

Construction of the Database for Tomorrow's Regulatory Activities

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1. Introduction

KINS has launched a top brand project since early 2007, which called the "Tracking System for the Implementation of Nuclear Regulation: R-TRACER[1][2]" The one of main contents of R-TRACER is promoting nuclear safety by interconnecting the information of the events and that of safety review and regulatory inspection. R-TRACER is composed of three parts. One is the CATS(Corrective Action Tracking System) to carry out the related affairs and to exchange information between organizations concerned efficiently. Another is the SIMS(Safety Issue Management System) to coordinate the safety issues program and to implement the operating experience feedback in a real-time basis. And the other is the DIOS to supply above both systems with core information. This paper is focused on the database structure of the DIOS.

2. Features of the DIOS

As the one of R-TRACER modules, DIOS means the Dissemination of Incident and operating experience System. Objectives of the DIOS are to manage the regulatory results for effective and efficient regulation and to supply safety issues with technical background.

In order to construct national operating experience feedback system according to Convention on Nuclear Safety Article 19 of the IAEA, DIOS provides a platform for the collection, classification, and effective dissemination of operating experience information with regulatory inspectors.[3]

2.1 The construction of DIOS database

A great deal of the information exists in the form of reports, articles, books and they have been supplied through various service system. But if very large and important information are integrated by means of the more advanced technology, they will tend to greatly benefit the regulator.

As part of an effort to integrate information, KINS have constructed prototype database focusing on retrieval conveniences for events of both domestic NPPs and foreign NPPs and now DIOS is extending the scope of database to information on safety review, periodic inspection and foreign information including NRC's generic communication such as bulletin, generic letter, information notice and regulatory issue summary. Specific information is used as specified in Table 1.

Table 1. Major Information used for the DIOS DB

Info. Categories	Domestic	Foreign
Events Information	Event reports by utilities Event reports by regulatory body Component failure reports	USA: EN, LER, PNO, Part 21 report Japan: PRI IAEA: IRS
Regulatory Information	Safety review related CP and OL PSR Results Safety review of amendment, notice and Topical Report Inspection Finding and Recommendation	Generic Communication(BL, GL, IN, RIS) SECY Report NUREGs
Research Information	Domestic Research Results	Overseas Research Results

2.2 Inter-connecting among regulatory information

As the number of operating nuclear power plants increased and their aging progressed, development of a comprehensive and structured database system for the nuclear safety is essentially needed. Core contents of database system are to determine the criteria for classification and to be grouped by character of regulatory information. So KINS developed integrated classification code that be applied to all of regulatory activity results.

Periodic inspection has been performed for 11 facilities, around 80 items of the NPPs according to notice of ministry of education, science and technology. The FSAR that submitted as the licensing document of the operating license are typically comprised of 18 chapters. And also watched code list of IRS includes around 120 systems and 50 components.[4]

We rearrange the system and components in the above three documents to inter-connect among regulatory information. And also failed and affected mode of each system and component can be distinguished clearly as mainly 4-type causes such as mechanical failure, electrical and I&C failure and human error.

Figure 1 shows the concept of inter-connecting method.

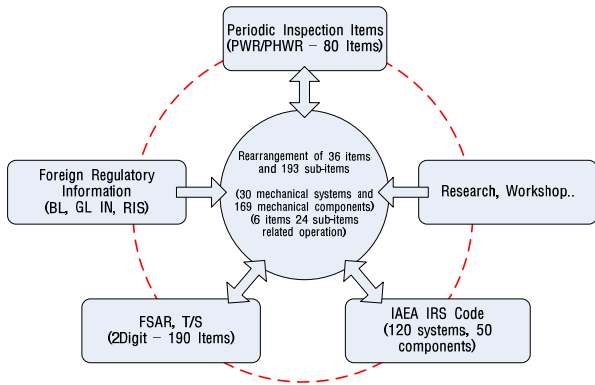


Figure 1. Inter-connecting method of the DIOS

2.3 System Operation

Information regarding periodic inspection, safety review and event analysis have piled up in the each system during regulatory activities. They will be rearranged by integrated classification code of DIOS. By using the integrated information technique, DIOS can supply the information to regulator which couldn't have been expressed by the existing technology. Regulator can pick the pertinent information on each system and components in the NPPs not only the latest regulatory history but also background on safety issues. Thus, DIOS can improve the efficiency of regulatory activities by dynamically storing voluminous information on the nuclear plants.

Figure 2 show the schematic diagram of DIOS operation

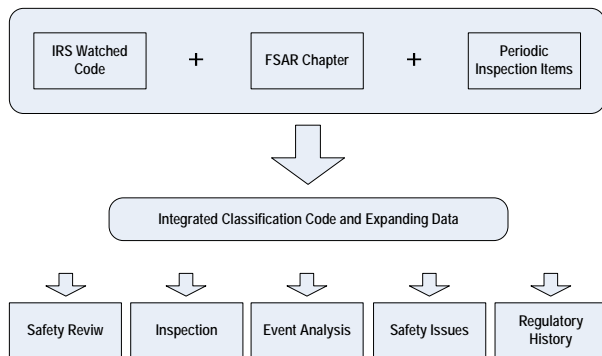


Figure 2. DIOS operation

3. Conclusions

This paper has introduced database structure and integration method of the DIOS and its impact on tomorrow's regulatory activities.

The expected benefits of the proposed DIOS may be summarized as follows:

- comprehensive management of the regulatory information

- supplying technical background in the regulatory decision making
- forming the basis of national operating experience feedback
- enhancement the efficiency of regulatory activities

As a part of R-TRACER[5], DIOS will be developing more advanced database system and successful completion of the R-TRACER project will most certainly put the nuclear regulatory back on the leading edge.

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