

Application of comprehensive sensitivity analysis method to HLW disposal concept in South Korea

Takeshi Ebashi and Yong-Soo Hwang*

Japan Atomic Energy Agency, 4-33, Muramatsu, Tokai-mura, Naka-gun, Ibaraki, Japan

Korea Atomic Energy Research Institute, 150 Duck-Jin Dong, Yusung-Ku, Daejeon, South Korea

ebashi.takeshi@jaea.go.jp

It is necessary to treat diverse uncertainty due to variability and ignorance properly on performance assessment of geological disposal system. In order to enhance the confidence of performance assessment, based on information about influence of uncertainty, it is important to reduce the relevant uncertainty and show the robustness of the system.

In order to reduce the uncertainty effectively, it is essential to judge key factors and identify the high priority for R&D. Such quantitative information as an influence degree of each uncertainty and system performance required from R&D as a target value is effective. Meanwhile, in order to show the robustness of the system, it is necessary to construct the barrier with a sufficient margin. It is important to extract such quantitative information as a system condition which is insensitive to diverse uncertainty, and moreover, to select the high feasibility factor on siting and design provisions based on R&D knowledge.

One of the sensitivity analysis techniques to obtain quantitative information is a comprehensive sensitivity analysis method [1-2]. Information of great influence on a result and the combinations of parameter values that results in doses less than the target value (defined as "successful condition") is obtainable from using the comprehensive sensitivity analysis method(see Fig.1).

In this study, the comprehensive sensitivity analysis method was applied to the HLW disposal concept in South Korea [3-4]. The applicability of the comprehensive sensitivity analysis method was verified, and moreover, quantitative information to contribute to the construction of a robust barrier was extracted and was demonstrated.

This study on the applicability of the method will contribute to efficient R&D planning on the stepwise approach of geological disposal. Also, it will give confidence on the safety of a proposed repository system and direct the optimum way to improve the repository system based on the information extracted from this study. In the future, more detailed computational works will be done to assess the influence of diverse uncertainty quantitatively.

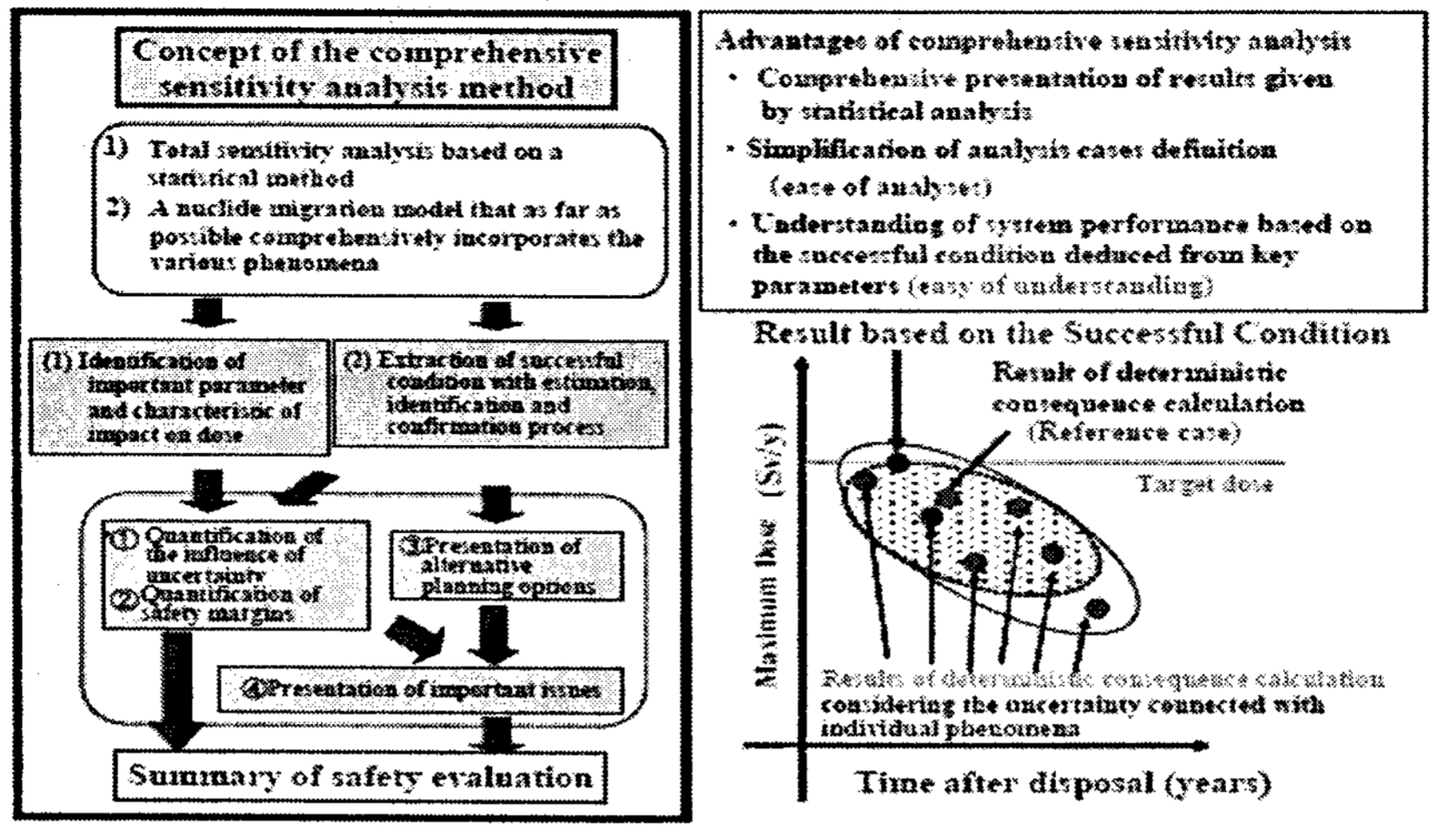


Fig. 1 Characteristics of the comprehensive sensitivity analysis method (refer to [2])

References

- [1] T. Ohi, et al., Application of a comprehensive sensitivity analysis method on the safety assessment of TRU waste disposal in JAPAN, 2006 MRS Fall Meeting, 2006.
- [2] Japan Atomic Energy Agency and The Federation of Electric Power Companies of Japan., Second Progress Report on Research and Development for TRU Waste Disposal in Japan"@"- Repository Design, Safety Assessment and Means of Implementation in the Generic Phase -, JAEA-Review 2007-010 FEPC TRU-TR2-2007-01, 2007.
- [3] Y. Hwang, M. S. Jeong, and C. S. Seo., Safety Assessment for a Potential SNF Repository and Its Implication to the Proliferation Resistance Nuclear Fuel Cycle, Global 2007, Boise Idaho, 2007.
- [4] Y. Hwang et al., Assessment of Post Closure Radioactive Safety for the Korean Reference Disposal System: Development of Scenarios and Quantitative Assessment, ISRSM 2005 Conference, Daejeon, 2005.