

Consideration of ISDC for Decommissioning Cost Estimation

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1. Introduction

Decommissioning cost estimates can be used for a variety of purposes depending on the stage in the decommissioning project lifetime. In the case of estimate before the start of decommissioning project, the main purpose is estimating the total project costs and planning. During the project, cost estimate is performed when the initial plan changes such as changes in manpower consumption or waste treatment. At the end of the project, estimate is aimed at the reduction of dismantling cost through the optimization of schedule based on the previous decommissioning experience. Because the decommissioning project needs the much budget, it has many risks if the cost estimation is performed during the project. After the completion of the project, the cost estimation results evaluate the first estimation as the reference index of the success.

The main purpose of the cost estimate is to vitalize designers and client organizations in order to establish overall project costs. The reliable cost estimation system is required to satisfy the relevant authorities and stakeholders because the procedures for licensing approvals of nuclear facilities are complicated. Cost estimates should be based on the format, content, practice, and requirements of the past estimates. Comparison with other estimates for similar facilities improves the confidence in the veracity of estimates along with the verification of the decommissioning process.

To address the above issues, the "Yellow Book"[1] was published in 1999 as a joint initiative of the OECD Nuclear Energy Agency (NEA), the International Atomic Energy Agency (IAEA), and the European Commission (EA). Ten years later, in 2009, they decided to update the Yellow Book, and began to update it by analyzing user experiences. They found that several countries have adopted the proposed standardized cost structure for the production of cost estimates directly or for mapping national estimates onto a common structure. They also made conclusions that more detailed advice should be given on the use of the standardized structure and on the definition of cost items to avoid ambiguity. The revised cost structure, to be known as the International Structure for Decommissioning Costing (ISDC)[2], was published in 2012. The standardized cost structure developed in the report may be used for estimating the costs of decommissioning of any type of nuclear facility.

We analyzed this standardized cost structure (ISDC) and applied it to DECOMMIS[3] which was developed

by KAERI. The appropriate estimation system for domestic application was examined by comparing the estimation results.

2. Structure of ISDC

ISDC was proposed as the new cost structure that contains the following three functions.

1. Reconfiguration and redefine of decommissioning activities item that general decommissioning strategy and decommissioning process in IAEA.
2. Provide a general cost structure of all kinds of nuclear fuel cycle facilities, laboratories and other facilities, including installation.
3. Major classification of activities related to waste management, such as the risk of separation and the traditional characteristics of the waste, treatment, storage, processing and transportation management to provide the latest radiation reflected IAEA waste classification[4].

This standard items of decommissioning activities on the three-level hierarchy to represent the basic activities can be found at the 3 level which was composed with 1,2 level group activities and typical activities representations.

The cost associated with each activity, as shown in Figure 1 may be sub-divided according to the four cost categories. The labour cost, investment costs, expenses, and contingency. And it also detailed as labor cost, labor related items, investment capital, equipment and material costs, expenses for project management and the contingency cost which from risk situation if accidents or emergency could be estimated.

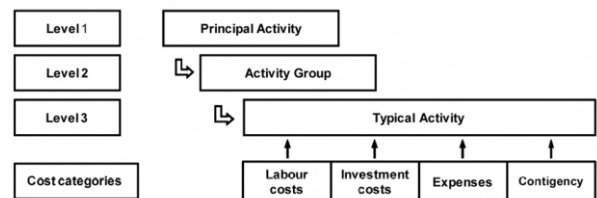


Fig. 1. Hierarchical structure of the ISDC

At the highest level I is divided with 11 principal items of activities as 1.Pre-decommissioning actions, 2.Facility shutdown activities, 3.Additional activities for safe enclosure or entombment, 4.Dismantling activities within the controlled area, 5.Waste processing, storage and disposal, 6.Site infrastructure and operation, 7.

Conventional dismantling, demolition and site restoration, 8.Project management, engineering and support, 9.Research and development, 10.Fuel and nuclear material, 11.Miscellaneous expenditures.

The level 2 was composed the sub-step items of level 1 activities by the group which is from each of the major activities. The level 3 shows a further sub-division of activities. This below figure 2 shows the classification of the levels.

Level 1	Level 2	Level 3	Activity	Labour cost	Investment	Expenses	Contingency	Total cost	User-defined data extensions
01	01.0100		Pre-decommissioning actions						
		01.0101	Decommissioning planning						
		01.0102	Strategic planning						
		01.0103	Preliminary planning						
		01.0200	Final planning						
		01.0201	Facility characterisation						
		01.0202	Detailed facility characterisation						
		01.0203	Hazardous-material surveys and analyses						
		01.0203	Establishing a facility inventory database						
	Etc.								
02			Facility shutdown activities						
03									
04									
05									
06									
08									
09									
10									
11									
Total									

Fig. 2. Structure of the presentation platform for the standardized listing of costs

2.1 Comparison with DECOMMISS

DECOMMISS (DECOMMissioning Information management System) is established at the mid time of the KRR-2 decommissioning activity processing as a computer system and creating a unique code for project management. The KRR-2 Decommissioning work was being performed for the first time in Korea. So, the WBS (Work Breakdown Structure) code which for the cost estimation items in DECOMMISS based on other country's experienced one. Therefore, there is a universal difference from ISDC and mapping between the DECOMMISS WBS code and ISDC structures. In order to solve this problem, perform the tasks mapped to a code in the WBS code to ISDC items.

2.2 Mapping methods and result

The finding items from the daily report result of the KRR-2 decommissioning activities at the site that corresponding tasks in the WBS code is first. And it need also find the same work history which is related activity in the code of ISDC through the same text keyword mapping. The mapping results the WBS code to FAC (Facility Code) code in order to find detail specifications that performed. By mapping the results can be seen in Figure 3, and it shows the unit cost that corresponds to each item on the standard price per unit work productivities. In addition, the classification of each item, depending on the work activity code of the

DECOMMISS defined the decommissioning cost estimation categories.

Fig. 3. Apply ISDC to DECOMMISS

3. Conclusions

KAERI made WBS code in DECOMMISS and data obtained during decommissioning work of KRR2 & UCP. Recently the IAEA updated the decommissioning cost items and its structure by ISDC. The cost estimation items of the DECOMMISS were applied to ISDC structure. For applying, the ISDC code compared with WBS code of DECOMMISS as on text of the activity name from daily report basis. The mapping result of the ISDC items to WBS code of the DECOMMISS is much different. AS results of this study that it need the corresponding cost category which classified in accordance with the national standard price estimates.

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