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Development of a Safety Assessment Information System for the Management of Periodic Safety Assessment Activities

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1. Introduction

At present, the 10-year Periodic Safety Review(PSR) has been performing to confirm all the aspects of safety issues for all the operating plants in compliance with domestic nuclear law of article 23, subarticle 3. For each plant, in addition, Probabilistic Safety Assessment(PSA) and Severe Accident Management Guideline(SAMG) are being implemented and revised periodically to reflect the latest safety level according to principle fulfillment of severe accident policy statement. The assessment reports, as one of outcomes from these activities, are submitted into and reviewed by domestic regulatory body. During reviewing (in-office duty) and licensing (regulatory duty) process, a large number of outcomes of which most are the formal technical reports and licensing materials, are inevitably produced. Moreover, repeated review process over the plants can make them accumulated and produce a variety of documents additionally. This circumstance motivates to develop effective tool or system for the management of these reports and related technical documents for the future use in licensing process and for subsequent plant assessments. This paper presents the development status of Safety Assessment Information System(SAIS) which manages safety-related documents of PSR, PSA and SAMG for practical use for experienced engineers in charge of these areas.

2. Present Status of Review Documents

A great number of outputs are produced during the safety review and renewal process accompanied by licensing process. They may be in the form of implementation plans, technical reports, presentation materials, review input data, computational outputs, answers of licensing review questionnaires, and so on. Table 1 shows the status of information about the licensing review questionnaires for each assessment area as an example of massive information materials to be managed. Among them, only the final technical reports generated formally can be registered into in-office ERP(DREAMS) Lifecycle Data Management(LDM)[1]. However, since LDM stores these documents simply and provides inquiry of themselves for all the employees, its usability becomes worse for practically experienced engineers. During a review of one plant along each assessment area, the number of the information and documents to be controlled and managed are estimated to be one to two ten hundreds including those as shown Table 1.

Table 1. The Number of Review Questionnaires

As of Dec. 2006

Assessment Area	K1	W1	K2	K3,4	Y1,2	Y3,4	K1 CO	Total
PSR	562	522	404	515	574	586	588	3751
PSA	189	155	120	143	86	176	na	869
SAMG	313	in progress	213	219	same with K3,4	277	na	1022
Total	1064	677	737	877	660	1039	588	5642

K1 CO : Kori Unit #1 Continued Operation

3. Development of the SAIS

The SAIS is driving in the web-based environment so that on-site and in-office qualified personnel can easily access.

3.1 Basic Design

The SAIS is basically designed that it control the documents and processed information (i.e. not raw data) obtained plant design and operating data with a consistent and complete manners.

The SAIS is designed that it treats all kinds of safety assessment-related documents and reports for all the operating plants. Specifically, details of scope and level for three different areas are defined as shown Table 2.

For functional specification, the SAIS has functions of newly registering, retrieving, printing and statistically analyzing of the document or information in database. Especially, this system provides analysis and trend of similar answers on licensing review questionnaires, Of course, basic tools for database system have to be included in the SAIS. On the other hand, the performance capacity of the SAIS database communication is able to accommodate up to 100 persons simultaneously.

Table 2. The Scope and Level of Database in the SAIS for Assessment Areas

Assessment Area	PSR	PSA	SAMG
Classification	Middle 14, Small 40	Middle 3, Small 20	Middle 4, Small 20
Database	Technical Reports Technical Bases Data Technical Computational Materials Licensing Materials Licensing Q/As PSR-Related Safety Issues PSR-Related Implementation Plan	Technical Reports Technical Bases Data Technical Computational Materials Licensing Materials Licensing Q/As PSA-Related Safety Issues PSA-Related Implementation Plan	Technical Reports Technical Basis Reports Technical Bases Data Technical Computational Materials Licensing Q/As SAMG-Related Safety Issues SAMG-Related Implementation Plan

3.2 Detailed Design Approach

Figure 1 is main picture of the SAIS in the web-based environment, especially in the Window Microsoft internet explorer. In this workspace, SAIS starts to work when the qualified users select the function menu. In addition to general characteristics for the database system, some detailed characteristics of the database to be stored are defined in order to facilitate the users to access to the database as shown in Table 2.

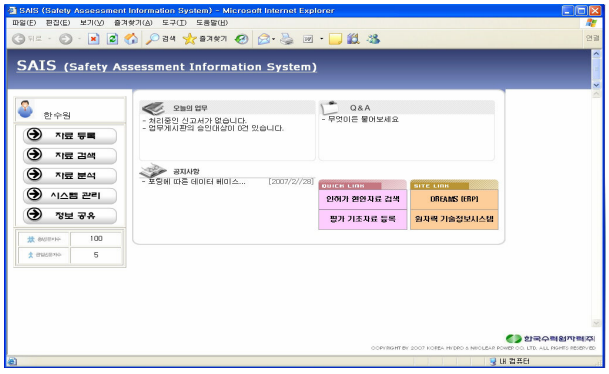

Figure 1. The Main Picture of the SAIS

3.2.1 The Exquisiteness of the Database Table

To immediately access to the database, technical keywords are allocated to every document or report in the database system. Also, every document or report is classified into hierarchical group by virtue of its type or nature as shown in Figure 2. These characteristics are embodied into attributes of the database tables.

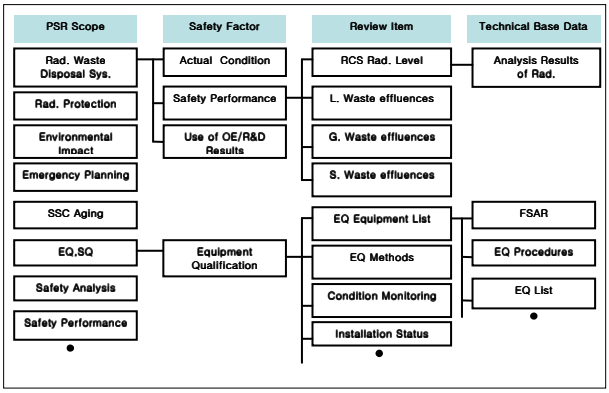

Figure 2. Hierarchical Structure of Technical Bases Data for PSR

3.2.2 The Accessibility of the Database

To promote the database retrieving, all the data are searched by database management system. For this performance, the stored documents and reports have uniform format in SAIS.

3.2.3 The Versatility of the Database

For versatility of the database, the SAIS has various statistical functions to find the trends of safety issues as a function of assigned time period, plant and topic.

3. Conclusion

This study has described the development status of the SAIS which manages safety-related documents of PSR, PSA and SAMG for practical use for experienced engineers in charge of these areas. At this time, the SAIS is materializing the required web pages for server machine in detail after the design stage of the system was finalized. The initial employment of the SAIS is scheduled by August of this year. It is expected that the timely application of this system can be helpful to promote the utility practical engineers' capability coping with the licensing process and the application of existent data on safety assessment activity to future plants.

REFERENCES

[1] ERP LDM User Manual, KHNP, 2006.