**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:**  Preliminary Considerations on Integrated Safety Case Development during the Construction of Beishan URL in China  [xdliu2019@hotmail.com](mailto:xdliu2019@hotmail.com) | |
| **Abstract (300-500 words):**  With the rapid expansion of nuclear power in China, the safe disposal of radioactive waste has become a challenging task of increasing importance. Since 1985, China has adopted a “three-step” strategy for high-level waste (HLW) disposal, which includes steps of “site-selection”, “underground research laboratory (URL)”, and “deep geological repository (DGR)”. Currently, China’s first URL for geological disposal, Beishan URL, is under construction, and extensive site characterisation activities and in-situ tests are being conducted. The URL and its research findings will provide a solid foundation for repository design, safety assessment, and safety case development, which are the prerequisites for DGR site recommendation in the future.  For more than two decades, the Integration Group for the Safety Case (IGSC) has been the global platform to share the progress of DGR programs in different countries, and to discuss the key issues on safety assessment and safety case development. It is globally accepted that, in a DGR program, site characterization, repository design, and safety assessment should form an interconnected cycle that evolves iteratively. At the present stage in China, the following questions have been addressed: How to develop and optimize a DGR design with site-specific inputs, and considerations from long-term safety, technological feasibility, and economic viewpoints, how to integrate EBS design and performance demonstration, URL in-situ experiments, and safety case development for site recommendation, and how can we better plan, develop, and optimize our safety case by using the past findings?  As an effort to answer these questions, the present paper consists of three parts. The first part serves as the background and set the “boundary conditions” for later discussions, in which a summary of (1) the concept of “area specific URL”, (2) Beishan URL’s site condition, design, main functions, and construction methods, and (3) the major R&D achievements in site characterization and engineered barrier system (EBS) development are introduced. In the second part, key outcomes selected from a survey of previous IGSC projects or workshops (such as the EC/NEA EBS project, the MESA project, the INTESC project, and workshops on Scenario Development, Timescales, Indicators in the Safety Case, etc.) are discussed in the context of China’s regulatory guidelines and previous works. Lastly, ongoing or planned activities on (1) site descriptive model (SDM), (2) considerations on site-specific DGR conceptual design with associated safety functions and indicators, and (3) plan to systematically review site-specific processes in support of scenario development are presented.  With these preliminary thoughts, the present paper aims to provide an integrated view on site characterization, repository design and safety assessment, to initiate the safety case development during URL construction, and to fill the gaps between the achievements of the past, the challenges at the present, and the path for the future. | |