

Development of Level 1 Schedule for Nuclear Power Plant Decommissioning Project in Korea

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1. Introduction

With the arrival of the permanent shutdown of Kori Nuclear Power Plant unit 1, scheduled in June 2017, the decommissioning is emerging as one of the hottest social issues. In preparation for it, this paper presents the overall project schedule at top-tier level through a comprehensive review on the anticipated tasks, interdependencies, business conditions and surroundings of the whole decommissioning process.

2. Main Discussion

2.1 Activity Listing

As the activities for this top-tier schedule, the work category and items of level 1 and 2 in the draft Work Breakdown Structure for NPP decommissioning developed previously by the author are adopted [1]. The activities consists of 8 items such as Decommissioning Planning and Licensing, Permanent Shutdown, Characterization and Environmental Evaluation, Decommissioning Engineering and Preparatory Works, Decontamination and Dismantling, Waste Management, Site Restoration, and Project Management. These items are subdivided into second level according to their own characteristics as shown in the left column of Fig. 1.

2.2 Project Milestones Setting

In order to manage large-scaled projects over a long period of time, the operation of project milestones has been believed to be very essential for the successful project control. The project milestones in Table 1 are incorporated into this top-tier schedule.

Table 1. Project Milestones, draft [2]

▪ Submit Operation Change Request	
▪ Operation Change Permit / Permanent Shutdown	<Key Milestone>
▪ Complete Characterization	
▪ Submit Draft Decommissioning Plan	
▪ Submit Decommissioning Permit Request	<Key Milestone>
▪ Start Interim Storage Facility Operation	
▪ Decomm. Permit / Start Decont. & Dismantling	<Key Milestone>
▪ Complete Transportation of Spent Fuel to Interim Storage Facility	
▪ Complete Large Components Removal	
▪ Complete Remaining System and Components Removal	
▪ Complete Building Demolition	
▪ Complete Site Restoration and Final Status Survey	
▪ Complete Decommissioning	<Key Milestone>

2.3 Duration of Major Steps in Each Phase

- Decommissioning Planning and Licensing Phase
 - Decommissioning Plan needs to be drafted within 4 years after the permanent shutdown, and then Decommissioning Permit Request shall be filed, through the public review process including public hearing, within 5 years after the permanent shutdown.
 - Planning tasks such as D&D scenario development, cost estimates, waste management planning, etc. need to be completed 1 year before submitting of Decommissioning Plan.
- Permanent Shutdown Phase
 - 2 years are given for plant permanent shutdown, drainage, drying, and removal of system fluids and operational waste.
- Characterization and Environmental Evaluation Phase
 - As the result of this phase is needed for decommissioning planning, it needs to be done within 2 years after the permanent shutdown.
- Decommissioning Engineering and Preparatory Works Phase
 - Primary system decontamination is carried out right after the permanent shutdown. Modification of the existing utilities, building structures and boundary security facility follows, and waste management facility is installed.

- The design and licensing of the spent fuel storage facility is carried for two years, and 2 years are given for its manufacturing and installation.
- Decontamination and Dismantling Phase
 - 6 months are given for the mobilization, purchase and testing of various equipment.
 - 9 months for the dismantling of the Steam Generator, Reactor Cooling Pumps and pressurizer, 15 months for Reactor Vessel Internal segmentation, and 12 months for the cavity drain and drying are assumed respectively.
 - Demolition of buildings and yard structures starts 1 year after the commencement of

component removal and finishes in 3 years after the component removal.

- Waste Management Phase
 - The waste management proceeds in parallel with the dismantling work.
- Site Restoration
 - After the building demolition, the demolition of remaining facilities, site decontamination, environmental restoration work and final status survey proceeds for 1 year, followed by the submitting of decommissioning completion report and deregulation process for another one and half years.

2.4 Level 1 Schedule, Draft

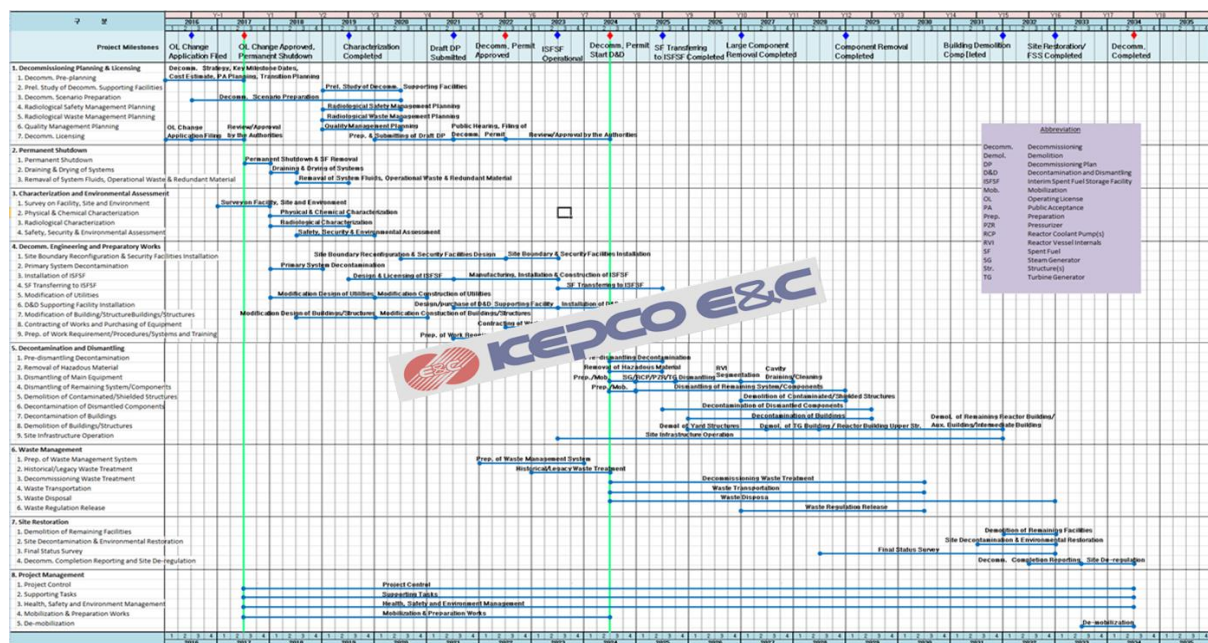


Fig. 1. Project Top-tier Schedule for NPP Decommissioning (Level 1), draft.

3. Conclusion

This paper introduces the top-tier overall schedule for the whole phases of the decommissioning project in Korea with a view to provide overview of the decommissioning sequence and duration.

Henceforward, this schedule is expected to be elaborated through the discussion by relevant parties on the various aspects including contract structure, spent fuel interim storage facility, applied decontamination technology, dismantling method, licensing requirement, site release criteria, etc.

REFERENCES

[1] Wanil Jung, Yong Beom Kwon, and Byung-sik Lee, "Development Direction of Work Breakdown Structure for Nuclear Power Plant Decommissioning Project", Journal of Power Engineering, Vol. 66, 2015.

[2] Wanil Jung, Yong Beom Kwon, and Jai Hoon Jung, "Development of Draft Project Milestones for Nuclear Power Plant Decommissioning Project", Proceedings of the KRS 2016 Spring Conference, 2016.