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# **Application of Safety Case concept in practice.**

Preliminary findings from the NEA  
INTESC initiative

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# IGSC INTESC

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- Aims to analyse existing or developing safety cases
  - identify key concepts, including points of consensus and divergence;
  - overview of progress that has been made in the last decade;
  - overview of regulatory expectations on future safety cases;
  - report the state-of-the-art to the IGSC and as an input to the forthcoming international symposium of January 2007;
  - report on practical experiences and the lessons learnt
- Questionnaire submitted to members
- Currently being compiled and assessed

# Respondents

- Answers from **16 organizations** representing both implementing organizations and regulatory authorities in **10 countries**
- Some in support of license application, some in preparation for a license application, some to guide further R&D (both ILW and HLW/spent fuel)
  - Not all Safety Cases completed – plans for Safety Case formed part of answer
- Most regulatory answers concern existing regulations on the Safety Case, but experiences from previous reviews are also addressed.
- Answers
  - Extensive (200 pages, font 10 in total)
  - Substantial overlap between several questions

# Areas of general agreement 1(2)

- Generally in line with NEA brochure, e.g.
- Safety strategy, e.g.
  - Aim at good management and engineering principles and practice
  - stepwise approach to decisions
  - Quality Assurance
  - Key safety issues govern program priorities
  - Focusing on major phenomena controlling repository evolution – rather than on academic disciplines
  - Uncertainty assessment a key component
  - high-level overall integration team
- Assessment basis e.g.
  - highlight evidence that the information base is consistent, well founded and adequate for the purposes of safety assessment

# Areas of general agreement 2(2)

- Evidence, analyses and arguments
  - Checking reliability or plausibility (data, QA, iterative Safety assessments, analytic approaches and peer review)
  - Indicators in addition to dose/risk for illustrative purposes
  - Demonstrate implementation with existing technology
  - Remaining uncertainties handled by ongoing R&D, site investigation and repository design projects.
  - Complementary evidence and lines of argument are used
  - Identification of safety functions enhance understanding
- Synthesis
  - All assessments contain at least preliminary conclusions
- Presenting the safety case
  - Mainly technical audience, primarily for the regulator.
  - Most regulators have documents on how they will review
  - Summaries (EIA, brochures etc.)

# Varying use and interpretation

- What elements are developing and gaining in use?
  - data clearance procedures.
  - actions for very long term preservation of information.
  - layout adjustment according to findings during construction
  - safety function indicators for scenario selection.
- Where are there variations in interpretation?
  - strict application of the multi-barrier-principle
  - use of “best available technology” (BAT)
  - post closure monitoring as a safety case component
  - actions to facilitate retrievability
  - separate treatment of Future Human Action
  - range of alternative conceptual models considered
  - Focus on the radionuclide retention aspects of the safety functions or putting most of the emphasis on the containment (isolating) functions
  - how to handle conflicts between transparency and traceability

# Elements beyond the brochure

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- Preparation of a geosynthesis,
  - assessing geoscience information from a variety of perspectives such as structural geology, hydrogeology, and geochemistry and synthesizing this data into an integrated geosphere model that is consistent with the knowledge and history of the site.
- Account of the construction and operational period.
  - Some respondents systematically address the thermal, mechanical, hydraulic and chemical processes/alterations for this stage, using the same methodology as for subsequent, post-closure stages, whereas
  - other still develop their approach – or even question whether it is important for post closure safety.

# Conclusions

- All responding programmes are preparing extensive safety cases (or preliminary ones) **in line with most of the elements** of a safety case suggested by the NEA Safety Case brochure.
  - Such an ambition level is also required according to regulations.
  - Overall, there are similar approaches and attitudes in different programs and similar concerns expressed from the participating regulators.
  - Implementers appear to address issues raised by regulators.
- Some important examples of differences in use or in interpretation and there are some elements of real life safety cases not covered by the brochure.
- Some further definition of the elements and terminology may be helpful to clarify the actual differences and similarities in safety cases.