

Development of APR1400 Regulatory Information Management System for NRC Design Certification

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1. Introduction

By issuing a design certification, the U.S. Nuclear Regulatory Commission (NRC) approves a nuclear power plant design, independent of an application to construct or operate a plant through 10 CFR Part 52. An application must contain a level of design information sufficient to enable to Commission to reach a final conclusion on all safety questions associated with the design [1].

We have been preparing the corresponding design control documents (DCD) to apply for the design certification of the APR1400 from the NRC.

For successful design certification, systematic and efficient management of the design control documents is essential. Especially managing the responses to a huge number of Requests for Additional Information (RAI) from the NRC well is very important because this can affect to the evaluation time of the NRC staffs. Furthermore, maintaining of the consistency between the requirements and relating documents is also important as well as systematic management of the requirement [2]. To be effective, the requirements must be traceable and linked across requirements areas, as well as through the hierarchy cascading from high to low-level requirements [3]. To manage these documents systematically, a system named as RIS (Regulatory Information management System) is being developed at KHNP Central Research Institute.

The main purpose of the system is to make documents managed according to the regulatory requirements. The system also provides configuration, tracking, and cooperation management functions.

2. Description of the System

2.1 System Configuration

A schematic diagram of the RIS is shown in Figure 1. The system consists of DB server, web server, backup server, output builder.

DB server is for requirement and tracing revised items management of the corresponding documents using IBM Rational DOORS (Dynamic Object-Oriented Requirement System). IBM RTC (Rational Team Concert) is installed in the web server for the management of co-work processing and configuration control. Backup server is for backup and restore of data. Output builder is for production of documents for submittal to the NRC.

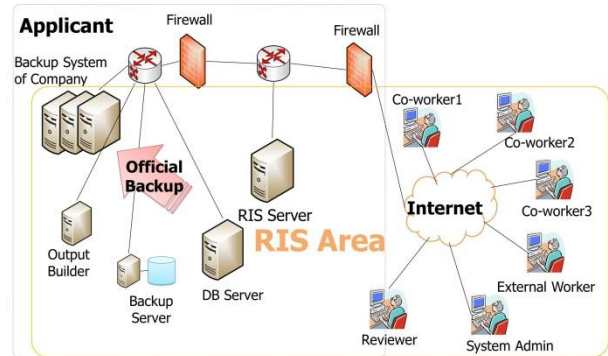


Figure 1. Schematic Diagram of the RIS

2.2 System Functions

Figure 2 shows a functional architecture of the system. The main function of the RIS is the requirement management. The system makes a notice to users what contents they should revise to apply changed requirements caused by the revision of standard review plan or RAIs from the NRC. Tracking Management is an essential function for the management for requirements. To manage this tracking of the requirement explicitly, the RIS provides the tracking function of the corresponding requirement by periods. Configuration management is also important to manage the change history of the documents. The system provides the function of co-work management, share point with the NRC, review and approval control, DB management.

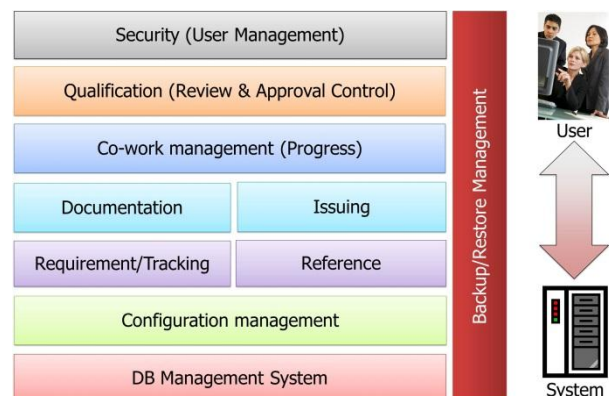


Figure 2. Functional Architecture of the RIS

3. Application of the System

A process of the design certification is shown in Figure 3. Upon receipt of an application for design certification, the NRC staff performs an acceptance review to determine if the application is acceptable for docketing and, if so, reviews the application against the applicable regulations. The NRC staff prepares a safety evaluation report that describes its review of the plant design.

The Commission's Advisory Committee on Reactor Safeguards (ACRS) reviews the application, and issues a report to the Commission. The commission determines if the application meets the relevant standards and requirements of the Atomic Energy Act and the Commission's regulations. Following the determination, the Commission proposes a rule to certify the standard design as an appendix to the regulations set forth in 10 CFR Part 52. After considering public comments on the proposed rule, the Commission issues a final rule. The design certification then becomes a part of these regulations [1].

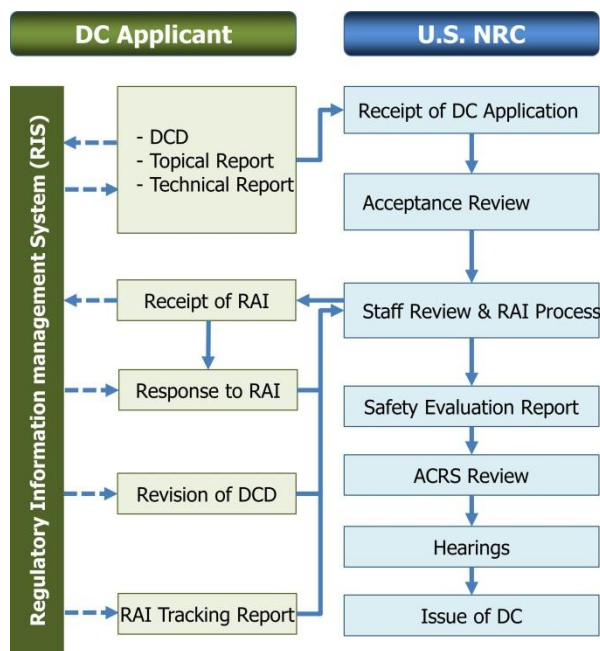


Figure 3. Design Certification Process

All documents including DCD, Topical Reports, Technical Reports, RAIs and responses to RAIs are managed by the RIS during the review of design certification. Especially the RIS is focusing on the management of RAIs. During the review of DCD for APR1400 design certification, quite a number of RAIs will be issued from the NRC. Applicant must prepare the response to RAI and submit it to the NRC within a given period. The RAIs and responses to RAIs are managed and tracked by the RIS. If some contents of DCD need to be revised by these responses to RAIs, the RIS make a notice to the user automatically. The revised DCD with all change history of the content is managed by the RIS. The changed contents caused by

the RAIs are collected to make a RAI tracking report by the RIS. This tracking report is to be submitted to the NRC periodically.

The associative relation among the functions of the RIS and work flows are expressed in Figure 4.

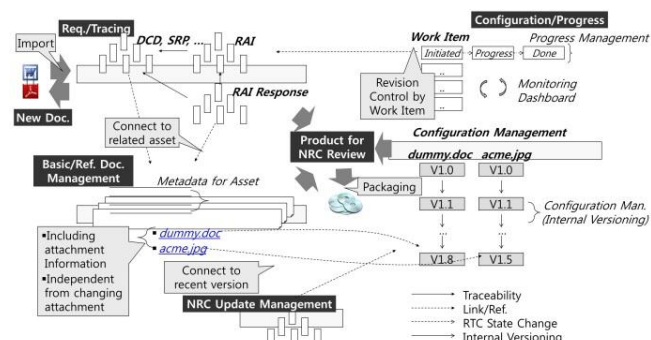


Figure 4. Logical Architecture of the RIS

The RIS has the several features in use convenience side. The system will check the NRC homepage to gather the information related to the APR1400 or regulation changes of the NRC. The information will be posted on the system automatically and checked by users. This would be very useful for users. The RIS also provides the share point to the staffs of the NRC. During the evaluation of the design certification, the NRC staffs require for reference to check the design documents such as the calculation note containing the proprietary information of the design company. The electronic reading room in the RIS provides this function. The design company uploads the proprietary document to the system, then the NRC staff authorized to read can only read the corresponding document by connecting the web server of the RIS.

4. Conclusions

The system named as RIS is being developed for successful design certification of the APR1400. The main purpose of this system is to manage the documents for design certification systematically and reduce the review period of the NCR staffs.

The above mentioned functions are being applied to the RIS. The RIS will be used in earnest after docketing of the APR1400 application. The RIS is hopefully expected to make reduce the time and cost for design certification of the APR1400.

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