

Visualization of Safety Assessment Result Using GIS in SITES

Bong-Yo Yun, Joo Wan Park, Se-Moon Park and Chang-Lak Kim
 Nuclear Environment Technology Institute, Korea Hydro & Nuclear Power Co. Ltd.
 P.O.Box 149, Yuseong, Daejeon, Korea 305-600, E-mail: bongyo@khnp.co.kr

1. Introduction

Site Information and Total Environmental database management System (SITES) is an integrated program for overall data analysis, environmental monitoring, and safety analysis that are produced from the site investigation and environmental assessment of the relevant nuclear facility [1, 3]. SITES is composed of three main modules such as Site Environment Characterization database for Unified and Reliable Evaluation system (SECURE), Safety Assessment INTeGration system (SAINT) and Site Useful Data Analysis and ALarm system (SUDAL) as in fig.1 [2].

The visualization function of safety assessment and environmental monitoring results is designed. This paper is to introduce the visualization design method using Geographic Information System (GIS) for SITES.



Fig.1 Systematic Diagram of SITES Composition

2. Design Method of Visualization for SITES

Two types of visualization methods are designed for SITES. The first method is to compare the safety assessment results to the environmental monitoring results using GIS in various geographical positions in radioactive waste repository. It will make more reliable for assessment result. The second method is to link commercial visualization codes (i.e. Visual Mode Flow, AVIZIER) with SAINT [4]. The codes are used for visualization of assessment result from MODFLOW and NAMMU which are assessment codes already linked with SAINT as in fig.3 [5].

Fig.2. shows the schematic diagram of sub-modules in SITES, which describes the relational data connection between SECURE, SAINT and SUDAL.

2.1 Comparison between Assessment Result and Monitoring Results.

SAINT includes various safety assessment codes. Among the assessment results of the codes, the visualization boundary is limited to the groundwater flow and radionuclide transport, because the data can be compared to the environmental monitoring results. At first, the radionuclide concentration maps from MODFLOW assessment results are represented at geographical position in the repository. Secondly, the radionuclide concentration-time curves and from SAGE/AMBER assessment results are expressed in the specified geographical position of repository. Thirdly, the radionuclide concentration, which is assessment result of SAGE and AMBER, at the repository boundary, is realized at the geographical position [6, 7, 8]. This visualization method is using GIS and the expressed data can be compared to the real monitoring data.

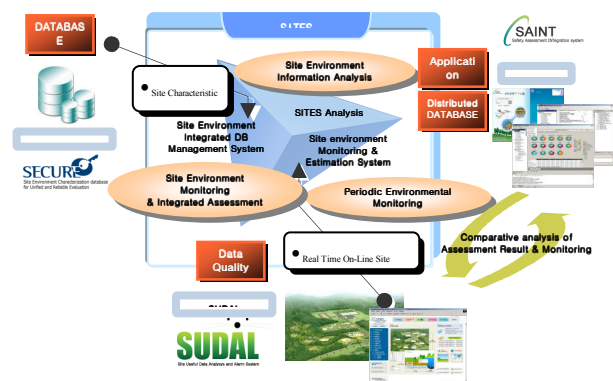


Fig. 2 Schematic Diagram of sub-modules in SITES

2.2 The Assessment Result of Ground Water Flow for SAINT

Among the safety assessment codes in SAINT, MODFLOW and NAMMU are the assessment codes for groundwater flow. For visualization of assessment results performed by MODFLOW and NAMMU, the two visualization codes Visual Groundwater Flow and AVIZIER are linked individually. In order to keep its own typical function of SAINT that is multi-user accessibility to the assessment code in SAINT, the remote control function for visualization process from client PC is designed. Special link program (X-manager) will be set up to meet the requirements of SAINT function. AVIZIER is because used in the

UNIX system, which is not able to control by SITES directly.

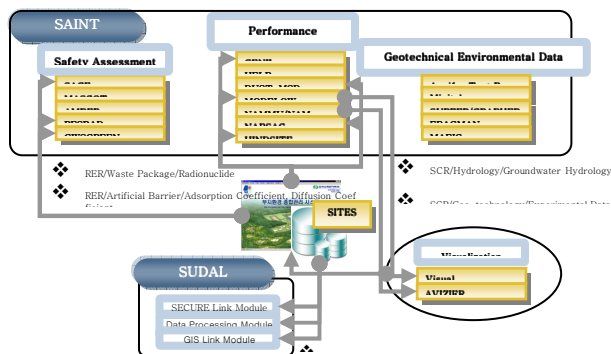


Fig.3 Composition of Assessment Code for SAINT

3. Conclusion

The visualization of SITES is designed for reliability and comprehension of safety assessment result, because a user can easily recognize the assessment result using the geological information of radioactive waste repository. The user of SITES can compare environmental monitoring results with safety assessment results. This function will help user's estimation and feedback for assessment result.

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