

## Managing long term implementation of HLW disposal in Japan

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### 1. Introduction

Implementation of a repository for vitrified high-level radioactive waste (HLW) from the reprocessing of spent fuel will extend over a period of about a century, from first planning until final closure. Over such a long period of time, project boundary conditions are certain to change significantly, requiring a fine balance between the need for clear goals in order to provide focus and assured flexibility to respond to changes. In Japan this is a concern already at the initial stage of siting as this has been initiated by an open call for volunteers, which is supported by a commitment to develop the repository in partnership with local communities [1]. This requires, even at an early stage, consideration of evolving socio-political factors in addition to developing technical boundary conditions.

### 2. Requirements management within the NUMO structured approach (NSA)

In Japan, the safety case is considered to be important for integration of the wide range of requirements that influence a practical repository project. Although this was initially focused on post-closure safety for the generic “H12” study that established the feasibility of HLW disposal in Japan [2], as stepwise siting progresses through selection of sites for preliminary investigation (PI) and then detailed investigation (DI), operational safety and a wider range of factors associated with the practicality of repository implementation also have to be included in this safety case (Fig. 1).

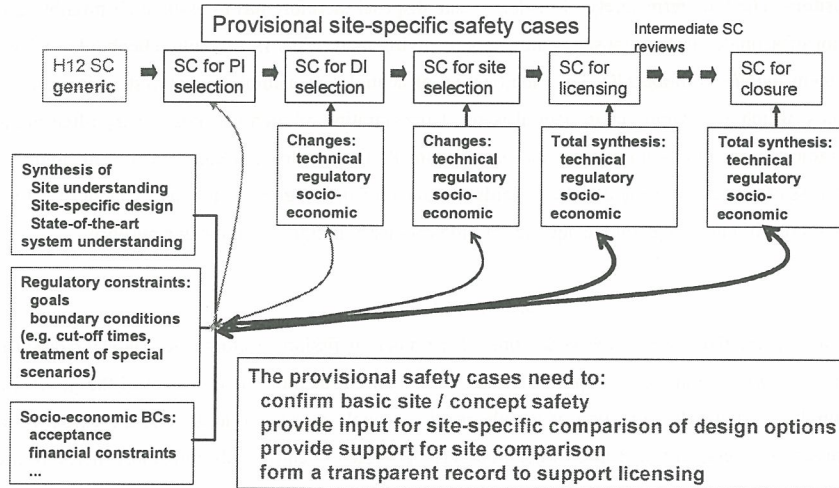


Fig. 1 Outline of safety case evolution

Managing this complex and constantly evolving set of project requirements in a manner that is transparent and, indeed, encourages involvement of a wide range of stakeholders (especially local communities) in the decision-making

process is a major challenge, This has led NUMO to develop an explicit methodology for modifying the repository programme (termed the NUMO structured approach – NSA), which is supported by a formal requirements management system [3]. In particular, the NSA allows the constraints set by site conditions, engineering requirements and performance assessment (PA – including both operational and post-closure safety) to be balanced – both at a particular stage of the siting programme (Fig 2, a) and with consideration of potential changes in the future (Fig 2, b).

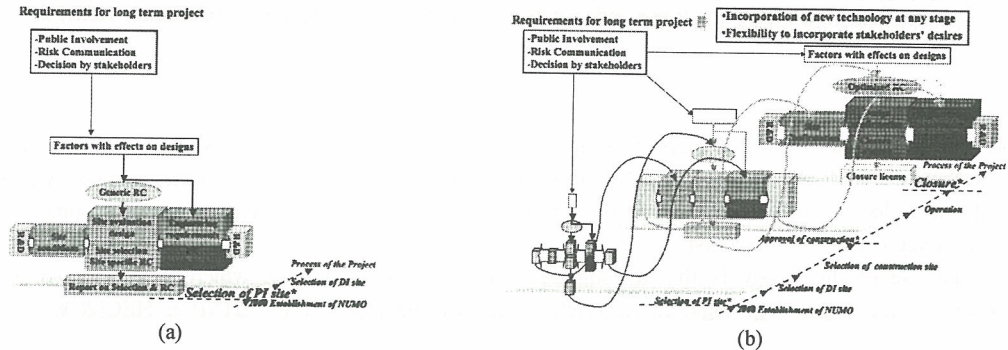


Fig. 2 Balancing safety case components (a) and consideration of how these would evolve with time (b)

Managing the complex set of requirements on a HLW repository project is a major challenge that requires technology at the leading edge of the current state of the art. NUMO has been developing a methodology based on that used in high-tech industries (such as aerospace), with adaptation to respond to the particularly long project timescales and the special needs of transparency to, and acceptance by, the general public. A first prototype is now operation and will be described in the presentation.

### 3. Conclusions and a look to the future

Managing the complex set of requirements on a Japanese HLW repository project involves not only a special approach to assure needed flexibility, but also a formal RMS that is at the limits of the current state of the art. Nevertheless, NUMO considers that this is a valuable area for investment of effort at an early stage of programme development, as it will pay dividends in terms of project optimization at later stages when investments of resources (and time pressure) will be much greater than at present.

### REFERENCES

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- [2] JNC, H12: Project to establish the scientific and technical basis for HLW disposal in Japan, TN1410 2000-001-004, 2000
- [3] K. Kitayama: The NUMO Structured Approach to HLW Disposal in Japan, NUMO-TR07-02, 2007