

# Risk Management of Large Component in Decommissioning

Kyung Ku Nah, Tae Ryong Kim

KEPCO International Nuclear Graduate School

## Introduction

In Korea, the operation of KORI #1 has been scheduled to be faced with end of lifetime in several years and Wolsong #1 has been being under review for extending its life.

Decommissioning is the final phase in the life-cycle of a nuclear facility and during decommissioning operation, one of the most important management in decommissioning is how to deal with the disused large component. Therefore, in this study, the risk in large component in decommissioning is to be identified and the key risk factor is to be analyzed.

## Method and Results

### 1. Literature Review

The average score of each risk was used for risk significance score.

$$R_{xy}^z = \frac{1}{n} \sum_{y=1}^n r_{xy}^z = \frac{1}{n} \sum_{y=1}^n p_{xy} i_{xy}^z$$

x=ordinal number of risk; y=ordinal number of valid respondent  
z=ordinal number of project objective;

$r_{xy}^z$  = significance score assessed by respondent y for the impact of risk x on project object z;

$p_{xy}$  = likelihood of occurrence of risk x, assessed by respondent y;

$i_{xy}^z$  = impact of risk x on project objective z, assessed by respondent y

n=total number of valid respondent;

$R_{xy}^z$  = significant score for risk x on project object z.

### 2. Identification of risk factor

Total risk factor for dealing with large component in decommissioning was summarized 56 items.

Classification	Regulatory	Technical	Safety	Economic	Public Acceptance
Decommissioning	3	4	5	2	2
Transportation	3	4	1	5	2
Waste treatment	3	3	3	3	1
Disposal	2	4	3	2	1
Subtotal	11	15	12	12	6
Total	56				

### 3. Data Collection

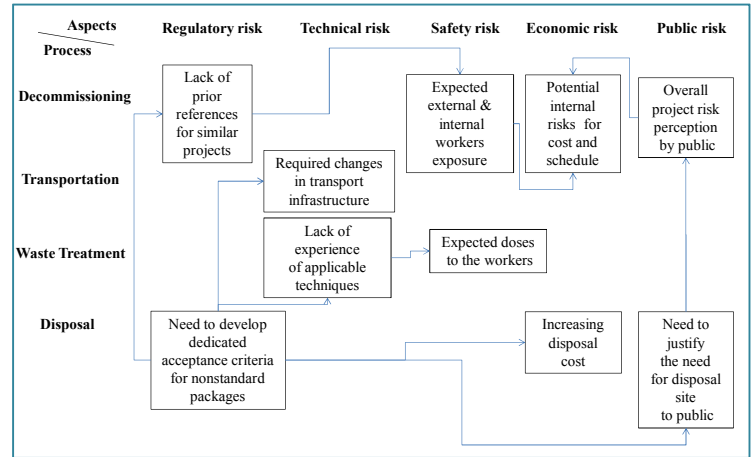
The Questionnaire form on the risk management awareness for large component in decommissioning was distributed to 25 people who have worked at the area of nuclear power plant.

### 4. Analysis of data result

Two high risk factors marked highest values of score index were prioritized among 5 each aspect based on survey results.

Type of Risk	Summary of Mean			
	P(a)	D(b)	Score Index	
i) Regulatory and licensing risk				
- Decommissioning				
1	Lack of prior references for similar projects	0.636	0.362	0.195
- Disposal				
11	Need to develop dedicated acceptance criteria for nonstandard packages	0.62	0.352	0.219
ii) Technical and operational risk				
- Transportation				
8	Required changes in transport infrastructure	0.604	0.32	0.194
- Waste treatment/interim storage				
9	Lack of experience of applicable wastetreatment techniques/processes (decontamination, segmentation, volume reduction, etc.)	0.584	0.346	0.196
iii) Safety and ALARA risk:				
- Decommissioning				
1	Expected external and internal workers exposure	0.654	0.494	0.302
- Waste treatment/interim storage				
7	Expected doses to the workers due to treatment processes	0.548	0.418	0.228
iv) Economic and scheduling risk:				
- Decommissioning				
1	Potential internal risks for cost and schedule (high cost for advanced cutting technology, process of decommissioning delay, etc.)	0.638	0.306	0.195
- Disposal				
11	Increasing disposal costs, including design, licensing, new process development and investment in new facilities	0.612	0.31	0.19
v) Public acceptance and stakeholder risk:				
- Decommissioning				
1	Overall project risk perception by public	0.66	0.48	0.317
- Disposal				
6	Need to justify the need for disposal site to public	0.612	0.366	0.218

Then, correlation analysis was used to perform to draw key risk which makes a great impact on other risk factors



The risk "Need to develop dedicated acceptance criteria for nonstandard packages" of disposal process was accessed as a key risk. It meant that if the criteria were not set for large components in disposal, the preceding process in decommissioning could not move forward and even though it does it would face critical problem.

## Conclusion

Developing dedicated acceptance criteria for large components at disposal site was analyzed as a key factor. Acceptance criteria applied to deal with large components like what size of those should be and how to be taken care of during disposal process strongly affect other major works. Therefore, considering insufficient time left for decommissioning of some NPP, it is absolutely imperative that those criteria should be laid down.