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

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| **Abstract Title:**  Development of the Safety Case for Nuclear Installations | |
| **Abstract (300-500 words):**  Regulatory reviews of the design of nuclear installations relies on the development of a robust safety case that demonstrates there is reasonable assurance that the health and safety of the public and the protection of the environment can be met. For nuclear power plants, development of the safety case requires an evidence-based approach that documents the design of the structures, systems, and components (SSCs) of the facility; the capabilities of those SSCs under normal, off-normal, and accident conditions; how those SSCs will be operated, maintained, and tested to show that critical functions to protect the public and the environment can be achieved; and how those human, procedural, and other factors important to protecting the public and the environment will be conducted. The safety case shows that multiple barriers must be breached for a safety function to fail (defense-in-depth) and that there are margins between the design basis of the facility and the conditions the facility is reasonably expected to encounter during operation (safety margins). For nuclear power reactors, the safety case is often developed building off a long history of experimental data, prototype reactor operation, and from the many years of operating experience that has been captured in either consensus standards or within regulations or regulatory guidance.  Insights from the development of safety cases for nuclear power plants can be applied to the safety case for deep geological repositories (GDRs). For example, in the areas of ventilation and fire protection systems, the spent fuel pool area ventilation systems at nuclear power reactors function to maintain ventilation for personnel access and control of airborne radioactivity in the spent fuel pool equipment areas during normal and off-normal conditions. Development of the safety case for this area includes consideration of the capability of the system to direct air from low radioactivity to areas of potentially higher radioactivity, detect and as needed isolate portions of the system in the event of failures, and to actuate components not normally operating that are required during accident conditions or to provide needed isolation. When developing the safety case for the spent fuel pool area ventilation system, it should be shown that the system is capable of maintaining its function considering plausible natural phenomena; that it is capable of controlling the release of radioactive materials in gaseous effluents to the environment; and that it can appropriately contain, confine, or filter the releases of radioactive airborne effluent within established limits under normal and postulated accident conditions. Other areas from the development of the safety case for nuclear power plants that may be discussed include experiences from NEA groups in the areas of operating experience, the approaches for treating the ageing of components, consideration of human factors in operation, and the role of a robust safety culture for managing safety. | |