

Application of the Integrated Site and Environment Data Management System for LILW Disposal Site

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1. Introduction

During the last five years, Site Information and Total Environmental data management System(SITES) has been developed. SITES is an integrated program for overall data acquisition, environmental monitoring, and safety analysis. SITES is composed of three main modules, such as site database system (SECURE), safety assessment system (SAINT) and environmental monitoring system (SUDAL). In general, for the safe management of radioactive waste repository, the information of site environment should be collected and managed systematically from the initial site survey. For this, SECURE module manages its data for the site characterization, environmental information, and radioactive environmental information etc. The purpose of SAINT module is to apply and analyze the data from SECURE. SUDAL is developed for environmental monitoring of the radioactive waste repository. Separately, it is ready to open to the public for offering partial information.

2. Function of sub-modules in SITES

The SECURE was developed under consideration of relevant nuclear acts, standards and guides for low & intermediate radioactive waste disposal sites. All the investigation and monitoring items required by the regulatory issues for the site safety assessment were reviewed for the DB system. The SAINT module was developed for the application and analysis of data from SECURE and for the systematic management of the resulted data from the safety assessment. To develop the control program of safety assessment, all assessment codes were analyzed in their functions. Those safety assessment codes were the AquiferTest, MiniTab, Sufer/Grapher, MODFLOW, GEN II, NAMMU, NAPSAC, MASCOT/MOP, AMBER, HELP, DUST-MS, GWSCREEN, RESRAD, and SAGE. SAINT is operated in Windows environment, but safety assessment codes are operated under the various operating systems (DOS, Windows, and UNIX). For example, the safety assessment codes for rock-cavern type disposal (NAMMU/NAM-DATA, NAPSAC, and MASCOT/ MOP) run under UNIX system. Therefore, TCP/IP protocol and Telnet were used in order to communicate between the data from these systems operated under the different operational environment. SUDAL is developed for the purpose of the real time monitoring, data analysis, statistics, prediction and automatic alarming for the radioactive waste repository.

These functions will be effective in its environment and facility through pre-operation, operation and after closure period. SUDAL is composed of several sub-modules to meet the requirement above. Six sub-modules such as data collection, real time environmental monitoring, SECURE relational module, assessment and automatic alarming, data process, and GIS relational module are the main functional systems in SUDAL. On the other hand, Internet homepage of SUDAL is developed for public acceptance about radioactive waste repository. It is ready to open to the public for offering relevant information. SUDAL will be one of the important systems in the SITES application.

3. Utilization of SITES for Radioactive Waste Repository

SITES applies to the radioactive waste repository from the pre-operation (construction) stage. Among sub-systems, SECURE is for data management of the site characterizations and environmental reports of a radwaste repository. The data are classified three categories, which are site characteristic information (topography/geology, meteorology, hydrology, seismic/geophysics, geotechnical engineering, geochemistry), general environmental information (natural environment, life/human environment, social economic environment), and radiological environmental information on disposal site



Fig.1 The Radiological Environmental Information of LILW Disposal Site in SECURE System

In present, site surveys are in process and we expect to take government approval for constructing and operating the repository. The data which are obtained

from the site characterization survey and radiological environmental assessment are stored in SECURE (as shown in Figure 1). The data stored in SECURE will apply to make out periodic safety assessment report. Meanwhile, SAINT is used for a safety assessment with various relevant codes to draw up radioactive environmental report of the repository. The assessment results on human intrusion scenario by SAINT system are shown in fig 2.

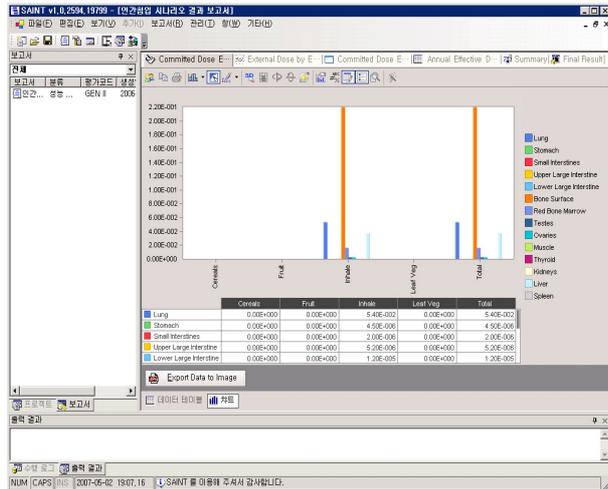


Fig. 2 Assessment results on human intrusion scenario by SAINT system

Especially, SAINT has a function of quality assurance which can inspect effectiveness of safety assessment result of the site. It will enhance consistency and effectiveness of safety assessment result. On the other hand, SUDAL is used for data collection from the site. The real time groundwater monitoring in SUDAL system are shown in Fig. 3.



Fig. 3 Real time groundwater monitoring in SUDAL System

Originally SUDAL is developed for environment monitoring of repository site during operating and closure period. In present, it is using for collecting

preconstruction data of site. The collected data will be used for background data of repository site.

4. Conclusion

SITES has been developed for effective management of the environmental and site information of the radioactive waste management site. SECURE module manages its data for the site characterization, environmental information, and radioactive waste disposal site. SUDAL is now test operation for Environmental surveillance. SAINT is used for a safety assessment with various relevant codes to take government approval for constructing and operating the radioactive waste disposal site.

REFERENCES

- [1] S. M. Park, C. G. Rhee, J. B. Park, H. J. Lee, and C. L. Kim, "Database Modeling of the Site and Environmental Information for a Radioactive Waste Repository", *Journal of the Korean Nuclear Society*, Vol. 36, No. 3, pp. 263-275, (June 2004).
- [2] Do Young Ko, Se-Moon Park and Chang-Lak Kim, "A Study on the Design of SEMS Module for SITES Development", *J. of the Korean Radioactive Waste Society*, Vol.2(4), pp. 263-269(Dec. 2004).
- [3] Jin Beak Park, Joo Wan Park, Chang Lak Kim, Daisuke Kawasaki and Joonhong Ahn, "Safety Assessment Codes for the Near-Surface Disposal of Low and Intermediate-Level Radioactive Waste with the Compartment Model: SAGE and VR-KHNP," Waste Management '05, Feb. 27-Mar. 3, Tucson, Arizona /2005.