authority for Nuclear Regulation

- UAE issued Nuclear Law "Federal Law by Decree No. 6 of 2009 on the Peaceful Uses of Nuclear Energy"

- The development and issuance of regulations and regulatory guides.
- Licensing.
- Inspection and assessment of all regulated activities,
- Identification and implementation of enforcement actions.
- Establish the enforcement powers of the Authority



FANR Regulatory Framework



IAEA SAFETY STANDARDS

SAFETY FUNDAMENTALS

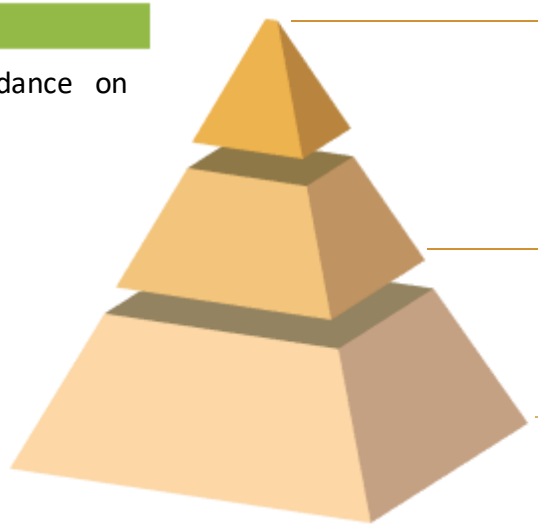
Establishes the fundamental safety objective and principles of protection and safety.

SAFETY REQUIREMENTS

Establish the requirements that must be met to ensure the protection of people and the environment, both now and in the future.

SAFETY GUIDES

Provide recommendations and guidance on how to comply with the requirements



FANR REGULATIONS AND GUIDES

U.A.E Nuclear LAW

- Federal Law by Decree No 6 of 2009, Concerning the Peaceful Uses of Nuclear Energy
- Federal Law by Decree No.4 of 2012 Concerning Civil Liability for Nuclear Damage

FANR REGULATIONS

Regulations' main purpose is to establish requirements with which all operators must comply

FANR REGULATORY GUIDES

Provide detailed and specific information on acceptable approaches to satisfying the regulatory requirements established in the regulations.

Licensing LLW Disposal Facilities

2008

- The Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy

2009

FANR
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Federal Authority for Nuclear Regulation

- The development and issuance of regulations and regulatory guides.
- **Licensing.**
- **Inspection and assessment of all regulated activities,**
- **Identification and implementation of enforcement actions.**
- Establish the enforcement powers of the Authority

Current Projects related Radioactive Waste Disposal & Treatment

- NORM Facility
- Low Level Radioactive Waste Management Facility

Regulatory Independence and Engagement with Waste Disposal Implementer

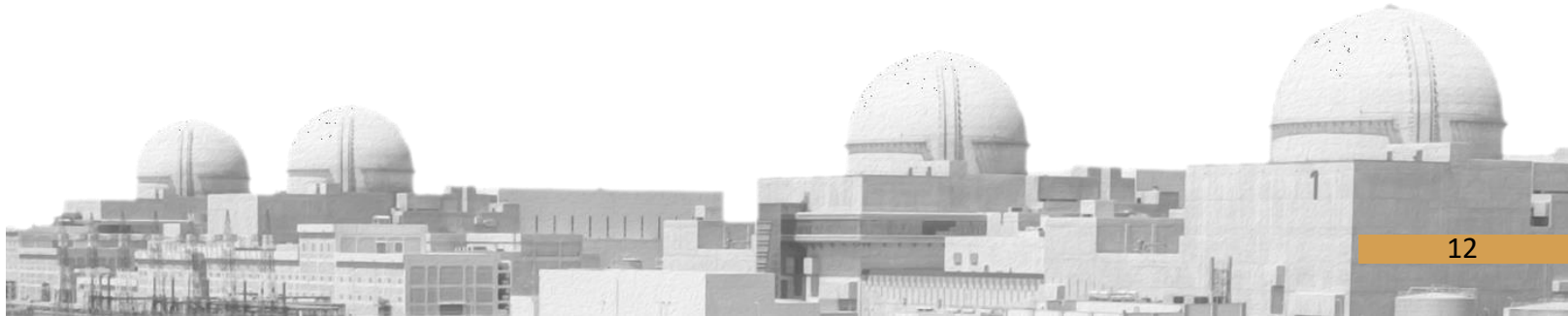
Objectives of Interaction Between Regulators and Implementers

As Licensee

- Alignment: To assure that Licence applicants understand FANR's licensing process and expectations and to engage with FANR in an open and transparent way in order to make efficient progress towards obtaining a licence.

As Stakeholder

- Stakeholder engagement: To gather feedback and input on disposal regulation challenging issues, and to ensure that the regulator is responsive to their concerns.



FANR Engagement with implementer as Stakeholder

❑ Radiation Protection Committee

FANR established a Radiation Protection Committee. The RPC provides environment for inter-agency cooperation on matters important for radiation protection with the view to ensure availability of appropriate radiation protection resources and infrastructure in the UAE.

❑ Radioactive Waste Management – Working Group

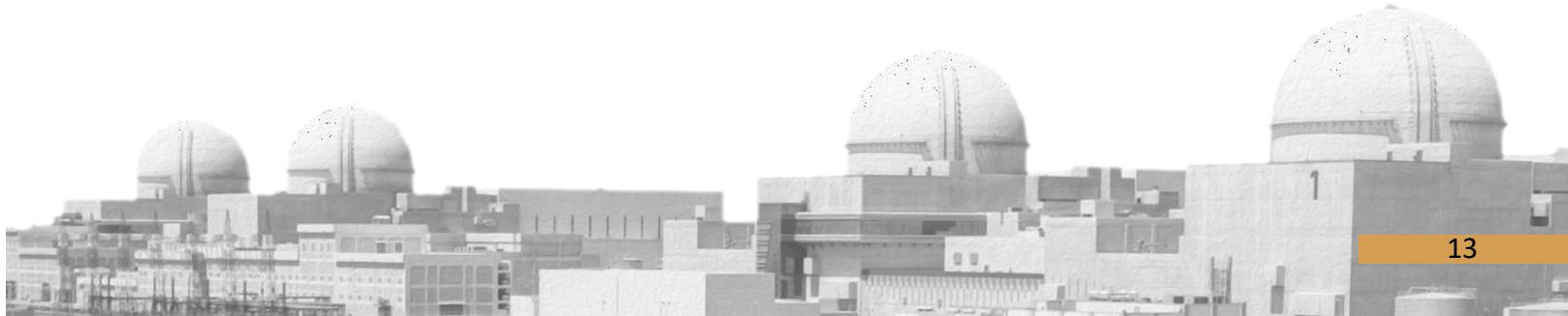
Emirates Nuclear Energy Corporation Developed a process that encourages and integrates concerned stakeholders in one platform to support the development of a reliable radioactive waste management program to ensure the long-term and safe management of radioactive waste generated within the UAE.

❑ The Emirates Nuclear Technology Center (ENTC)

A hub to address the present and future research requirements to support the UAE's nuclear power program and deliver our key stakeholder's goals for the delivery of safe, clean and efficient nuclear energy.

❑ Review of the Regulations

all regulations and regulatory guides are processed through an external stakeholder review process



Asserting on Regulator Independence

The Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy

2008

FANR
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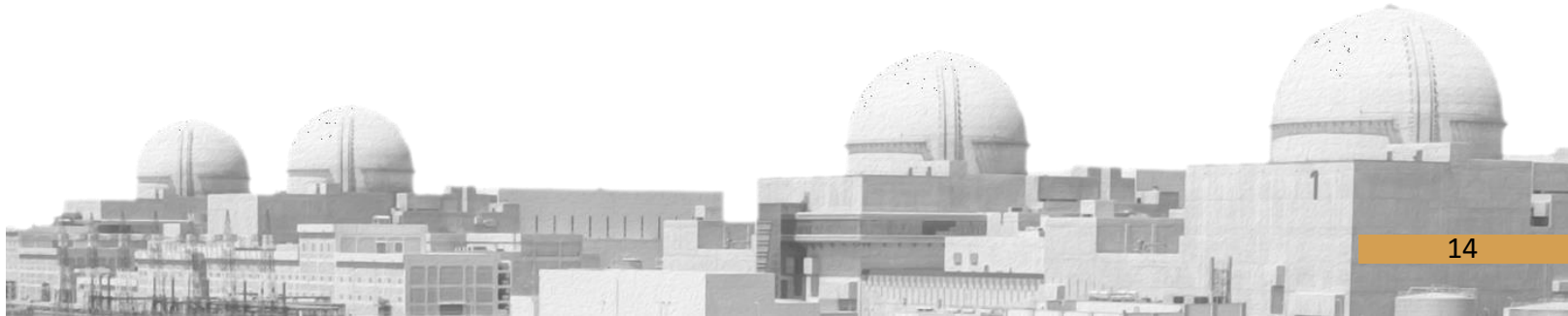
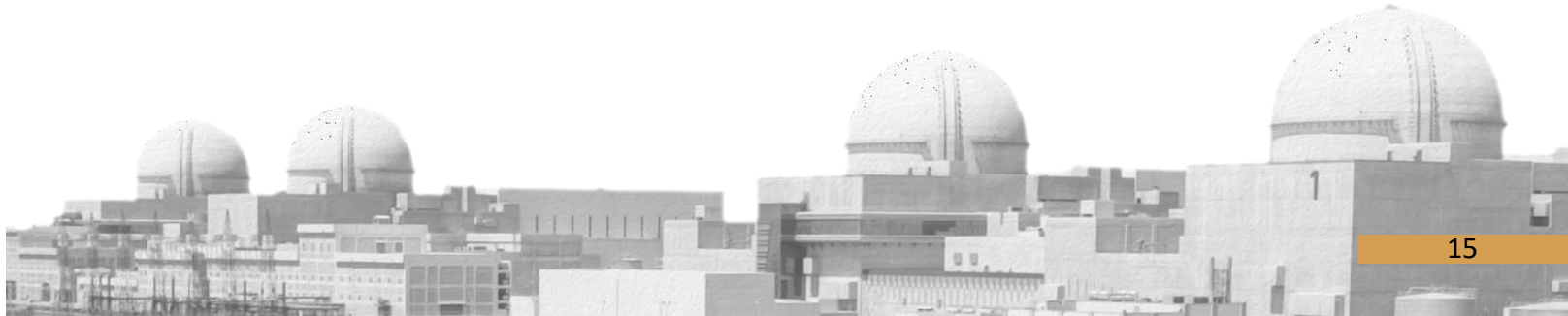
Federal Authority for Nuclear Regulation

- Clearly communicating FANR mandate and decision-making processes, and by maintaining transparency in its actions and decisions.
- Establish clear lines of communication and protocols for interacting with its licensees.
- Demonstrate independence through decision-making processes, by basing the decisions on scientific and technical evidence, and by being accountable to the public.



Conclusion

- Establishing a robust legal and regulatory framework for DGR hinges on early and sustained interaction between regulators and implementers.
- Early interactions ensure that regulatory requirements are clear, comprehensive, and informed by practical implementation challenges.
- Parties can anticipate streamline approval processes, and enhance safety and compliance.
- This proactive approach not only builds public trust but also promotes innovation and efficiency in developing DGR.




Thank You

The regulatory framework in Norway for disposal of spent fuel and long-lived waste

Peter Bennett
Norwegian Nuclear Decommissioning

ICGR-7, Session 2B
May 2024

IFE | NND
NORSK NUKLEÆR DEKOMMISJONERING

Spent fuel management in Norway: key players

Ministry of Trade, Industry and Fisheries

- Funding for decommissioning and RW management
- Owning organization for NND

NND
NORSK NUKLEÆR DEKOMMISJONERING

- RWMO, established 2018
- Will take over nuclear facilities and staff from IFE, 2025 - 2030

DSA Norwegian Radiation and Nuclear Safety Authority

- Regulator

IFE

- Licensee
- Responsible for storage of spent fuel until transfer to NND

IFE | NND NORSK NUKLEÆR DEKOMMISJONERING

Laws and regulations

- DSA administers three acts along with associated regulations:
  - Act on radiation protection and use of radiation
  - Act on nuclear energy activities
  - Act concerning protection against pollution and concerning waste in relation to radioactive pollution and waste
  - Regulations on radiation protection and use of radiation
  - Regulations on the application of the pollution control act to radioactive pollution and radioactive waste
  - Waste regulations (sections applicable to radioactive waste)

The current position: recommendations from IAEA IRRS mission, 2019

- The government should:
  - Establish a national policy and a strategy for spent fuel and radioactive waste management
  - Make provisions to provide DSA with the necessary resources
  - Establish provisions regarding national competence in nuclear safety
- DSA should:
  - Implement a human resource plan and training programme based on an analysis of the necessary competence and skills
  - Take action for the further development of regulation and guides in order to ensure a comprehensive regulatory framework

Interactions between DSA and NND

- Formal processing of license applications
  - License transfer of IFE`s Halden site to NND in 2025
- Inspections & audits
- Contact meetings, at director level
- Guidance meetings, after submission of detailed questions and supporting information from IFE & NND

Recent documents from DSA

i. Guidance for planning clean-up after the Norwegian nuclear facilities
ii. Guidance on export and import of radioactive waste
iii. Draft national strategy for radioactive waste management

DSA guidance on developing disposal facilities

- The applicant must demonstrate that the "best" solution is recommended:
  - Structured methodology to choose concept, including
    - Identify all feasible solutions
    - Define assessment criteria & weightings
  - Well defined site selection process, including
    - Defined exclusion criteria
    - Defined assessment criteria & weightings

Questions?

Please contact me on

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Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Canada

CNSC Regulatory Perspective

Session 2B: *Establishing legal and regulatory frameworks for DGR development through early interaction between regulators and implementers*

John Thelen

Director, Major Projects and Strategic Support
Canadian Nuclear Safety Commission

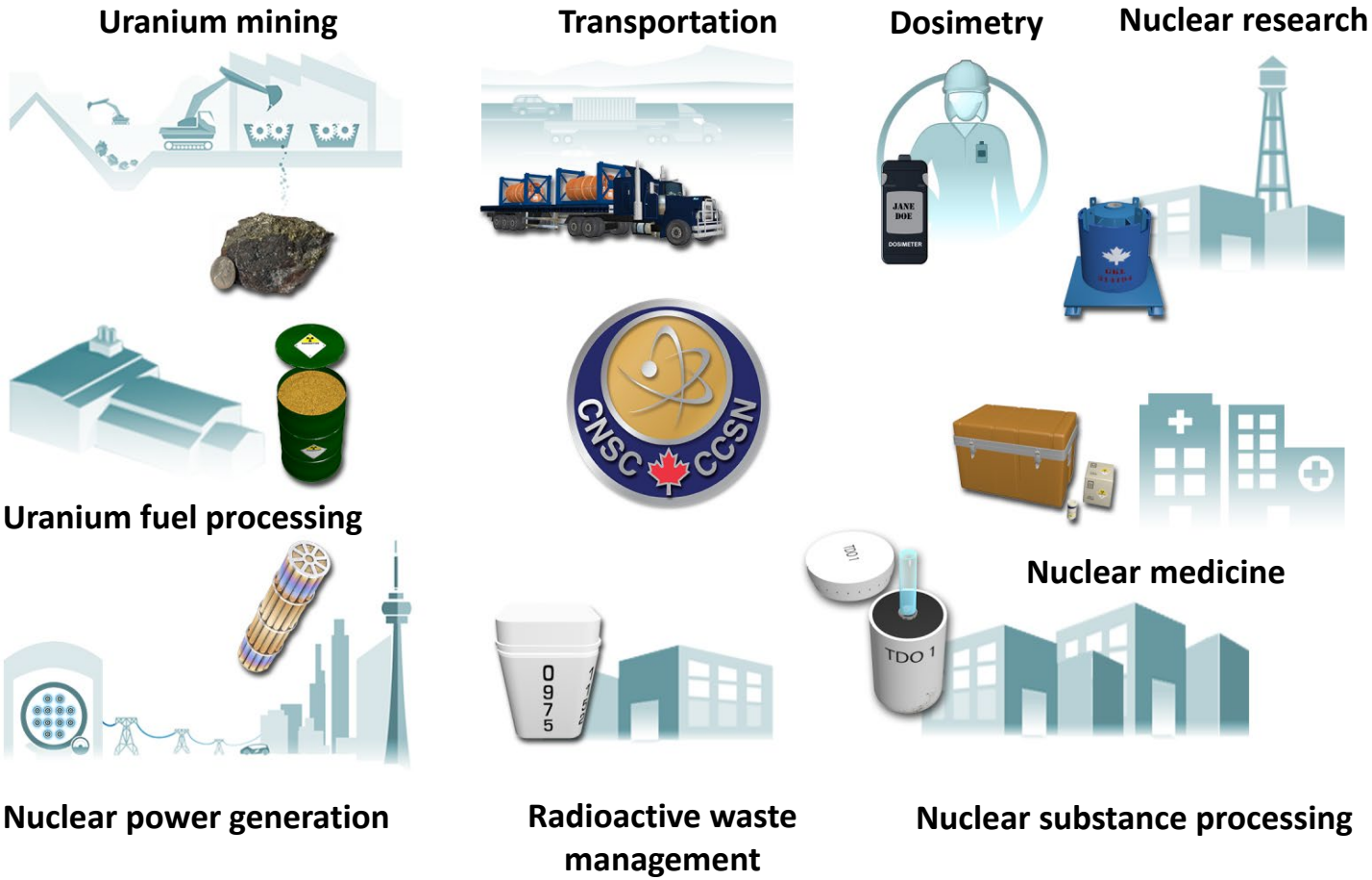
ICGR-7 May 2024

Content

- **Overview of Canada's Regulatory Framework for Radioactive Waste Management**
- **Canadian DGR Projects and Activities**
  - AECL concept (1978-1998)
  - OPG DGR L&ILW project (2005-2020)
  - Nuclear Waste Management Organization APM Approach (2007-ongoing)
- **Early Involvement In Canadian Regulator & Implementor Interactions**
  - CNSC/NWMO Example
- **Conclusion**

Canadian Nuclear Safety Commission

- Established May 2000, under the ***Nuclear Safety and Control Act***
- Act defines CNSC's separate role
  - Regulate the use of nuclear energy and materials
  - Implement Canada's international commitments
  - Disseminate information to the public
  - Reports to Parliament through Minister of Natural Resources

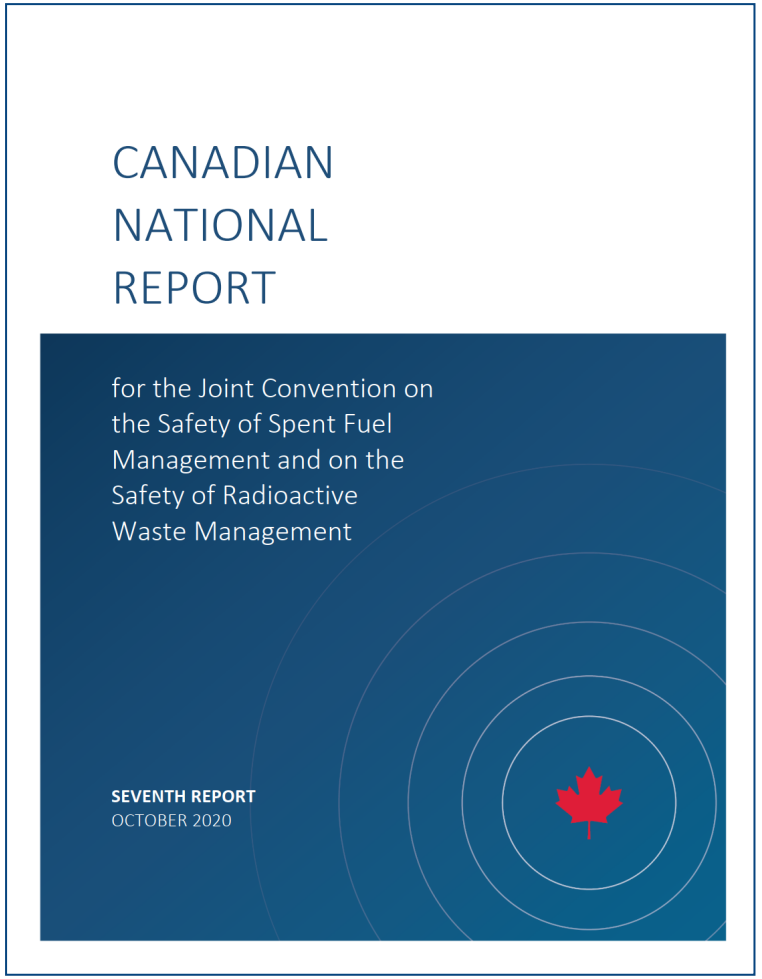


Over 75 Years Of Nuclear Safety

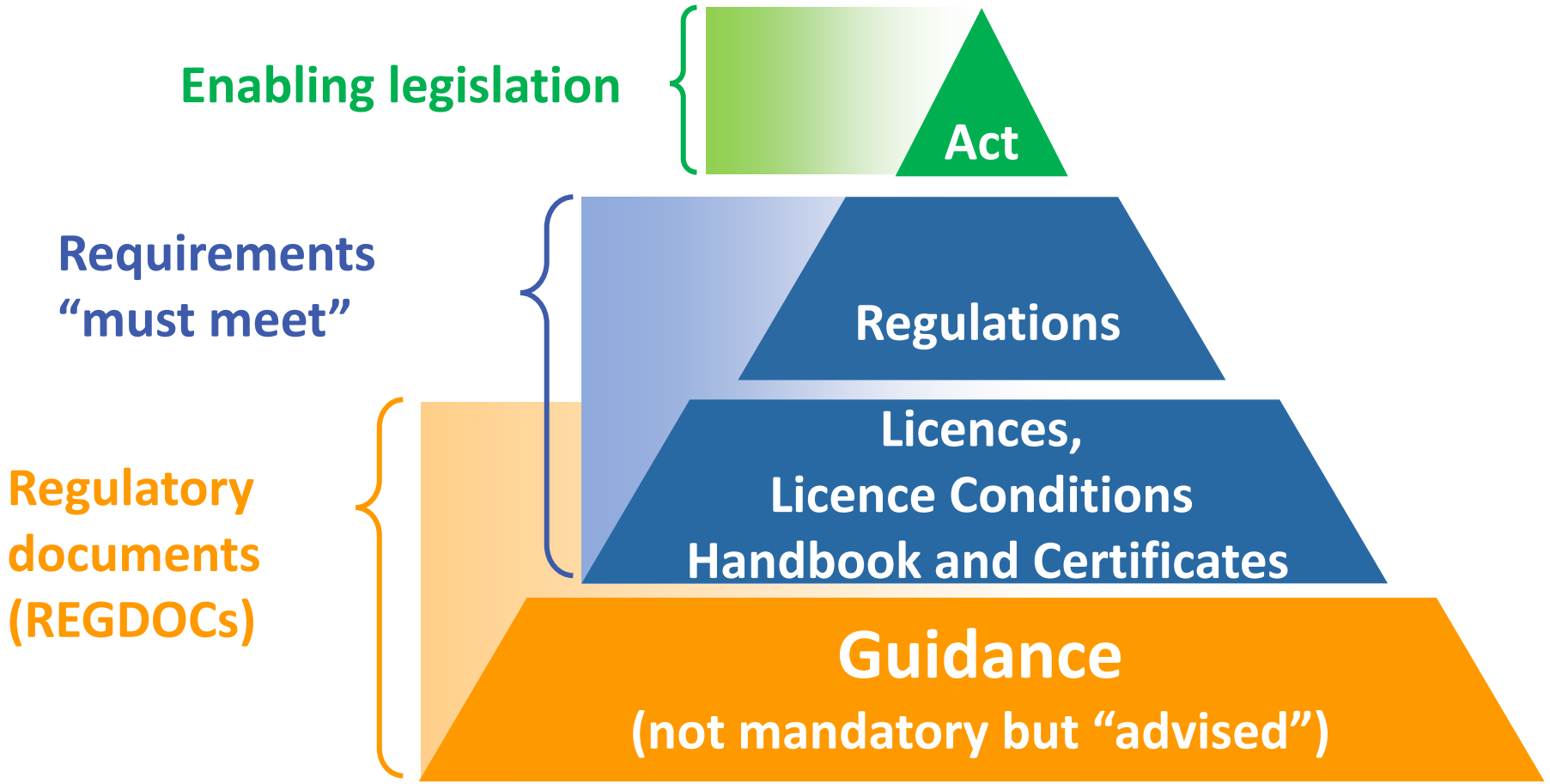
National and International Perspectives

- **CNSC participates in:**
  - CSA Group Technical Committees
  - International Atomic Energy Agency (IAEA) Waste Safety Standards Committee
  - Nuclear Energy Agency (NEA) Radioactive Waste Management Committee

- **Canada is a signatory to:**
  - Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management



CNSC Regulatory Framework



Regulatory Framework For Radioactive Waste Management

- **Published in 2021:**
  - REGDOC 1.2.1 *Guidance on Deep Geological Repository site characterization*
  - REGDOC 2.11, *Framework for Radioactive Waste Management and Decommissioning in Canada*
  - REGDOC 2.11.1 *Waste Management* v I *Management of Radioactive Waste*
  - REGDOC 2.11.1 *Waste Management* v III *Safety Case for the Disposal of Radioactive Waste*

- **Published in 2022:**
  - CSA N292.7 *Deep geological disposal of radioactive waste and irradiated fuel*

- **Approved for publication in 2024:**
  - REGDOC 1.2.3 Licence Application Guide for a licence to prepare site for DGR

Deep Geological Repositories in Canada

Atomic Energy of Canada Limited - *DGR Concept*

- Independent review concluded that technical safety was demonstrated
- Project cancelled due to lack of public support

Ontario Power Generation - *Low & Intermediate Level Waste DGR*

- Joint review panel concluded the project was not likely to cause significant adverse environmental effects
- Project cancelled after Saugeen Ojibway Nation voted against it

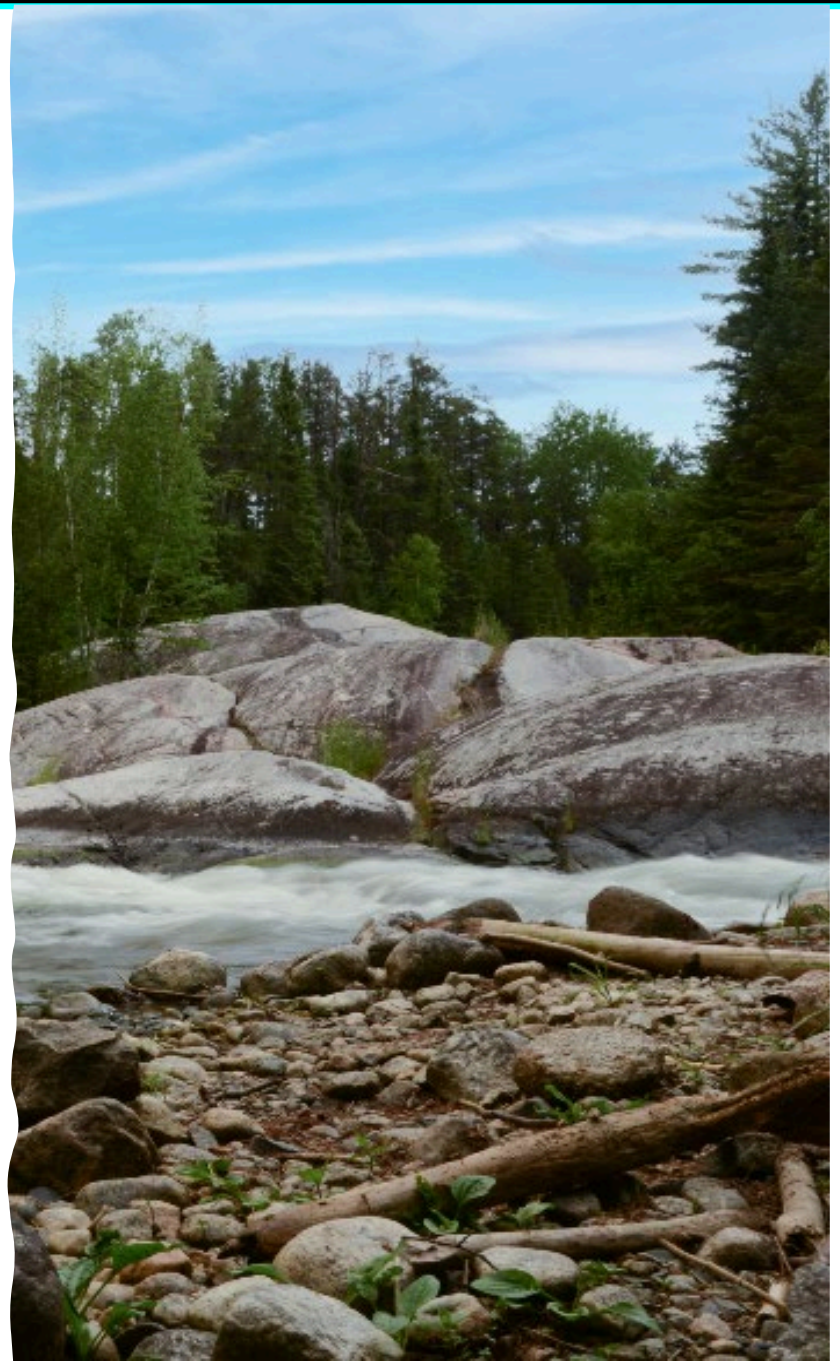
Nuclear Waste Management Organization (NWMO) - *Used Fuel DGR*

- Adaptive Phased Management (APM) approach
- Current process is focused on identifying a willing and informed community to host a national DGR

The science behind safe nuclear waste disposal includes decades of research

NWMO APM – An Overview

- **2002:** NWMO is established and funded under the *Nuclear Fuel Waste Act* (2002) by waste owners
- **2005:** Following three years of extensive dialogue with Canadians, NWMO presented the results of the options study to the Government of Canada
- **2007:** Government of Canada selects "APM" approach
  - *"a DGR for Canada's used nuclear fuel"*
  - centralized isolation and containment in a DGR
  - willing and informed host community
- **2010:** NWMO launched extensive site selection process which is ongoing in 2024



NWMO APM – Licensing Project Stages

Pre-licensing Stage

- Site selection process launched
- Preliminary site assessments underway
- Preferred site selected

Licensing Stages

- Site Preparation
- Construction
- Operation
- Closure

Federal regulatory process triggered

Ongoing CNSC Regulatory Involvement

NWMO APM DGR - Impact Assessment

- **In Canada, the Impact Assessment Act (the IAA) provides for a process for assessing the environmental, health, social and economic effects of designated projects with a view to preventing certain adverse effects and fostering sustainability.**
- **A DGR for used nuclear fuel will be subject to an integrated assessment under the IAA**
- **CNSC's Readiness under the IAA:**
  - Established MOU with the Impact Assessment Agency of Canada (IAAC) available on CNSC's website (link)
  - Regular discussions between CNSC-IAAC-NWMO on the APM project

A single process to discharge the requirements
of both the IAA and the NSCA – one project, one review

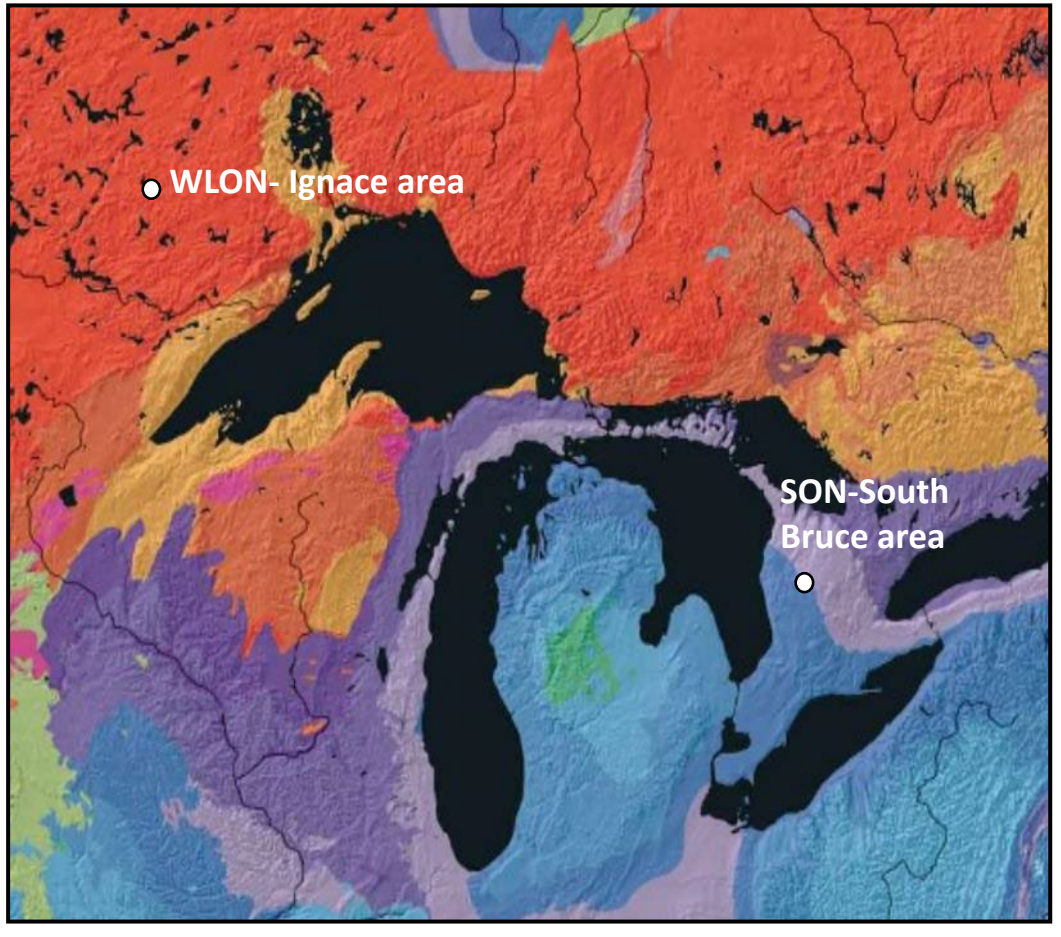
NWMO APM – Regulator/Implementer Interactions

- **Formalized under the CNSC/NWMO special project service arrangement**
  - Regulator-implementor dialogue formalized through a special project service arrangement available on CNSC's website (link)
  - Describes possible undertakings of both the CNSC and the NWMO
  - Defines how information should be exchanged – including coordination, management, retainment and retrievability (single points of contact (SPOC), responsibilities)
  - Establishes scope and frequency for meetings and technical seminars
  - Pre-project review process is described, with timelines and related activities associated to requests
  - Cost recovery is defined

Mechanism for conducting pre-licensing activities

NWMO APM - Site Selection Status

- **NWMO site selection process**: Initiated in 2010, inviting communities to learn more about the NWMO APM project.
- **Status:** 22 communities narrowed to 2 communities with the objective to narrow down 1 selected site by end of 2024.



NWMO APM – Early Regulatory Engagement

- Communities expressed appreciation for a trusted, independent source of scientific information
- Communities like to have the opportunity to talk directly to CNSC technical staff
- Important to:
  - Build relationships with Indigenous Nations and communities, as well as the public
  - Clarify CNSC's role as the independent nuclear regulator and current pre-licensing involvement
  - Arrange virtual meetings with technical specialists in a variety of online forums when not possible to have in-person meetings
  - Convey technical information that is accessible to all audiences - science communication tool development

Summary

CNSC's early and continuing regulatory involvement and interaction with implementors has enabled:

- Scientific and technical capacity building - *independent regulatory DGR research, building knowledge needed for future licensing reviews*
- Outreach and engagement activities – *essential for building trust*
- Lifecycle perspective – *continuous regulatory oversight role*

CNSC's regulations ensure that the environmental effects of nuclear projects are considered at every phase of their lifecycle

Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Canada

Thank You

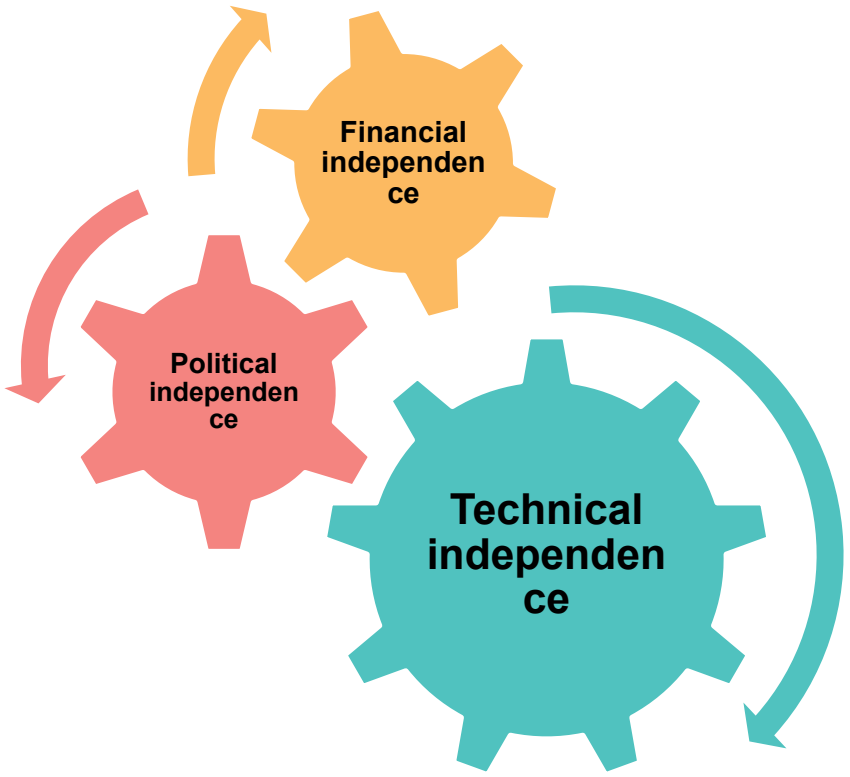
John Thelen
Director, Major Projects and Strategic Support
Canadian Nuclear Safety Commission

ICGR-7 May 2024

Establishing a regulator-implementer dialogue in different licensing phases of DGR

Jaakko Leino

Legal framework, dialogue and effectiviness, independence



Elements from NEA 2014,
The Characteristics of an
Effective Nuclear Regulator

- Legal framework – Roles and responsibilities
  - NEA 55 §, para 4: "The Radiation and Nuclear Safety Authority may, upon request by anyone planning to use nuclear energy, check the plan drawn up by them and issue preliminary instructions on what should be taken into account with respect to safety, security and emergency arrangements."
  - NEA 63 §: "The Radiation and Nuclear Safety Authority shall, in order to carry out the oversight required in this Act and the provisions and regulations issued thereunder…"
- "In order to be an effective, credible and trusted regulatory body, the regulator must be able to explain its requirements and expectations to the licensees and other stakeholders in a clear and understandable manner."
- Independence does not mean isolation!

Regulatory oversight and focus changes over time

Design and construction orientation

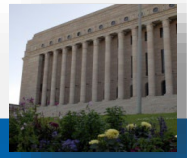
R&D orientation

Operational orientation

Pre-license phase

Late 1970' → 2000

- Waste management strategy
- Concept understanding
- Site characterisation
- Overall safety performance



Decision-in-Principle

Pre-license phase

2000 → 2015

- …
- Facility design
- …
- Site monitoring
- Comprehensive safety assessment
- …

Construction license

Pre-license phase

2015 → 2024

- …
- operational safety
- …
- Component fabrication
- Supply chain management
- ….

Operating license

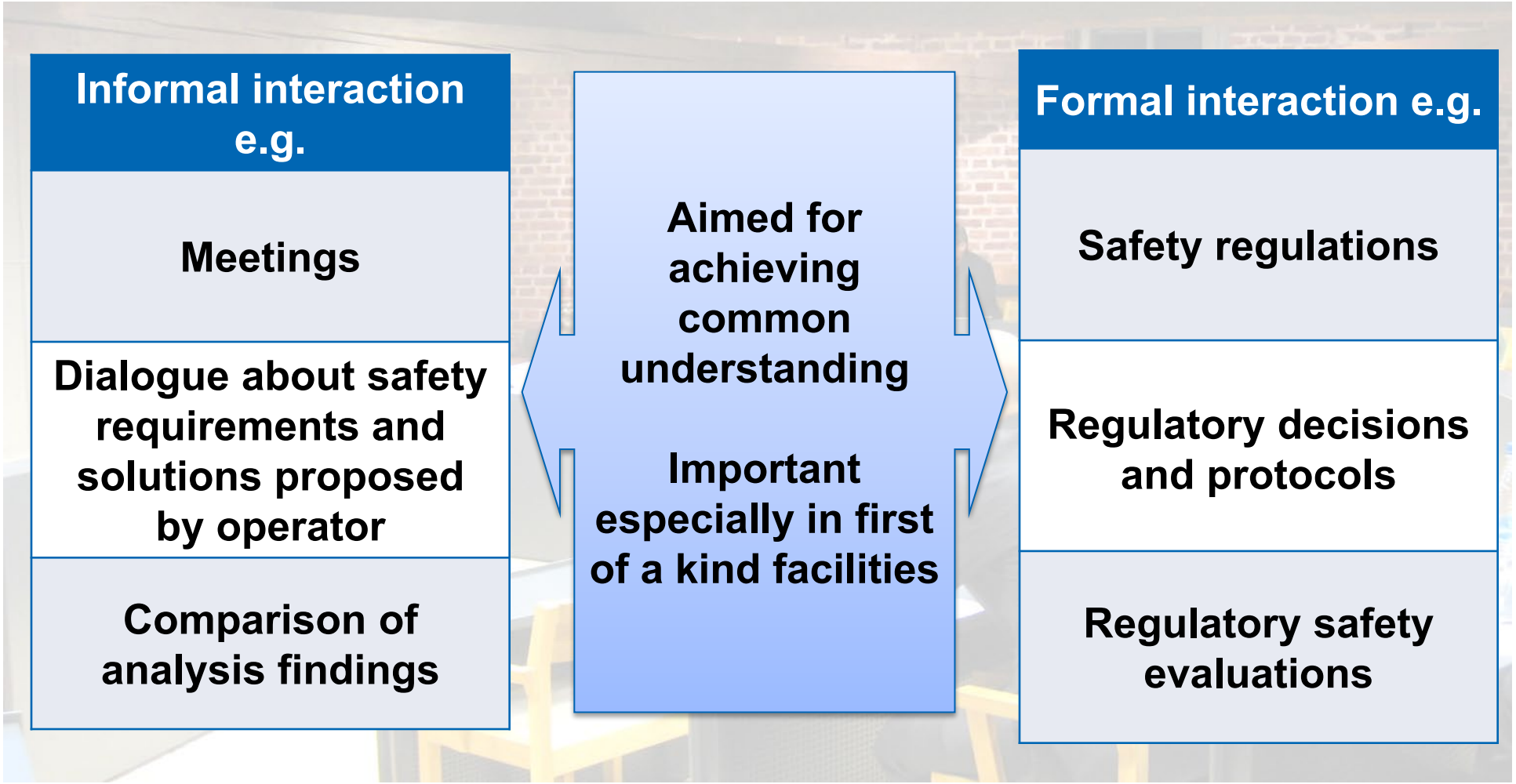
2025 → 21..

- …
- Operations
- Transport
- Radiation safety
- …

Safe disposal is a common goal!

stuk
SÄTEILYTURVAKESKUS
STRÅLSÄKERHETSCENTRALEN
RADIATION AND NUCLEAR SAFETY AUTHORITY

Interaction in practice



Conclusions

- Pre-licensing dialogue and interaction is a must for successful DGR licensing
  - Legal framework
  - New type of facility
  - Regulator has to learn
  - Implementor has to understand requirements
- Pre-licensing dialogue between regulator and implementer supports communications with other stakeholders and creates trust in achieving common goal!
- Formal and informal interaction has their place – transparency and independence
  - Independence does not mean isolation!

- **Formal licensing has been successful because of good dialogue in all licensing phases!**

Structuring, Enhancing and Maintaining Regulators - Implementor Dialogue during Pre-Licensing of Deep Geological Repositories: **Some Lessons from the NEA RIDD Initiative**

Philippe Lalieux

Long-Term Waste Management Director, ONDRAF/NIRAS

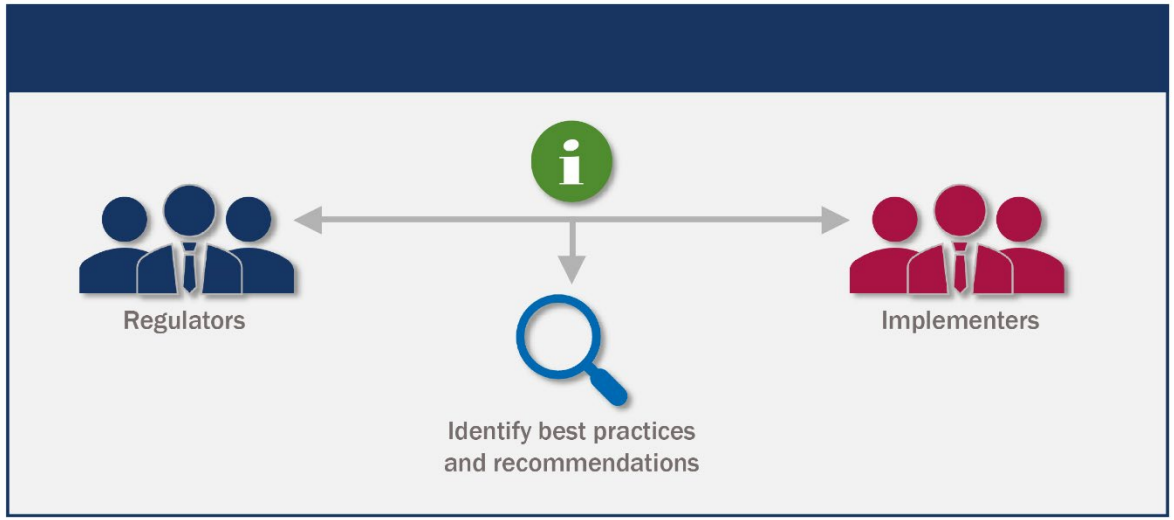
RIDD Co-Chair

NEA Nuclear Energy Agency

RIDD Rationale

Expert Group on Building Constructive Dialogues between Regulators and Implementers in Developing Disposal Solutions for Radioactive Waste (RIDD)

NEA
NUCLEAR ENERGY AGENCY



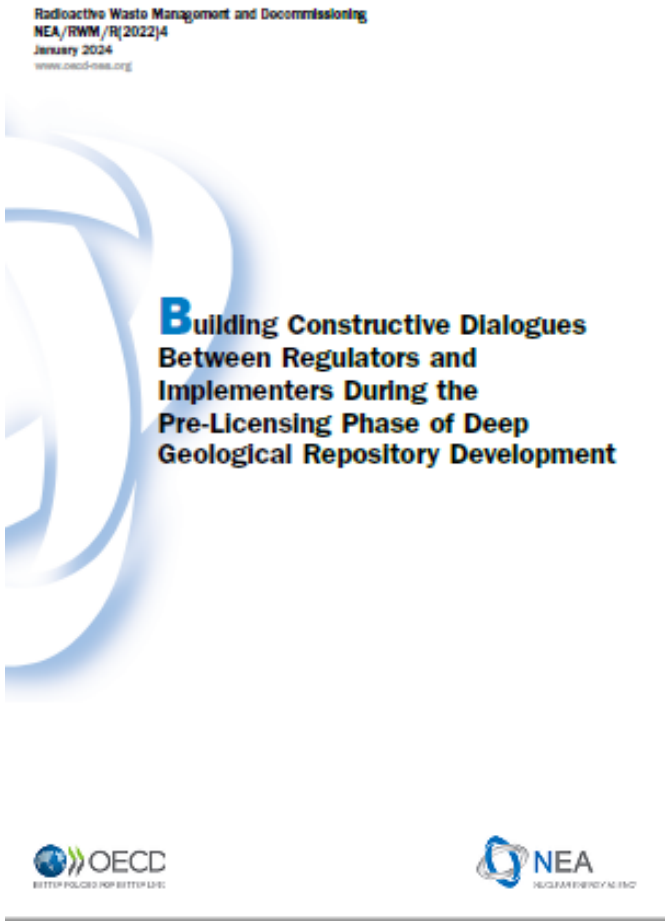
- Established by NEA RWMC in March 2019 to examine how to more efficiently structure regulator-implementer (R-I) dialogue in the RWM decision-making process
- Co-Chairs:
  - Philippe Lalieux, ONDRAF/NIRAS, BE
  - Jens Mibus, BASE, DE
- Bureau Members:
  - Sylvie Voinis, Andra, FR
  - Julie Brown, CNSC, CA
- R-I input from Australia, Belgium, Canada, Czechia, Finland, France, Germany, Japan, Korea, Norway, Spain, Switzerland, UK, US + IAEA
- Input from NEA RF, FSC and IGSC

RIDD Objectives

- RIDD Focus
  - R-I dialogue during the pre-licensing stage of deep geological repository (DGR) projects
- Through the collection and discussion of e.g.
  - National practices in terms of **stepwise pre-licensing**
  - **Impact** of the respective **national frameworks on R-I dialogue** and on dialogue with other stakeholders
  - **Pre-licensing governance**
  - Involvement and **independence of the regulatory authorities**
  - **Societal trust** considering uncertainties in the dialogue
  - **Continuity** of competence, interpretation, decision… due to the decennia-long time-frame and **evolving regulations**
  - Types of **technical/scientific support** needed throughout pre-licensing

RIDD Deliverables

- Report entitled **"Building Constructive Dialogues between Regulators and Implementers in the Pre-Licensing Phase of a Deep Geological Repository" (January 2024)**
- **Provides**
  - The effective practices and lessons learnt for structuring the R-I dialogue in DGR projects during their pre-licensing phase
  - A framework for the effective organization and management of R-I dialogue



Some Key Outcomes of 1st RIDD Report

- Dialogue to pave the way towards licensing
- Dialogue to start as early as possible in the pre-licensing process
- Mix of formal and informal approaches throughout a stepwise process
- Beyond technical and administrative aspects, attitudes and behaviors play a major role in the effectiveness of the dialogue (mutual transparency, confidence, respect…)
- Independence of the regulator makes it possible to construct R-I dialogue on a sound basis

Current RIDD Work

- **Establish a generic roadmap towards licensing of DGR facilities**
  - A generic and schematic stepwise approach towards licensing based on a series of building blocks that could be combined and rearranged according to the respective national frameworks
  - While ensuring
    - ❖Independence of the regulatory authorities
    - ❖Feedback loop from safety assessment towards regulations and vice-versa
  - Input gathered during an NEA workshop held from 24-26 January 2024 at BASE, Berlin (DE)
  - As basis for the 2nd RIDD Report (planned for March 2025)

Preliminary RIDD Workshop Outcomes (1/5)

1. Framework

- Importance of having the R-I dialogue framed in a national DGR strategy
- Each DGR project is a first of a kind (geology, waste, regulations, stakeholders, …)
- R-I dialogue should be expanded as there are always multiple regulators
  - Mapping of various interests/positions/strategies of all actors in advance helps contribute to successful and effective communication/consultation programme.

Preliminary RIDD Workshop Outcomes (2/5)

2. Time perspective (1/2)

- Duration of DGR development and implementation requires specific measures for R-I Dialogue
  - Traceability of decisions, capability building
  - Knowledge maintenance, charge management
  - ⇨ Need to establish at a very early stage the framework for an enduring R-I dialogue
- Start dialogue early in the process, time is needed to build up competence and trust
- Experienced difficulties in maintaining continuity (long durations, lack of priority)

Preliminary RIDD Workshop Outcomes (3/5)

2. Time perspective (2/2)

- Time is the most important factor in resolving RWM
  - Postponing R-I dialogue/decisions can be a source in loss of confidence and trust of key stakeholders
- There is now a greater need for a sense of urgency in R-I dialogue on radioactive waste management, in particular with expansion of SMRs/new technologies and the need to fully address the back-end of the fuel cycle

Preliminary RIDD Workshop Outcomes (4/5)

3. Dialogue as such

- R and I should formulate and communicate "safe DGR" as their common goal
- Overall objective of R-I dialogue during pre-licensing: ensure successful development of the DGR license application
- Role definition (and their evolutions) to be clear and understood by stakeholders
- R-I Dialogue as an element of risk management by e.g.
  - Avoiding misunderstandings
  - Identifying and solving stumbling blocks
- Independence of the regulator must be guaranteed, however this does not mean isolation of the regulator
- Governance is needed but attitude plays an important role

Preliminary RIDD Workshop Outcomes (5/5)

4. Technical milestones

- Importance to establish (legally or agreed upon) milestones to
  - Help focus the pre-licensing process
  - Create a decisional momentum
  - Define what is appropriate at each step
  - Support continuity of involvement
  - Build R-I trust in respective scientific capacity
  - Provide input to evolving regulations
  - Most importantly, help the preparation and appropriateness of a license application
- Multiple examples of such milestones
  - R&D programmes and their updates
  - Design and/or safety options dossiers
  - Generic safety cases as well as their updates and evolutions
  - SEA
  - …