Kori-1 Decommissioning Project Expense Evaluation

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1. Introduction

In Korea, a general decommissioning cost per one unit has been estimated (623.7 million US dollars). However, to undertake the decommissioning project for a specific unit in a reliable way, it is necessary to evaluate a decommissioning project expense using site-specific information. Furthermore, in order to manage the project in a detailed and economic manner, decommissioning project expense is based on decommissioning waste quantity and cost estimation similar to those of construction expense. Therefore, this paper describes the methodologies for the evaluation of the project expense for Kori-1, the first commercial Nuclear Power Plant in Korea.

2. Methods & Current States

To evaluate the decommissioning project expense for Kori-1, decommissioning cost computation program is used, which calculates Project Expense for Kori-1 based on decommissioning waste by incorporating Plant Inventory (PI) database and other information as shown in Fig. 1.

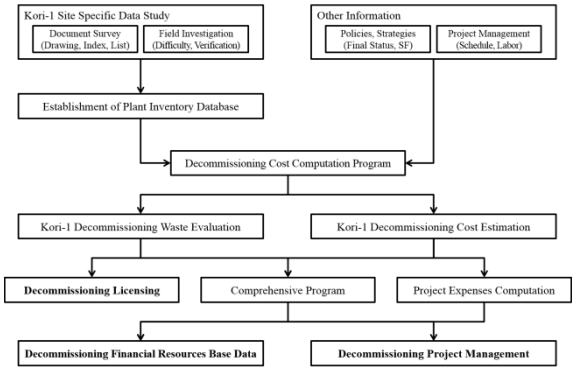

Fig. 1. Process and Applications of Decommissioning Cost.

2.1 Kori-1 Site-specific Plant Inventory Study

2.1.1 Document Survey. Site-specific document survey should be conducted for PI establishment the same as erstwhile decommissioning cost estimation. For Kori-1, some of the essential materials for PI study are depicted in Table 1.

Table 1. List of essential materials for PI study

Type	Essential Materials
Kori-1 Specific Data	Drawings, Construction Report, Indices, Lists, Non-radiological & Radiological Survey data
Other Information	Final Status of Site Release, Schedule & Process, Standard of Construction Estimate

2.1.2 Field Investigation. Field investigation is one of the most important activities that Kori-1 decommissioning project expense differentiated from the existing decommissioning cost in Korea. Main targets of Kori-1 field investigation are listed in Table 2.

Table 2. Targets of Kori-1 field investigation for PI study

Category	Main Target of Field Investigation
Structures	Building (Reactor, Auxiliary, Service, Miscellaneous, etc.), Yard, Structural Steel
Systems	NSSS, CVCS, Reactor Cooling, Main Steam, Feedwater, Fire Protection
Components	Reactor Vessel, Steam Generator, Turbine, Generator, Condenser, Pump, Pipe, Valve, Tank

2.2 Decommissioning Cost Computation Program

Computation program is utilized to process a lot of input and output data as shown in Fig. 2 for Kori-1 decommissioning cost estimation [2]. Investigated Kori-1 site-specific materials and surveyed other information are used as input data in computation program. The computation results, decommissioning waste quantity and cost, reflect to licensing, project expense and etc.

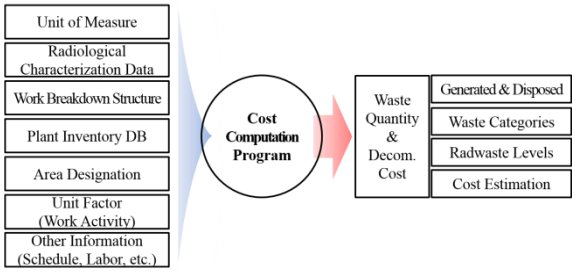

Fig. 2. Input and output in Cost Computation Program.

2.3 Decommissioning Project Expense Evaluation

Differentiated from decommissioning cost, project expense is going to stand on the basis of Cost Breakdown Structure (CBS), a kind of Work Breakdown Structure (WBS). CBS based expense is evaluated with the purpose of easy project management such as fund accounting and service design.

2.4 Conceptual Design on Waste Quantity, Cost and Process Comprehensive Program

KHNP has developed the 3D-based decommissioning waste quantity estimation program using Building Information Modelling (BIM) for Kori-1 [3]. Comprehensive program, linked with cost and process, is being improved from waste estimation program.

3. Conclusions

Different from decommissioning cost, Kori-1 decommissioning project expense is not easily evaluated due to the lack of precedents analysis. However, KHNP tries its best to progress the project expense evaluation in a variety of fields and methods. The ultimate result of project expense evaluation can contribute to the safe and reliable decommissioning for Kori-1. Applications of this investigation are expected to acquire licensing, appropriate service order to supply chains, and effective project management.

REFERENCES

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[3] Kim, J.; Min, B., Development of 3D-based Nuclear Power Plant Decommissioning Waste Quantity Estimation Program, Proc. of the 2016 Autumn Conference, 14(2), Oct. 12-14, Jeju.