

Dismantling Process Development of the General Equipment/System of Nuclear Power Plant

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1. Introduction

Dismantling work can be roughly classified into dismantling of main equipment, dismantling of other remaining equipment/system and demolishing of buildings/structures. Among them, the dismantling of other remaining equipment/system is relatively easy in terms of difficulty of work, worker's risk and radiation protection compared to main equipment dismantling work. However, it is necessary to analyze the work order of each floor/area in consideration of the overall work quantity, type and work environment, and to establish a more efficient work schedule by applying a standard dismantling process that can be formalized.

Therefore, this paper proposes a standard dismantling process for these works and a work order for each floor/area of the main buildings in order to establish a detailed schedule for dismantling work of all other remaining equipment/system of Kori Unit 1.

2. Scope of Service

The scope of general equipment/system dismantling is to demolish large/small bore piping, electric cable, tray, conduit, measurement equipment and all the other equipment (pumps, HVAC, motors, transformers, pipes, etc.) except main equipment (reactor, steam generator, turbine, etc.). The processes such as preparing/submitting/obtaining of licensing documents related to dismantling of general equipment/system, removing the spent nuclear fuel, demolishing the structure and restoring the site will be managed by a separate schedule module.

3. Work order by floor and area

The order of dismantling of general equipment/system by working area should be designed to maximize the efficiency of dismantling work and to minimize interference to work by area. Basically, the work for the floor starts at the power

plant ground level (20ft) and proceeds upward and downward concurrently to facilitate carrying in and out of the dismantling equipment and waste. The work order for each area starts from the area where it is easy to get in and out of each floor, and the work progresses gradually toward the area far from the entrance.

The order of work for each floor/area of the main building is as follows, and the order of work for other buildings follows the general process of dismantling work from the lower floor to the upper floor.

3.1 Reactor Containment Building (RCB)

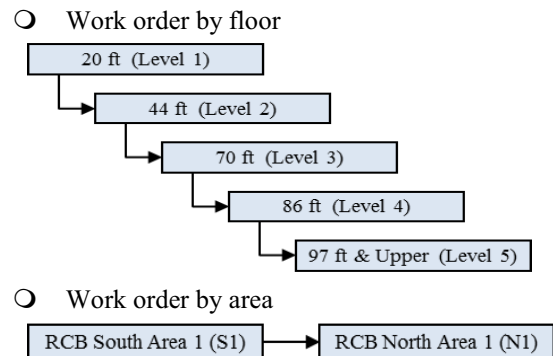


Fig. 1. Reactor Containment Building (RCB).

3.2 Primary Auxiliary Building (PAB)

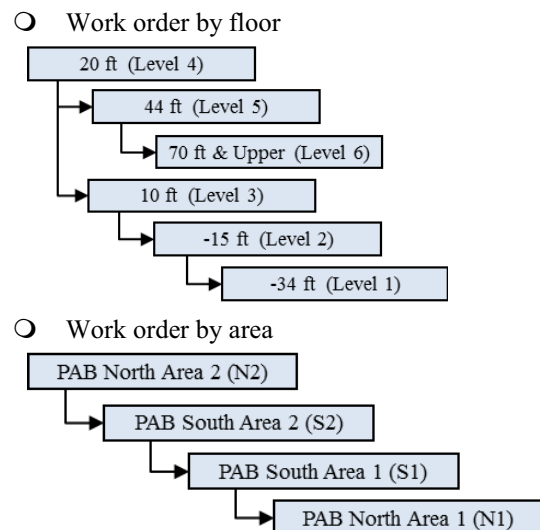


Fig. 2. Primary Auxiliary Building (PAB).

3.3 Turbine Generator Building (TGB)

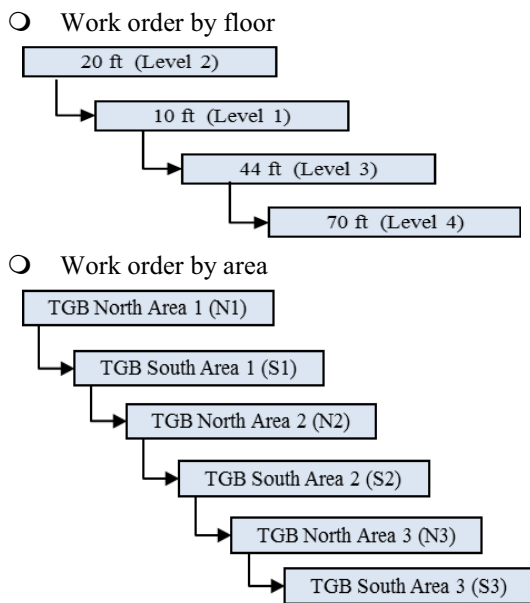


Fig. 3. Turbine Generator Building (TGB).

4. Standard logic for dismantling of general equipment/system

The order of dismantling of general equipment/system in each floor and each area of the buildings is forecasted to vary widely depending on the site conditions such as equipment complexity, density, accessibility, free space availability and radiation risk of each work area. And the standard logic diagram of dismantling work was created as shown below. It is expected that this standard logic can be modified in various ways such as change between predecessor and successor activity, concurrent execution of each detailed work considering site conditions, and it should be complemented by continuous review.

In particular, hazardous materials such as asbestos, which are included in some equipment and systems, are the main factors causing delays in the dismantling process, so they should be closely examined during the preparation of dismantling work areas and reflected in the work schedule.

In addition, the duration for each activity is calculated as follows considering the Work Difficulty Factor (WDF) that reflects the work environment conditions.

$$\text{Duration for each activity} = \text{Quantity} \times \text{WDF} [1]$$

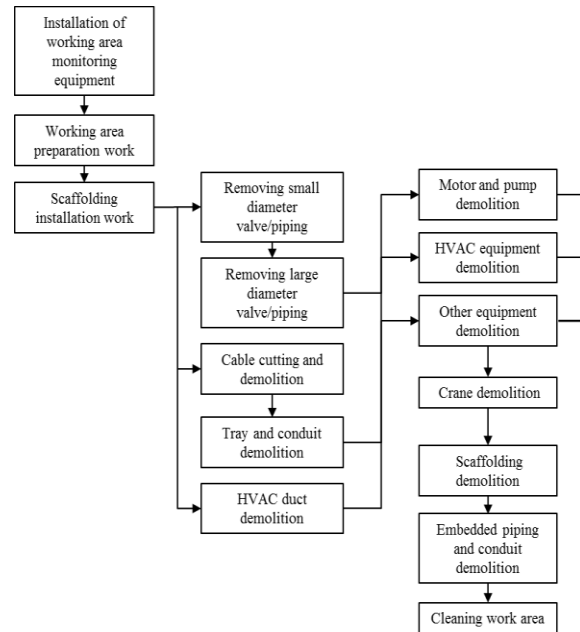


Fig. 4. Standard Logic Diagram.

5. Conclusion

This paper describes the process for dismantling general equipment/system based on the limited Kori Unit 1 data. Therefore, it is necessary to revise the order of dismantling works by each floors/areas in this paper by obtaining information on the current status of the Kori Unit 1, such as actual dismantling quantity, contamination degree, the location of the waste treatment plant, the minimum space for work, securing of temporary passage, and so on.

Also, in order to calculate the required duration for each unit work, the detailed basis of Unit Cost Factor on which it is based should be reviewed, and the work group composition, work speed, work efficiency and work detail order should be reviewed.

In conclusion, this paper will be useful in understanding the dismantling sequence of general equipment/system of nuclear power plant and using as basic scheduling standard.

REFERENCES

- [1] AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates" (1986).
- [2] EPRI, "Maine Yankee Decommissioning Experience Report" (2005).