Searching for Methods on Evaluation Alternatives and Studying Decision Making System Regarding Enhancing Publicity of Nuclear Spent Fuel

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1. Introduction

The government is planning to organize 'Publicity Enhancement Committee' in 2013 in order to search alternative ways of the management of nuclear spent fuel, based on the public bond of sympathy. According to this, this study was done in order to anticipate the aspect of publicity enhancement on nuclear spent fuel so that it can find the evaluation methods of alternative ways of management which could applied actually and make the decision making system of Publicity Enhancement Committee in advance.

In Korea, the nuclear spent fuel is temporarily stored inside of the nuclear facility field, and it is expected that Gori nuclear facility is going to be saturated since 2016 but the solutions are still incomplete. The problem of management of nuclear spent fuel is an important issue in terms of not only the nuclear power policy but also of safe management of the already made nuclear spent fuel.

2. Methods and Results

In order to precede the research, we have drawn evaluation criteria of management alternatives after analyzing domestic and foreign examples of nuclear spent fuel management ways of and consulting the professional. With the criteria, we distributed survey on the general public and the related parties, and performed the experimental survey of simulation of Publicity Enhancement Committee so that we decided the order of priority of the evaluation criteria.

In order to find the system of decision making of Publicity Enhancement Committee, we have analyzed the cases of public conflicts, briefing, public hearings, charrettes, citizen juries, and performed the experimental survey on four ways of publicity enhancement methods as simulation of Publicity Enhancement Committee. In addition, through having interview with the professionals and the related parties, we have collected the consults on the decision making system.

2.1 Finding evaluation criteria on management alternatives of nuclear spent fuel

In order to find the evaluation criteria on management alternatives of nuclear spent fuel, firstly, we have researched the domestic and foreign cases of evaluation criteria on management alternatives of nuclear spent fuel throughout the book research and collected the documents. Throughout internal discussion, we have set the first criterion. In specific, we have looked through the final land selection criteria of CoRWM in UK, DOE/RW in USA, NWMO in Canada and Sweden. Also, we have analyzed the researched performed in Korea, such as 'Making Managing Alternatives and Developing Roadmap of Nuclear Spent Fuel (2011)' and 'A Research on Making Management of Alternatives on Nuclear Spent Fuel Publicity Enhancement (2012)'

On the criteria we set throughout these book researches, we have performed a feasibility study by the professionals, and the evaluation criterion 1 is drawn as following.

Table I. Evaluation Criterion of Management Alternatives on Nuclear Spent Fuel

Category	Criteria
Safety	Level of Threats to Health (Is there a possibility that the facility will generate severe threats to personal health?)
	Level of Threats to Ecology (Is there a possibility that the facility will generate severe threats to regional ecology?)
	Effective Range (Is there a number of local governments that may be under influence from transportation processes?)
Security	Level of Physical Security (Will the facility be safely protected from physical attacks?)
	Level of Online Security (Will the facility be safely protected from online attacks?)
Feasibility	Technology Capability (Are proper technologies retained for the safe facility operation?)
	Budget Capability (Will sufficient budget be secured for the safe facility operation?)
	Infrastructure Capability (Is the facility supported with proper infrastructures including roads and ports for safe transportation processes?)
Resilience	Situational Coping Capability (Will the effects from any possible accidents be minimized?)
	Environment Restoring Capability (Will the environment be perfectly restored from any possible accidents?)
	Adaptation of Policy and Regulation (Will the demand of policy change from social conflicts be embraced?)
Sustainability	Fairness to the next generation (Will burdens on the next generation be minimized?)
	Fairness to the local communities (Will continuous reimbursement be made for the local communities under any type of risk?)

2.2 Public Survey

With the evaluation criterion, we performed general public mobile survey on March 15th, 2013. The subjects are 600 general public who were selected throughout quota sampling according to sex and age.

As a result of researching the priority order of the five evaluation categories, it is shown as follow: Safety(29.81%)>Feasibility(20.79%)>Security(18.09%)>Resilience(16.47%)>Sustainability(14.84%). There was no big gap among the age groups.

Safety category was regarded importantly throughout 20~30 age group, and feasibility was throughout 50~60 age group, compared to the other age groups. The 10-age group highly evaluated the resilience and sustainability, compared to the order generations.

2.3 Survey on the Related Parties

With the same survey papers of the above, we have performed the survey on the core related parties who directly or indirectly affect the policies of nuclear spent fuel.

Except for the unanswered or less-answered papers, 24 survey papers were collected and analyzed.

The result shows: Safety(31.11%)>Feasibility(23.33%)>Sustainability(16.11%)=Restorability(16.11%)>Security(13.38%). The priority on safety and feasibility was same as the survey of the general public.

Throughout the survey, it can be found out that the general public and the related parties both think safety as a basic premise on the evaluation of management alternatives on nuclear spent fuel.

Table Ⅱ. Evaluation of Priority Order of Management Alternatives

Priority	Evaluation Criteria	General Public	Related Parties
1st	Safety	29.81%	31.11%
2nd	Feasibility	20.79%	23.33%
3rd	Security	18.09%	Each 16.11%
4th	Resilience	16.47%	
5th	Sustainability	14.84%	13.38%

*Converting into percentage after adding up the priority score

2.4 Simulation Investigation on Publicity Enhancement Committee

We have performed an Simulation investigation in order to analyze the characteristics of Publicity enhancement methods of management on nuclear spent fuel.

The subject group was chosen to be (under)graduate students group, but this group was limited to the major of nuclear energy studies, engineering and humanities and the ones who had experience in environmental organization activities, in order to easy the representation role of the five related parties.

The experiment methods are briefing, public hearings, charrettes and citizen Juries, in order to arrange fairly regarding the degree of information offering, exchange of the ideas with the related parties and agreement degrees, etc.

Table Ⅲ. Comparison on Experiment Methods

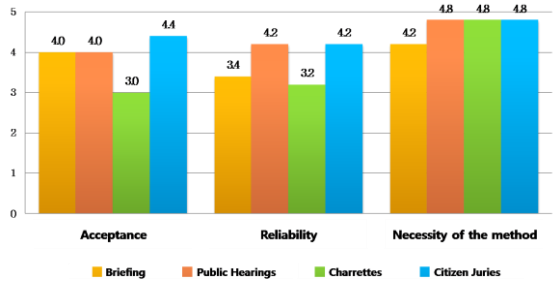
Category	Degree of Information offering	Exchange of the Ideas	Agreement on the conclusion
Briefing	Low	No	No
Public Hearings	High	No	No
Charrettes	Low	Yes	No
Citizen Juries	High	Yes	Yes

*Converting into percentage after adding up the priority order score

With the capacity, satisfaction and necessity degrees of nuclear spent fuel which were drawn through the methods, the score was set based on the 5 points.

As a result, the citizen juries was highly evaluated in terms of capacity and credibility. On the other hand, charrettes was low rated in terms of capacity and credibility. However, it is appeared highly in regard to the necessity of the method.

Fig. 1. Simulation Research Conclusion Graph



Throughout the experiment, it is found out that as the level of information offering is high, the capacity and credibility are improved. Also, rather than the charrettes which only verifies the different ideas of the related parties, the capacity and credibility are high in regard to the citizen juries which draws out a certain conclusion all together.

3. Conclusions

This study has its meaning to draw the evaluation criteria of the management alternatives on nuclear spent fuel which can be applied in Korean case, and to find the necessity of verifying the evaluation of management alternatives through Publicity Enhancement because of different stands according to the interests.

As a result, rather than technological engineering safety evaluation, qualitative analysis in terms of social costs, quantitative evaluation in terms of economic costs, this study advises the methods of public hearings and citizen juries which are effective, which makes it meaningful.

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