

The Nuclear Power Plant Life-cycle Analysis Considering the Decommissioning Projects

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1. Introduction

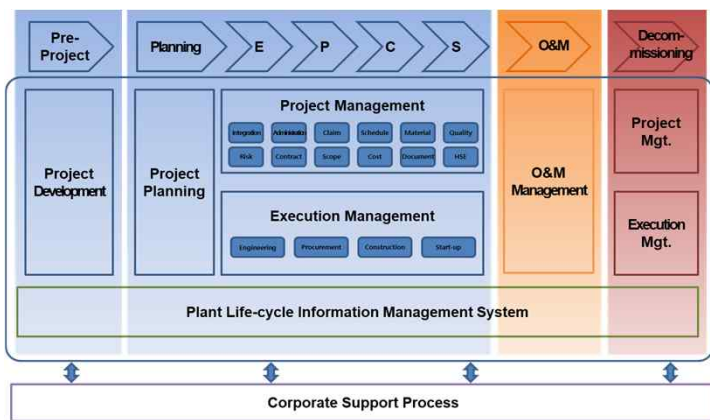
Life-cycle management is meant to manage the information and processes throughout the entire cycle of the plant. The life cycle of a nuclear power plant is divided into planning, engineering, procurement, construction, operation & maintenance, and decommissioning phases. Korea has experience in constructing various type of nuclear power plants and operating multiple units, and is now pursuing a decommissioning project. The project in the field of nuclear facility decommissioning is an area that has not yet been experienced and should be well prepared. There are many studies related to the establishment of a management system and integrated information management focusing on data-driven processes in consideration of the nuclear power plant life cycle. However, it can be assessed that the management focused on the construction and operation phase of the nuclear power plant life cycle [1].

It should be used as an opportunity to complete the nuclear power plant industry system for the entire cycle of ‘construction – operation - decommissioning (waste management)’ of nuclear power plants through the decommission of Kori Unit 1 [2]. This study proposes the nuclear power plant life cycle that includes the decommissioning phase from the perspective of project management through literature review.

2. Methods and Results

According to the decommissioning project promotion strategy, the project management is essential to complete the decommissioning project within the provisions, optimization of the decommissioning schedule and minimizing radiation waste [2]. The nuclear power plant life cycle, taking into account the decommissioning phase of the project management point of view as follows:

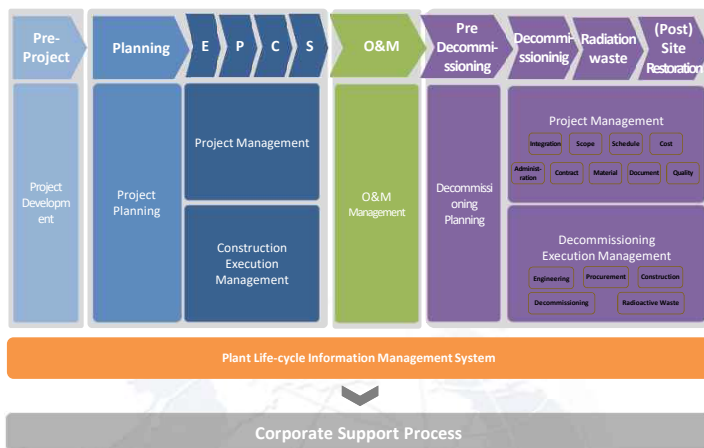
2.1 The Nuclear Power Plant Life Cycle Review



2.2 Analysis of decommissioning phase through literature

Reference	Decommissioning phase
Park [3]	(Project management) ①Pre-decommissioning ②Main decommissioning ③Post decommissioning
Jeong [4]	(Technology classification) ①Decommissioning Engineering ②Characteristic evaluation and safety evaluation ③Decontamination, Cutting and demolition ④Radiation waste management ⑤Site restoration
KINGS [5]	(Decommissioning waste) ①Radiation waste ②Non-radiation waste
Shin [6]	(Decommissioning cost) ①License Termination ②Spent Fuel Management Site Restoration
Jeon [7]	-German Case (1.Order: From outside to inside) ①Removal of the turbine building and related systems ②Removal of the reactor building and related systems, and ③Removal of the nuclear power plant (2.Phase Approaches) ①Operational phase, ②Post operational phase ③Residual operations and dismantling phase - pollution system and parts removal - large structure removal - reactor system removal - residual system and parts removal
Choe [2]	-Kori Unit 1 Case (1. Stage Approaches) ①Safety management stage ②Demolition stage of non-radioactive equipment ③Demolition stage of radioactive equipment ④Site restoration stage (2.Unit process) ① Decommissioning engineering ②Decontamination of system ③Construction and operation of waste treatment facilities/ Decontamination/Demolition ④Cutting and demolition of nuclear reactor facilities ⑤Radiation measurement evaluation and verification ⑥Site restoration

2.3 Proposal of the nuclear power plants life cycle including the decommissioning management



3. Conclusions

In this study, we reviewed nuclear power plant life cycle management processes proposed in the construction advancement plan. Additionally by surveying literature related to the decommissioning project, the entire nuclear power plant life cycle included the decommissioning project was proposed. In the future, additional research is needed on the standards and guidelines for decommissioning regulations, work methods and workload according to the decommissioning technology and equipment development. Based on this, project management from decommissioning technology & method - schedule management - cost management - waste management should be organically linked.

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