Relationship of Project Management Risk and Radiological Safety during the Decommissioning of Nuclear Facilities

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Introduction

➢ The triple constraints of project management - scope, schedule, and cost - are in conflict with each other, and if one thing changes, it affects the other. In addition, the balance between the three factors affects the quality of the project. Project risk management identifies and manages factors that affect project elements to ensure compliance with the quality of the project, and radiation safety management can be viewed as part of project quality management in nuclear decommissioning projects. Therefore, this study briefly identified the relationship between decommissioning project risk and radiological safety factor.

Methods & Results

Factor 1 : Characteristics of the exposed population • Gender / Age / Health status / Sensitive groups / Habits	•Physical status •Radiological status and characterization •Status of waste and materials •Site characteristics	Initial condition of facility
Factor 2 : Characteristics of the exposure ▪ Distribution of exposures in time and space ▪ Number of individuals ▪ Minimum/Maximum/Mean individual dose ▪ Statistical deviations ▪ Collective dose associated with ranges of individual doses ▪ Likelihood of potential exposure ▪ Pre-existing radiological conditions	•Definition of the end state of the project •Difficulty in achieving the end state	End state of decommissioning project
	•Waste management policy •Waste estimation and characterization •Waste management infrastructure	Management of waste and materials
Factor 3 : Social considerations and values ▪ Equity ▪ Ability to control ▪ Sustainability ▪ Intergenerational consideration ▪ Individual benefit ▪ Social benefit ▪ Level of information/know-ledge held by those exposed ▪ Social trust	•Organizational structure •Human resources	Organization and human resources
	•Cost •Funding	Finance
	•Management of contractors and suppliers •Contractor and supplier oversight	Interfaces with contractors and suppliers
Factor 4 : Environmental considerations ▪ Impact on fauna and flora ▪ Impacts on climate	•Decommissioning strategy •Decommissioning scenarios •Technology	Strategy and technology
Factor 5 : Non-radiation hazards	•Laws and regulations •Licensing process	Legal and regulatory framework
Factor 6 : Technical and economic considerations for protective options ▪ Feasibility ▪ Costs ▪ Uncertainties	•Radiological safety •Conventional safety •Security	Safety
Factor 7 : Political aspects	•Communication •Involvement of interested parties	Interested parties
Factor 8 : Regulatory constraints		

✓ **Optimization attribute factors of radiological safety and decommissioning project risk families are similar in most factors.**
✓ **The risk management could affect radiological safety during decommissioning.**
✓ **The clearer the identified risk prompts, the more detail the factors that need to be considered to optimize radiation exposure.**
✓ **When doing optimizing decision, the hazard-related information could be obtained from the safety assessment, and other information related decommissioning project could be found in the risk assessment register data (e.g. cost-benefit analysis).**

Conclusion

➢ Using the information and experience investigated would manage the possible risks in the decommissioning project. Risk management could also prevent or mitigate the negative effects of unexpected events. However, the decommissioning project is a large-scale and long-term project, making it difficult for the person in charge to consider radiation protection to grasp all of this information alone. Thus, in addition to the exposure environment and technical aspects, project managers could further optimize the exposure of decommissioning workers and improve quality if they constructed an information provision scheme to selectively consider recognizable triggers from the project's risk perspective.

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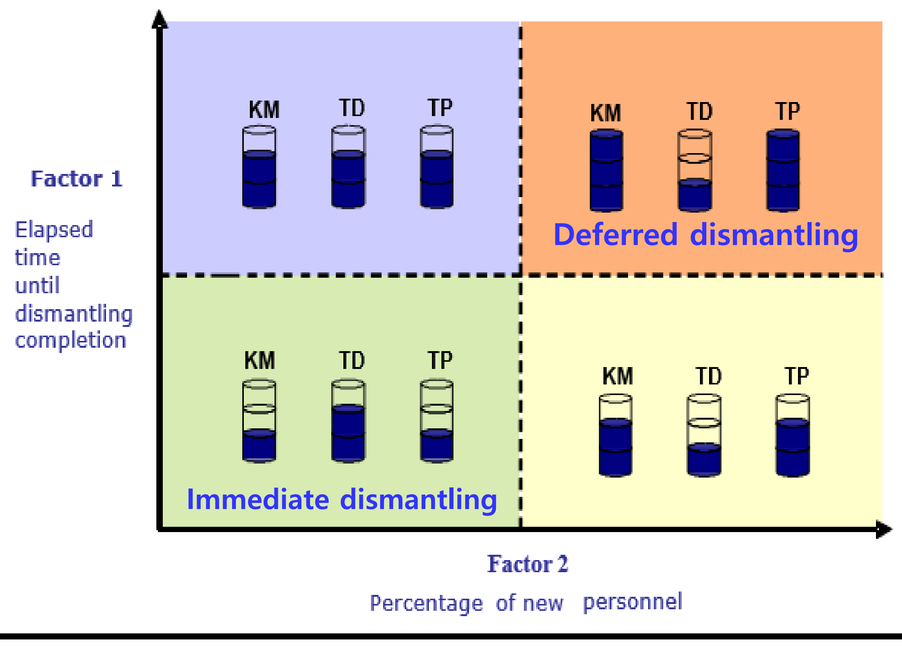
Introduction

➢ In Korea, Each Nuclear Power Plant(NPP) has a different operating period. According to the energy policy and dismantling strategy, decommissioning schedule of each unit is expected to proceed in various way. At the time of each NPP decommissioning project, proper human resource management and training are needed in consideration of this background. Therefore, this study identified the necessary educational and training requirements for management of decommissioning personnel.

Methods & Results

Decommissioning Training Requirements

- **KM** : Retention of knowledge
- **TP** : Training on aspects relating to the configuration & operating history of the plant
- **TD** : Training on specific aspects of decommissioning



Training on aspects Relating to the Configuration & Operating history of the plant

✓ **Customized training**

= Effective tool for communicating information

- Updated configuration of the facility
- Installation operational history
- Inventory of radioactive wastes
- Inventory of non-radioactive hazardous wastes
- Updated radiological characterization of the facility

Retention of Knowledge

Complexity

✓ Decommissioning = Large-scale Project Management
✓ Knowledge Management
: from Construction to Decommissioning

Correct Categorization → DATA ← Digitization

Information is available **in a timely manner** during Decommissioning period

Training on specific aspects of Decommissioning

✓ **Decommissioning-specific training**

✓ **Focused thinking for the decommissioning culture**

Decommissioning Feature	Training Emphasis
One-off activities / Use of temporary structures to assist dismantling	Focus on individual tasks & achieving goal
Project completion orientated management objectives	Focus on project management skills & completion culture
Much smaller stable resource pool topped up as/when required using highly mobile contractors	Focus on ensuring and maintaining a reliable supply of fully competent workers & contractor management
Changed nature of radiological risk, industrial risk more significant	Focus to ensure correct blend of training to cater for both industrial & radiological risk issues
Working environment can be uncertain	Focus on pre-job preparations, job hazard analysis & risk assessment

Conclusion

➢ The requirements for training are variable depending on the life cycle of each NPP and the requirements for manpower input. Therefore, training plans for decommissioning should be established in consideration of their strategies and human resource conditions. It improves the quality of members of the decommissioning project and ensure that they have the capabilities appropriate for the purpose. Proper teamwork formation and communication will improve the quality of the decommissioning project.

➢ Furthermore, considering the timing of decommissioning projects for each facility, the next nuclear facility project will be more successful if relevant industries continue to manage appropriate knowledge and human resources during the period between individual decommissioning projects.

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