

NEA IDKM/EGSSC Workshop on Digital Safety Case Methods and Development

Tuesday 25th October – Wednesday 26th October 2022

Venue: NH Hotel Berlin Mitte, Leipziger Str. 106-111, 10117, Berlin, Germany

1. Background

Radioactive waste is produced in all phases of the nuclear fuel cycle and from the use of radioactive materials in industrial, medical, defence and research applications. Disposal in engineered repositories, located in suitable geological formations, is being developed worldwide as the reference solution for the long-term management of high-level, or long-lived radioactive waste.

The safety of a repository is evaluated and documented in a “safety case” that supports the key decisions to progress between each stage of repository development and into closure. It presents the underlying supporting evidence and methods that give confidence in the quality of scientific and institutional processes, as well as in the results of analyses on repository performance and safety.

A safety case is traditionally presented through a suite of printed documents, often with a significant page count (*e.g.* in excess of 10,000 pages). These documents make qualitative and quantitative arguments through the use of text, tables, diagrams and plots with references provided to underlying reports, models and similar. However, the advent of digital technologies brings an opportunity to review existing processes for the production of safety cases, as well as approaches for the presentation of the information contained within. In doing so we can investigate whether additional benefits (for all stakeholders involved in the development programme for the repository) can be gained from the adoption of new technologies. Examples of envisaged benefits include the use of:

- interactive infographics, video (or other media), and the use of multiple output channels (*e.g.* pdf, e-books or web publishing) to improve the presentation of information and communication, either within the radioactive waste management organisation itself or to other stakeholders;
- resolvable hyperlinks, and full-text or link search capability to improve usability (including in the review process) and reduce repetition of information within Safety Case sections;
- glossaries and controlled vocabularies for terms (or metadata) used in the safety case, allowing consistency and enrichment of existing information, while potentially aiding machine-readability, thereby facilitating the long-term management, storage and archiving of the Safety Case and the information contained within;
- workflow processes and electronic signing to increase auditability and timeliness of information sharing and efficiency.

2. Workshop Objective and Scope

2.1. Objectives

Digitisation options for the development of Safety Cases form a continuum, varying from minor enhancements to existing paper-based processes, to adopting a full digital workflow involving significant changes to existing processes, formats and methods. There is currently no common international understanding of what the latter may look like. The topic of digitisation forms the subject of a number of ongoing activities within the IDKM EGSSC who propose to host a workshop on ‘Digital Safety Case Methods and Development’.

The objectives of this workshop are to:

- share learning on the work currently being carried out in member states in digital safety cases for radioactive waste disposal;
- lay the groundwork to develop a common understanding of the opportunities, challenges and potential extent of a digital safety case (a ‘shared vision’) for radioactive waste disposal;
- discuss differences in the priorities made by different organizations that progressed Safety Case digitisation depending on the context under which they operate (e.g. stage of programme, quantity of existing records);
- establish a general guidance for member organizations to advance digitisation within their organizations; and
- inform the future work programme of EGSSC in 2023 and beyond.

2.2. Scope

The workshop will focus on all aspects related to *authoring, updating and presenting the Safety Case and associated performance assessment (PA) using digital systems and technologies, together with its approval and review.*

To avoid dilution of the specialist nuclear ‘*safety case*’ emphasis of the workshop, only aspects related directly to the safety case narrative and its associated safety and performance assessment will be considered in the present workshop, and not earlier activities which this assessment is reliant upon.

This is intended to provide focus on those aspects which are specific to a nuclear safety case without diluting this focus through the consideration of wider needs such as systems or databases for digital design/BIM¹, site characterisation, GIS², radionuclide inventories or similar. Including such activities would mean taking the workshop to a higher level, inviting additional attendees to cover multiple specialisms, and reducing the time dedicated to the core of the safety case itself, *i.e.* the development and presentation of the claims and arguments that support the safety objective. In addition, many of these

¹ https://en.wikipedia.org/wiki/Building_information_modeling

² https://en.wikipedia.org/wiki/Geographic_information_system

omitted aspects are within the focus of developments driven by other industries (for example oil and gas exploration or urban design), which provides opportunities for off-the-shelf offerings that are adaptable to the specialist needs of geological disposal.

Note that the *integration* between these latter aspects and the safety case *is* within scope, however. This includes the means by which the safety case system interacts with such other systems (human, data files with metadata, automated protocols) and how changes cascade and are tracked.

The digitisation of the Safety Case may also support the objective to improve stakeholder confidence from local stakeholders in affected communities and the wider interested public. To accommodate such a non-expert audience, it would be interesting to know which additional functions are necessary, for example special guidance within this digital system, different levels of detail for the same information or providing different modes of presentation adapted to the audience addressed.

Examples of aspects proposed to be within scope and out of scope for the workshop are provided in Table 1. During the workshop there will be opportunity to discuss whether future EGSSC activities or workshops on extended digital tools would be beneficial to the participants.

Table 1 Examples of Topics Within Scope and Out of Scope

<p>Within Scope</p>	<p>How digital systems and technologies can help with:</p> <ul style="list-style-type: none"> • Recording safety case claims, arguments and evidence (the safety case ‘golden thread’), including identifying evidence gaps and RD&D planning • Use of interactive graphics or digital media to communicate the safety case narrative, including visualisation of input data and PA results • Data, model and calculation (‘run’) management for scenario development and performance assessment • Change control, configuration management (including consistency with wider systems) and data freeze for the safety case (versioning, change tracking, timely notification of status change etc.) • Process automation, including recording and auditing approval workflows • Providing SC essentials and SC-related information <i>consistently</i> to various audiences in a traceable and transparent way, including non-specialists, and allow for feedback from these actors <ul style="list-style-type: none"> ○ Potential for interaction with the NEA Forum for Stakeholder Confidence (FSC) • Interactions with Regulators <ul style="list-style-type: none"> ○ providing Regulatory access to the safety case ○ taking feedback from Regulators on the safety case and managing review comments ○ Potential for interaction with the NEA Regulator’s Forum • The use of consistent vocabulary and terminology across the SC • Searching for safety case content, including its underpinning knowledge base, or other knowledge management activities • Transfer of the safety case to company or national archives in line with policy or legislation • Integrating the digital safety case with supporting tools and databases (such as design, GIS) and associated interoperability requirements
<p>Out of Scope</p>	<p>The following systems, for which third-party, “off-the-shelf” solutions are becoming more and more available, are proposed to be out of scope:</p> <ul style="list-style-type: none"> • Site characterisation, GIS etc. • Storing inventory and waste package information • CAD and design, ‘digital twins’, BIM etc. • Finance, procurement, HR or other business support functions

A questionnaire has been issued to IGSC, IDKM and selected FSC members to inform the Agenda for the workshop, which is summarized under §3 below.

3. Programme Description

This workshop will be held in-person in Berlin, Germany, over two full days (~9.00-5.00pm) with an optional site visit the day before organised by BGE (details below).

3.1. Overview of workshop sessions (Tuesday 25th – Wednesday 26th October)

- **Session 1 - Digitisation and Digitalisation experiences**
 - Keynote presentations and panel discussion on digital technologies and approaches which could have applicability to safety cases for radioactive waste disposal
- **Session 2 - Projects and Tools in Member Countries**
 - Presentations and panel discussions by RWMOs on current work on digital safety case tools and systems
- **Session 3 - Digitisation of the Safety Case**
 - Breakout sessions with open discussion followed by a summary in plenary to share and develop ideas on relevant topics
 - Session 3a: Opportunities and Challenges
 - *Linked Data and Semantic Approaches in Demonstrating the ‘Golden Thread’ of a Safety Case between safety claims and its Evidence*
 - *Digital Workflows and the Safety Case Production Process*
 - *Use of Interactive Graphics and Media to Gain (Technical) Insight*
 - *Benefits of Digital Approaches for Stakeholders (Regulators, Local Communities, the General Public, Archives etc.)*
 - Session 3b Implementation of Digitisation
 - *Production of a Business Case for Digitisation*
 - *Migration to a Digital Safety Case, Prioritization of Effort and Dealing with Legacy Information (e.g. Determining priority of what to digitize and the value of image scanning versus production of full machine-readable formats.)*
 - *Future Vision Setting and Technical work needed by NEA and its groups*
- **Session 4 - Summary of Workshop Conclusions and Proposed Forward Work**

A detailed agenda is being developed for the workshop and will be published soon.

3.2. Optional Visit to Site (Monday 24th October)

Workshop participants are invited to a technical visit to the Morsleben repository organised by the host organisation, BGE (please note that additional information will be required). The site visit is scheduled for Monday, October 24, 2022. Departure time: 6 am from Berlin (transportation will be provided). Please, indicate your interest to participate through the registration form. Note that the number of visitors will be limited.

4. Registration Details

Registration is now open through our [website](#). The registration deadline is September 16, 2022. The registration is free of charge.

5. Programme Committee

CAPOUET, Manuel	ONDRAF/NIRAS, Belgium
CARTER, Alexander	Nuclear Waste Services, UK
De CLERCQ, Olivier	FANC, Belgium
KINDLEIN, Jonathan	BGE, Germany
LEUZ, Ann-Kathrin	ENSI, Switzerland
MARTA, Daniel	SOGIN, Italy
NISHIKAWA, Shogo	NUMO, Japan
PICIACCIA, Luca	DSA, Norway
ROHLIG, Klaus-Jürgen	TUC, Germany

6. Key dates

Workshop Registration Opens	June 2022
Draft Agenda Published	July 2022
Finalised Agenda Published	September 2022
Workshop Registration Closes	16th September 2022
Workshop Opens	25th October 2022

7. Contacts

For further information please contact Teresa ALONSO DE VILLAPADIERNA and Jesus MARTINEZ GONZALEZ at dsc-workshop@oecd-nea.org.