

Uncertainty in Risk and Social Decision Making: A case study of nuclear safety regulation

*Tatsujiro Suzuki¹

1. Research Center for Nuclear Weapons Abolition, Nagasaki University

Social decision making on Risk

Any science and technology has potential risk on society. How large risk society can accept is, of course, a decision by the society. But any risk assessment has inherent uncertainty. How to deal with such uncertainty must be clarified in social decision making process. Otherwise, such decision making will not gain enough public trust.

Risk assessment is typically done by scientific/technical experts. It is often the case that there are wide disagreements on the result of risk assessment. At the end, however, experts who are involved in decision making play critically important role, it is essential that there is social trust in those technical experts and the process in which final decision is made. Especially, there should be a clear understanding on how to deal with such uncertainty.

Next, decision on “acceptable risk” must be made. It is often the case that risk does not be eliminated to zero, it is necessary to decide how much risk can be acceptable. This decision cannot be done only by scientific/technical experts. It is desirable that users of such science/technologies, or stakeholders who would be exposed to such risks, would be involved in such decision making. It is often difficult, in reality, to involve such actors in decision making, and thus decision made by the regulatory authority sometimes is not socially acceptable.

In short, 1) there is always uncertainty in risk assessment and thus it is important to have trust in experts involved in decision making and in the decision making process, 2) since risk cannot be eliminated to zero, decision on “acceptable risk” had better to involve stakeholders in addition to scientific/technical experts. In order to gain public trust, transparency of such decision making is essential.

Issues on Nuclear Safety Regulation (Basis earthquake ground motion)

From viewpoints made above, let us discuss social issues associated with nuclear safety regulation, in particular on basis earthquake ground motion. The following is a brief description of what happened in the case of Ohi nuclear power plant licensing process.

Assessment of basis earthquake ground motion during the licensing process of Ohi nuclear power plant was done based on conventional “Irikura/Miyake method” by both Kansai Electric and regulatory authority (Nuclear Regulation Authority: NRA). And NRA decided that it satisfied the regulatory standards and that allow operating license for Ohi nuclear plant.

However, earthquake expert such as Prof. Shimazaki, pointed that such decision was inappropriate considering new data from Kumamoto Earthquake in 2016, and that the prediction by Irikura/Miyake method had too much uncertainty to make a decision.

NRA confirmed its own decision despite the argument made by Prof. Shimazaki, saying his argument was based on “biased data setting”. And declared that there is no need to change its decision on Ohi nuclear power plant.

This case illustrates the various important issues involved in uncertainty in risk assessment and how to deal with such uncertainty.

First, there are disagreements over the “new data” based on the Kumamoto Earthquake. According to Dr. Hiroyuki Fujiwara, an expert on earthquake movement, “it is necessary to consider such uncertainty...prediction based on the ‘Irikura/Miyake method’ may show too much width (uncertainty),

and it is not clear how regulatory process deals with such wide uncertainty.” On the other hand, NRA said that uncertainty is considered by taking account of the length of geological fault during the process of assessment.”

In addition, such disagreements over the risk assessment were linked to the social decision on restart up of Ohi-reactor. As a result, it generated social mistrust, including a speculation that NRA wanted to avoid reevaluation of decision to allow restart up of Ohi. Lack of transparency between the risk assessment and the final decision to allow restart up the reactor may be the reason of such speculation and mistrust. It is essential to involve non-technical experts as well as stakeholders in such decision making.

Conclusion

Based on the above example, it can be concluded that 1) when there is a disagreement among experts in risk assessments, especially on uncertainty, it is important to make clear how such uncertainty can be deal with during the decision making, 2) when the risk assessment can lead to larger social decision making, it is important to clarify the criteria of such decision making and to have enough transparency in decision making. It should be recognized that enough trust cannot be gained only by scientific/technical experts and thus there is a need to involve other important stakeholders as well.

Keywords: risk assessment, uncertainty, social decision making, public trust