**Integration Group for the Safety Case (IGSC) Symposium 2024***MOVING TOWARDS THE CONSTRUCTION OF A SAFE DGR – GETTING REAL*

|  |  |
| --- | --- |
| **Abstract Number: 35** | **Topic Number: poster P7.1.9** |
| **Author:** Jeremy Rimando1\*, Julie Brown1, Elias Dagher1, Zhenze Li1, Son Nguyen1, Grant Su1, Qinghuai Zheng1  1Canadian Nuclear Safety Commission  \*Corresponding Author: jeremy.rimando@cnsc-ccsn.gc.ca | |
| **Abstract Title: Overview of Canada’s independent and strategic regulatory research on geological disposal** | |
| **Abstract (300-500 words):** In Canada, independent, regulatory research on geological disposal for the purpose of reviewing documentation in support of long-term Deep Geological Repository (DGR) safety spans several decades, and was informed by, and reflective of three DGR projects. In 1978, the Canadian government established the nuclear fuel waste management program (CNFWMP) directing the Atomic Energy of Canada Limited (AECL – a crown corporation for nuclear power research and development) to manage and develop the technology for the long-term disposal of nuclear waste. This also marked the beginning of independent regulatory DGR research in Canada by the Atomic Energy Control Board (AECB), the Canadian Nuclear Safety Commission’s (CNSC) predecessor. The AECL DGR concept evaluated the feasibility of a DGR in a crystalline host rock in the Canadian Shield (1989-1998). From 2005-2020, Ontario Power Generation’s proposal for a low and intermediate level waste DGR within a sedimentary host rock was reflected in the CNSC’s regulatory research scope that was extended to include that host rock type. However, while regulatory review determined both concepts to be technically feasible for the proposed stages and activities, neither the AECL’s nor OPG’s DGR project proceeded, due to the lack of broad public support.    Currently, the CNSC regulatory research takes place under the Deep Geological Repository – Strategic Research Agenda (DGR-SRA). The DGR-SRA includes both a planning and knowledge management tool to facilitate the identification of CNSC’s research needs to prepare for review of documentation in support of a licence application for a radioactive waste disposal facility; specifically, the Nuclear Waste Management Organization (NWMO) have signaled their intent to select a site for a Canadian used nuclear fuel DGR by the end of 2024. Ongoing research since the late 1970s has helped build and maintain the CNSC’s capacity to adequately review the safety case, make scientifically informed recommendations to the Commission on licensing decisions, and to conduct regulatory oversight of a disposal facility for radioactive waste. The current DGR-SRA ensures that CNSC staff will build and maintain technical competencies and knowledge base relevant to assessing the safety case for all DGR phases. Research projects build in-house knowledge through independent and collaborative research with partners in national and international organizations. An existing database captures previous, ongoing, and planned CNSC research projects as well as past AECL, OPG, and NWMO projects, acting as a knowledge repository for project results. In doing so, the DGR-SRA promotes and facilitates the long-term knowledge management and knowledge transfer over the duration of the review of licences for the site preparation, construction, operation, decommissioning and final closure of a nuclear waste disposal facility.  CNSC’s ongoing research includes the development of in-house safety assessment tools, and investigating the various aspects relating to the long-term performance of both the natural barrier system (for both crystalline and sedimentary host rock) and the engineered barrier system. For example, interrelated projects explore the processes that involve the Thermal (T)-Mechanical (M)- Hydraulic (H)- Chemical (C) coupled influences; uranium deposit natural analogues; and assessing the swelling behavior of bentonite**-based buffer and sealing materials.** | |