

Construction of APR1000 nuclear power information management system based on international standards

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1. Introduction

In recent years, due to speedy rise of international oil prices, orders of nuclear power plant construction have been in progress by many countries to solve the stable supply of power.

Our country has continued to perform nuclear power construction. As only a few developed countries like Japan and European countries have its own nuclear power construction technology, competition among them is keen.

Our country has awarded the contract of UAE nuclear power plants based on the accumulated nuclear power plant construction technologies so far. In this regard, KEPCO has recognized the needs of information management system to manage nuclear power information and proceeded the implementation of nuclear power information management system for export-model.

2. Study Background

In this study, to satisfy the requirements of export model and overseas information management system, we have developed:

- implementation of nuclear information management system based on international standards and requirements of information exchange,
- user requirements covering 2D/3D viewer.

This study enables to establish collaboration support system under the environment of STEP(ISO10303) standards & its own viewer and web-based flat form thus allows to utilize it at the final operating and maintenance phase on the basis of this.

2.1 Analysis of Requirements on Development Needs

In this study, we have collected the following requirements of internationally accepted IMS development by analyzing working-level interviews, EPRI URD(Utility Requirements Document) & etc:

- collaboration system enables to share among various service providers.
- link among variety of information
- reflecting the process of configuration &

- change control
- establishment of data warehouse
- overseas export model
- supporting the function of requirement/change/historical data management

2.2 Outline of IMS development

IMS established a data warehouse on the basis of ISO 10303-AP239 PLCS (Product Life Cycle Support)[4] to apply the concept of 'PLM (Product Lifecycle Management)' and 'Long Term Archiving' based on international standards.

In addition, it met the requirements of EPRI URD under the needs of the U.S. nuclear industry, and implemented the functions in phase to meet the requirements of nuclear information management system, e.g. securing the system scalability etc

Fig 1 is a part of data model expressing the PLCS based plant life cycle support.

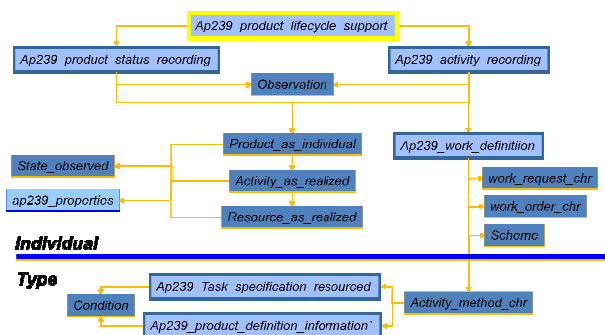


Fig. 1. IMS Implementation Requirement

3. Details of Implementation

3.1 Establishment of configuration management system for nuclear power plant

In this study, to establish a configuration management system it is proceeding the following development procedures and has implemented the core elements, such as nuclear information classification system, ID

identification system by organization, change control, version control & requirements management:

- requirements and business process analysis
- definition of nuclear power plant business model & functional rules
- analysis of the data sources, data acquisition and migration
- establishment of IT-based system
- user interface and logic design system design, implementation and testing

3.2 International standards-based information management system

IMS is handling maintenance information, supply chain information, and configuration management & support information to support the project from the beginning stages for the conceptual design phase as well as product manufacturing process and related activities utilizing the AP239 PLCS[4].

PLCS was used to build a data warehouse as well as the neutral format for data transfer thus utilized to define the relationship of all data stored in IMS.

To do this, the various concepts(business object) used in the nuclear field were mapped at the PLCS object(Entity).

Also, to define these concepts used in the nuclear power field as standards it can build and utilize a reference library, and the standards of ISO 15926 Oil & Gas RDL (Reference Data Library) [5] are used for this study.

3.3 Key Implementation Capabilities of IMS

Key features of the IMS development are creation of 'Functional Location' regarded as BOM(Bill of Material) of nuclear power plants and the followings are implemented:

- Functional location based engineering data management
- Drawing/document management
- 2D/3D visualization
- Requirements management(registration of generated requirements and assignment)
- Change management
- Project Management
- Version/revision management
- Web-based project collaboration environment
- review and approval process
- role-based organization, personnel management
- access management
- data traceability
- function of data batch input/output

4. CONCLUSION

In this study, a research was proceeded on information management system implementing configuration management system of nuclear power plants by applying the international standards model.

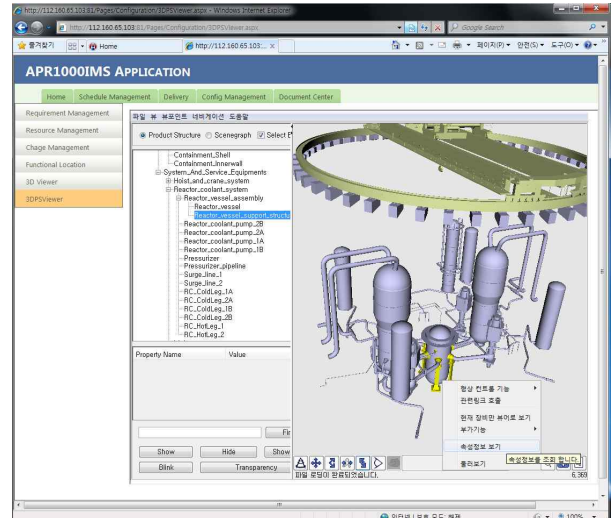


Fig. 2. Web based on IMS 3D Viewer

Considering the export, international standards and a neutral format were applied thus the generality and flexibility of data was improved.

Through requirements management, it can manage whether the requirements have been applied to the final design, and enables configuration management for all data through version and change control.

Web-based collaborative environment, which enables collaboration among various organizations by assigning ID per organization, organizational management and access management to the same entity, has been built.

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