Considerations for Nuclear Power Plant Decommissioning Project Management and Areas to be Managed

Hyung-woo Seo [a*], Sang hyun Lee[a], Ji-hwan Yu[a], and Gi-lim Kim[a]
[a]*Korea Hydro & Nuclear Power (KHNP) Central Research Institute, 70, 1312-gil, Yuseong-daero, Yuseong-gu, Daejeon, 34101, Republic of Korea*
[*]*Corresponding author: sehywo1727@khnp.co.kr*

1. Introduction

For licensees who have no experience in dismantling nuclear facilities, there will be some considerations in order to manage the decommissioning project efficiently. In Korea, we have experience in project management in the field of NPP (Nuclear Power Plant) construction and operation, and from this, there will be parts that will be applied to the decommissioning project. However, decommissioning project needs to reflect its unique characteristics different from the existing construction and operation, and the management area and project management based on these considerations will have to be made. Therefore, this study aims to present matters to be considered and management areas for the decommissioning project based on international guides and references.

2. Methods and Results

This section describes some considerations related to decommissioning project management presented in IAEA safety standards and some other related technical documentations.

2.1 Differences between decommissioning and operational states

The NPP decommissioning project is to dismantle on a large scale after permanent shutdown of systems, structures and components that have been built and operated during the construction and operation phase. The decommissioning of such large nuclear facilities will proceed differently from various viewpoints, and in general, important considerations can be describe as follows [1].

- Planning strategy
- Safety
- Work approaches
- Staffing
- Organization and management while preparing
- Organization and management during transition
- Organization and management for active phase
- Organization and management for safe enclosure
- Organization and management for remediation
- Spent fuel and waste storage routes

These important considerations may be due to the fact that the decommissioning of nuclear facilities is different from the operational management system. The difference between decommissioning and operational states can be elaborated as shown in the table below.

Table I: Differences between Decommissioning and Operational States [1]

Decommissioning	Operations
Temporary design life of structures to assist dismantling	Permanent design of structures for operation
Safety management systems based on decommissioning tasks	Safety management systems on operating nuclear facility
Control based on as-built structures	Control based on drawings
Reduced safety risks but changing situation	Significant safety risks but permanent and routine
Management of changing situation during decommissioning	Management of steady state during operation
Reduced administrative infrastructure	Steady state administration infrastructure
Retraining staff for new activities	Routine training and refresher training
Visible end of employment-refocus their work objective	Permanent employment with routine objectives
New or developing regulations/regulatory requirements	Established and developed regulations for operation

2.2 Project Management Guidance

Project management guidance available worldwide that can be referred to will be IAEA publications. In particular, GSR Part 2 (Leadership and Management for Safety) provides guidelines applicable to decommissioning projects. Selected requirements from GSR Part 2 and their applicability to nuclear facilities project management is summarized in IAEA publication [2]. Among these requirements, matters to be considered in relation to decommissioning can be established, and in particular, it will be possible to review parts that need to be newly or supplemented as they are distinguished from other nuclear projects.

Table II: Selected GSR Part 2 Requirements Related to Nuclear Project Management [2]

Requirement	Applicable to project management
Requirement 1: Achieving the fundamental safety objective	Requires licensees to ensure the fundamental safety objective
Requirement 2: Demonstration of leadership for safety by managers	Requires managers to demonstrate leadership and commitment to safety
Requirement 3: Responsibility of senior management for the management system	Requires senior management to establish, sustain and continually improve a management system for safety
Requirement 4: Goals, strategies, plans and objectives	Requires nuclear power project goals to not compromise safety
Requirement 5: Interaction with interested parties	Requires that communication with interested parties
Requirement 6: Integration of the management system	Requires systems to address safety, health, security, quality, human and organizational factors
Requirement 7: Application of the graded approach to the management system	Graded approaches are to be documented that take into account safety significance and complexity
Requirement 8: Documentation of the management system	Requires the management system for a nuclear project be documented
Requirement 9: Provision of resources	Requires resources such as individuals, work environment, knowledge, information, suppliers, material and financial resources
Requirement 10: Management of processes and activities	Requires project processes and activities to be developed
Requirement 11: Management of the supply chain	Requires arrangements to be in place with vendors and contractors
Requirement 12: Fostering a culture for safety	Requires individuals in organization
Requirement 13: Measurement, assessment and improvement of the management system	Requires management systems to enhance safety performance
Requirement 14: Measurement, assessment and improvement of leadership for safety and of safety culture	Requires senior management to regularly commission assessments

2.3 Areas to be Managed in Nuclear Projects

The areas of management that normally be considered and contents considered in an example case are summarized in following table.

Table III: Areas to be managed between guideline and an example

Areas to be considered in nuclear project [2]	An example case in decommissioning [3]
▪ Integration ▪ Scope ▪ Time ▪ Cost ▪ Quality ▪ Human resources ▪ Communications ▪ Stakeholders and interested parties ▪ Risk ▪ Procurement ▪ Health, safety & environment ▪ Lessons learned and operating experience	▪ Dismantling planning ▪ Exposure dose evaluation ▪ Dismantling support ▪ Health and safety ▪ Decontamination management ▪ Human resource and procurement ▪ Surveillance & security ▪ Radwaste management ▪ Radwaste storage & final repository

3. Conclusions

In Korea, decommissioning of nuclear facilities will be implemented in the near future and differentiation will be required from projects undertaken in existing operations and construction. In order to prepare and carry out a successful decommissioning project, IAEA guidelines, related publications and cases of overseas prior decommissioning experience must be reviewed. In this study, factors to be considered in nuclear projects and the contents of management areas were investigated. A case that actually experienced decommissioning was also reviewed, and the management areas were compared. We hope that these contents can be utilized as basic data on factors and areas to be managed while preparing for nuclear decommissioning project.

REFERENCES

[1] IAEA, Organization and Management for Decommissioning of Large Nuclear Facilities, Technical Reports Series No. 399, International Atomic Energy Agency, VIENNA, 2001.
[2] IAEA, Management of Nuclear Power Plant Projects, No. NG-T-1.6, International Atomic Energy Agency, p.15, 2020.
[3] I. H. Chou, C. F. Fan, Development Integrated Decommissioning Information Management System (IDIMS) of Nuclear Facilities, Journal of Nuclear Science and Technology, 2012.