A study of a decommissioning activities classification structure for decommissioning of the project management of a nuclear power plant

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1. Introduction

Decommissioning of the research reactor and nuclear power plant facility that require safety and economic are hard to control as systems are too complicate. Decommissioning cost and schedule depend on which scenario of regulatory requirements and technical criteria when establishing of the decommissioning planning. We found out the fact from the lessons learned of the nations that had decommissioned the NPP.

Decommissioning activities and requirements that was established in the planning stage should be organized systematically in the course of dismantling the NPP. The work breakdown structure is essential to ensuring that all the project scope is identified, estimated and executed. The project manager needs to ensure that a WBS is established early in the project and maintained throughout the project lifecycle. Decommissioning activities that have to progress during the lifecycle of the NPP decommissioning are shown in Fig. 1.

The paper will be explained the current status in domestic and abroad of the WBS as a strategy in order to organize a project management system for decommissioning of the NPP.

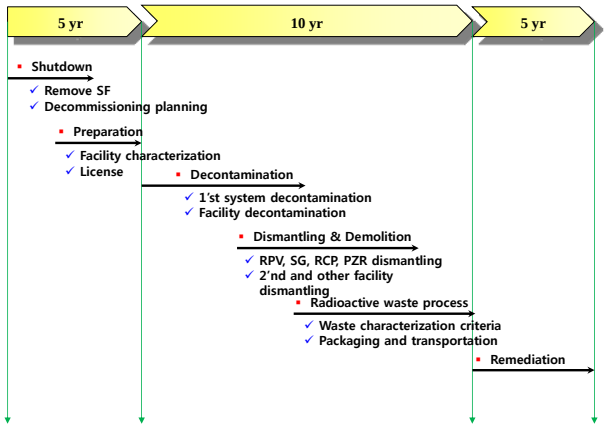

Fig. 1. Decommissioning project lifecycle

2. Methods and Results

2.1 current status of domestic

D&D (Decontamination and Decommissioning) division in KAERI was used the WBS in order to evaluate amount of dismantled waste and decommissioning cost with using data made by KRR-2 (Korea Research Reactor-2, TRIGA-Mark III) [1]. KEPCO E&C (Engineering & Construction) have been developed systematically a system that can process entire of the construction of the NPP to manage procurement management and earned value management through the combination of the PBS (Physical Breakdown Structure) and FBS (Functional Breakdown Structure). KINGS (KEPCO International Nuclear Graduate School) had implemented the WBS with target to nuclear power plant facility using IPS (Integrated Project Schedule) based on the process management of the NPP construction [2].

2.2 current status of abroad

The Forsmark site in Sweden had examples utilizing the WBS to evaluate the NPP decommissioning cost. The cost estimates are divided by WBS levels such as the topmost level, the second level, the third level, and Subsequent levels. And the time schedule has also been structured according to the project WBS. In the study only the one-piece removal of the RPV, these costs are found in personnel costs, operational costs and container costs [3].

ISDC (International Structure Decommissioning Cost) that have been widely used the WBS concept is to calculate costs according to the activities defined in the WBS for the decommissioning project. The WBS organizes the decommissioning activities according to the sequence of work packages defined for planning and managing the decommissioning project. Costs may be determined for elementary decommissioning activities and the resulting cost estimate follows the WBS for the decommissioning project [4].

In the U.S.A, YNPS shut down on October 1, 1991, in response to regulatory uncertainties associated with the integrity of the Reactor Vessel. The Decommissioning Plan was submitted to the NRC on December 20, 1993 and subsequently approved on February 14, 1995. They needs to ensure that a WBS is established early in the project and maintained throughout the project lifecycle. At YNPS an initial WBS was established as part of the Decommissioning

Plan. One of the valuable lessons learned at YNPS was that the cost estimate should to be integrated with the baseline schedule. The latest WBS was refined to meet the needs of completing the remaining decommissioning activities and reflect the scope of designing and implementing a dry fuel storage facility and to provide cost information for a rate case filing. [5].

OECD/NEA has been studied peer reviews, which is a standard co-operative working tool, in the field of decommissioning costing. The organization request that it should include a WBS dictionary which describes the activities associated with each WBS scope of work. For large projects like nuclear plant decommissioning, the WBS can be very detailed and confusing if a roadmap overview is not provided. The facility physical description and characterization data should be followed the WBS format because the radiological and hazardous/toxic material inventory must be identified to accurately represent the conditions that precede and drive decommissioning decisions. And the report provides the reviewer with a checklist to ensure the baseline cost estimate is complete.

Germany had organized an initial planning, cost calculation, real cost management, and time scheduling based on the WBS when shut down the NPP.

2.3 WBS of the decommissioning project management

According to a project management process, stakeholder's requirements should be defined in the initial stage. The WBS is drawn after a detailed document that was defined acceptance criteria and scope and goal of the project management. Input information of the WBS divided into a project management scope technical document, requirements document, organization, process, and budget. Using the WBS template, it is updated the WBS, the WBS dictionary, scope baseline, and project document. Fig. 2 represents a data flow of the WBS that will be applied to a decommissioning project management.

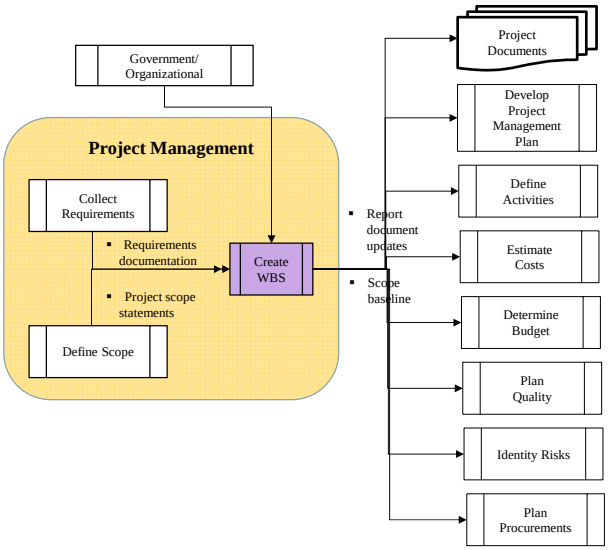

Fig. 2. Schematic diagram of the WBS of the decommissioning project management

3. Conclusions

A project management system is ongoing under the circumstance of having no experience dismantling the NPP. The system related to the NPP decommissioning should have technical criteria as well as regulatory requirements in the full scale of decommissioning stage. In the dismantling stage, decommissioning plan document should include the results of radiation/radioactivity characterization, evaluation of the amount of dismantled waste, calculation of the expose dose rate, evaluation of decommissioning cost and schedule after shutdown. As a strategy for these items to manage, the WBS will be used a basis information. Furthermore, it will be applied with EVMS (Earned Value Management System) related to decommissioning cost.

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