

Seventh Edition of the International Conference on Geological Repositories (ICGR-7)

Empowering Progress in Developing Deep Geological Repositories

ICGR-7 Concept Note

27-31 May 2024

Venue: BPEX - Busan Port International Exhibition & Convention Centre, Busan, Korea

Background

There is a broad consensus within the international community that geological repositories can provide the necessary long-term safety and security to isolate long-lived radioactive waste from the human environment over extended timescales. At a global scale, there is now a body of experience in developing the licensing of deep geological repositories (DGRs) that has established a foundational structure for other countries to explore and initiate their own DGRs. DGR development is a multi-disciplinary endeavor, covering numerous transversal cross-cutting scientific and policy aspects. This includes, but is not limited to, societal, political, ethical, legal, and economic elements, along with specific considerations to building and maintaining public confidence, ensuring sufficient human capacity, and transferring information and expertise across generations to manage long-lived HLW in DGRs.

Building upon the success of previous conferences held in Denver (1999), Stockholm (2003), Berne (2007), Toronto (2012), Paris (2016), and Helsinki (2022), ICGR-7 will gather key stakeholders in DGR development. Participation will include government officials, regulators, decision-makers, implementers, research organizations, international organizations, academia, and young professionals in RWM.

ICGR-7 is a collaborative endeavor of the NEA, co-organised with Korea's Ministry of Trade, Industry and Energy (MOTIE), in co-operation with the International Atomic Energy Agency (IAEA) and the European Commission (EC). Korea Radioactive Waste Agency (KORAD) is the local host of ICGR-7.

Main objectives of ICGR:

- Take stock of progress made since 2022 in developing and implementing geological repositories for long-lived radioactive waste, and to advance mutual learning through exchange of perspectives and experiences.
- To examine the latest issues and challenges encountered by various stakeholders in different developmental stages by sharing experiences among countries developing geological repositories.
- To enhance international co-operation for transforming research results into practical and reliable technologies for the long-term implementation of deep geological disposal facilities.
- To identify opportunities to strengthen co-operation for building and increasing confidence in the geological repository life cycle.
- To improve involvement of the younger generation in the development and research of geological disposal.

Programme Overview

Monday, 27 May 2024

Younger Generation Session

This session invites the younger generation to explore nuclear energy education, research and career development opportunities, with a specific focus on enabling the establishment of DGR programmes. Delving into the initiatives of NEA, IAEA, and EC with specific presentations dedicated to each organisation, the younger generation session will focus on methods for further engaging youth to foster academic and career growth in this field.

Targeted audience for the younger generation session includes university-level students and young professionals with 0-5 years of working experience or under 30 years old.

However, while ICGR-7 registered participants over the age of 30 are not eligible to register for the reduced younger generation fee, the younger generation session is open to all ICGR-7 participants (regardless of age) who are interested in contributing to the collective discussion. This includes early/mid-level career experts.

Keynote presentations will be provided by various international organisations before splitting into breakout sessions. All participants will be split into small groups to discuss several topics in addressing challenges of developing DGRs. Members of the Programme Committee of ICGR-7 will serve as facilitators, leading and animating discussions for 20-25 minutes.

Key topics during the younger generation breakout session to be discussed include:

- How can the young generation in the nuclear sector participate or contribute to knowledge transfer and leadership development in radioactive waste management?
- How can we make scientific safety arguments more accessible for the younger generation? What methods could best bridge the gap between scientific and perceived safety?
- How can we build and strengthen involvement of the young generation into trans-generational projects?
- What methods / approaches are used in your respective countries to build up capacity of the younger generation in nuclear?

Following the discussion, each group facilitator will briefly present an overview of their groups' output (reflection of discussion, and key conclusions reached).

Once the breakout sessions have concluded, opportunities for networking amongst young professionals and ICGR-7 attendees will be provided.

Tuesday, 28 May 2024

Session 1 – Lessons learnt: Experiences in development of DGR facilities

Session 1A: Presentations by countries with DGR development experience

Countries with well-established knowledge of DGR development will provide insights into their ongoing programmes, lessons learnt, and progress achieved since ICGR-6 in Helsinki, April 2022. Participants will discuss challenges faced in regulatory framework development, licensing, construction and operation - including the decision-making process, iterations of the safety case, site selection, stakeholder engagement and support. Furthermore, presenters in this session will outline and analyse the reasons for different approaches chosen in their respective countries. This learned experience will help the audience understand considerations in progress towards DGR development, including a closer look at challenges encountered during DGR licensing and how these were addressed.

Session 1B: Panel discussion on developing licensing of DGR facilities

This panel discussion will bring together representatives from countries at various stages of establishing their national DGR programmes. Representing a range of progress in DGR development, panelists will highlight the necessary conditions to achieve progress, from siting to operation. This session aims to illustrate how a systematic, stepwise process with open communication of progress and discussion of remaining safety issues are factors which tend to lead to more successful DGR programmes. Lessons learnt in achieving success could be drawn from this panel discussion. Regarding licensing, a discussion will be held on key differences between various approaches of regulatory bodies and implementing organizations – and how we can mitigate some of these potential differences. Some key questions to be discussed during the panel discussion could include: what are the proven success factors in DGR development? How do we cope with the long time-frames in DGR development?

Session 2 – Setting the foundations for initiating DGR programmes

Session 2A: Panel discussion: national status of DGR development programmes

Building on progress achieved since ICGR-6, a panel discussion will be held to discuss the national status on a handful of DGR programmes - exchanging experiences on establishing the groundwork for DGR development. This session will illustrate conditions which should be addressed from the very beginning stages of DGR development – notably legal, institutional, technical, societal and economic aspects. Furthermore, the discussion will highlight the role of various stakeholders (policy makers, WMO, TSO, regulators) and their individual contributions.

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

There is a clear need for establishing a regulator-implementer dialogue which provides guidance throughout the various licensing steps to DGR development. This session addresses various national approaches for formalizing a regulatory framework through interaction and dialogue between the regulator and the implementer during the pre-licensing phase (spanning from inception of the DGR programme to the DGR license application). Presenters in this session are requested to show national examples of regulator-implementer dialogue, covering key drivers for clear, simple and transparent R-I dialogue in the licensing process. Panelists may also discuss important factors in maintaining independence of their national regulatory bodies.

Session 2C: Building a roadmap for DGR development: essential steps and considerations for initiating DGR programmes

Drawing insights from various DGR development examples, presenters will discuss how to lay the groundwork for a holistic roadmap which outlines critical measures and factors to initiate DGR programmes. This includes the initiation phase where key decision points are defined for the programme based on needs and timing for the disposal facility. Panelists will also discuss the necessity of sufficient time reserves and lessons learnt from programme optimization. Learning from both success and challenges, the roadmap will serve as a strategic guidepost, providing a clear and structured path for countries embarking on DGR development initiatives.

Wednesday, 29 May 2024

Session 3 – Siting approaches for DGRs

Session 3A: Panel discussion: siting approaches for DGRs and lessons learnt

During this session, panelists will provide an overview of their current national programmes and milestones achieved since ICGR-6, showcasing the practices and comprehensive information that supported their progress. Discussions will encompass lessons learned and shared experiences to reveal the scientific and technical complexities inherent in site identification and selection, including the importance of a participatory approach and public engagement throughout the entire process of DGR siting.

Session 3B: Successful stepwise approaches in stakeholder engagement throughout DGR siting and the safety case

Delving deeper into the methodology for stakeholder engagement, this session examines how to build and maintain trust among local communities and at the national level. Presentations will highlight successful examples of stakeholder engagement in the context of various site selection strategies. Presenters will also describe the progressive phases of safety case development from early siting process to license application. In particular, how each stage of the safety case during its' evolution will have various strategies in stakeholder engagement as the siting process progresses phase by phase. This includes communication approaches with a diverse range of stakeholders on technical subjects related to siting criteria, site investigation, evaluation, and site suitability in order to build and maintain societal trust during the siting period.

Session 4 – Cross-cutting aspects and societal considerations

Session 4A: Public engagement strategies and stakeholder involvement: addressing social, ethical, and cultural factors in DGR implementation

Recognizing that public engagement and stakeholder confidence is crucial to successful DGR development, presenters in this session will share how social, ethical and cultural factors can influence a DGR programme. This session will also highlight that there is no proscriptive rule in public engagement and stakeholder involvement applicable to every country – engagement is culturally specific to a national programme. Presenters will discuss key aspects for establishing and promoting the right tools for stakeholder engagement, issues which have stalled progression of DGR programmes, and how these challenges were addressed.

Session 4B: Panel discussion: capacity building initiatives and knowledge management – ensuring continued competency and expertise

Given the long lifespan of any geological repository project (from siting to closure), it is crucial to maintain highly qualified human capacity and transfer appropriate knowledge from generation to generation. This session will address the importance of knowledge management programs and capacity building initiatives to ensure that continued competency and expertise are well built and effectively maintained during the long period of radioactive waste management. The panel discussion will also share success stories of capacity building, recruiting strategies and long-term knowledge management. Risks in the loss of knowledge will also be discussed in the panel discussion.

Session 4C: Rise of new and innovative technologies, future nuclear systems, and impact on the development of DGRs

This session will discuss how new technologies may influence current disposal systems, facility optimisation, and capacity of current facilities to host future waste in which properties are not currently known. Panelists will also discuss lessons learned from legacy waste, possible requirements to future waste products which may save back-end costs, benefits of late-stage optimisation and potential during the construction and operation phase.

Thursday, 30 May 2024

Session 5 – Fostering the use of existing R&D facilities and international co-operation

Session 5A: Role of underground research laboratories (URLs) in DGR advancement and strategies for promoting knowledge sharing

The session will be dedicated to showcasing, in various national contexts, how URLs are critical facilities supporting DGR development from technical and societal perspectives. URLs enable many activities to be carried out and tested under realistic geological conditions in the subsurface and have supported a significant amount of DGR research and development. They are being used as international collaborative platforms, for technical improvements and optimizations of DGR concepts, and to engage the younger generation. This session is expected to give good insights to countries where URL development is under consideration/preparation, in addition to young professionals present at ICGR-7 who are interested in pursuing careers in repository science.

Session 5B: Panel discussion: International co-operation, relevant initiatives, projects and networks

Panelists will delve into international collaborative efforts between countries, organizations, and projects. The session will also explore new initiatives to promote research and development for DGR, emphasizing the importance of international co-operation to leverage existing resources for mutual benefit and advancing DGR development.

Session 5C: Exploring potential use of multinational infrastructures for managing radioactive waste

This presentation session will discuss possibilities of establishing a multinational infrastructure for managing radioactive waste as an innovative solution for the safe, timely, and efficient handling of waste. Discussions will focus on potential opportunities and inherent challenges, addressing the treatment and disposal of low- to high-level radioactive waste and spent nuclear fuel. Participants will collectively explore

how this framework aligns with global needs for sustainable and reliable radioactive waste management practices.

Session 6 – ICGR-7 breakout sessions

For the first time, ICGR-7 will feature a breakout session with all conference participants. The conference hall will be divided into two groups and led by two separate facilitators.

Breakout Group 1 will discuss establishing dialogue between generators and the implementer in interdependency aspects of radioactive waste management.

Breakout Group 2 will discuss future advanced reactors, new technologies, new waste streams and subsequent impact on disposal.

Immediately following the breakout sessions, each facilitator will present a summary of their breakout session in plenary. Findings will also be reflected in the final ICGR-7 Summary Report to be released as an NEA publication.