

Case Study Activities for Nuclear Security Culture Development in JAEA

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ABSTRACT

In Japan, about 10 years have passed since the law obligated nuclear operators to develop and maintain a nuclear security culture. During this period, the global nuclear situation has changed significantly, and it is becoming increasingly important to maintain a stance that emphasizes compliance with regulations and nuclear security culture.

In JAEA, the policy of legal compliance and developing nuclear security culture is determined by the president of JAEA. For compliance with regulations and developing nuclear security culture, many activities are carried out at both the headquarters and each of six nuclear sites based on that policy. Finally, these activities are evaluated and improved it every year.

Case study is the one of activities that can obtain skills for legal compliance and developing nuclear security culture, such as sensitivity of nuclear security risks, correct understanding of the laws. The procedure for the case study was created with reference to a method called KY-Training which is often applied to safety training program in Japan. KY-Training is a training that participants (groups) can reach the conclusion how to respond to cases through four questions. Firstly, participants are given illustrations and descriptions which has potential of nuclear security risks. Then, participants make discussion according to four questions. Questions are given following viewpoints: I) raising the issues, II) focusing on one, III) predicting what would happen, and IV) considering what to do. Consequently, participants can effectively become aware of nuclear security risks.

In the 2022 case study, we prepared 23 cases so that they can select choose freely according to role of participants such as in charge of nuclear security, guards, general employees. Finally, participants are asked to fill a questionnaire to evaluate effectiveness of case study. The result of questionnaires indicated that the case study was able to lead to improvement sensitivity of nuclear security risks and correct understanding of the laws.

Overall, case study results suggested that JAEA's efforts were implying sufficiently to develop and maintain a nuclear security culture.

INTRODUCTION

In Japan, it has been about 10 years since an amendment of laws and regulations in 2012 obligated for operators to foster and maintain a nuclear security culture [1]. During this period, the situation surrounding nuclear energy in Japan and abroad has also changed significantly, and it is becoming increasingly important to maintain a stance that emphasizes compliance with regulations and nuclear security culture.

JAEA has developed an annual plan that effectively combines the top-down and bottom-up activities listed below to ensure compliance with laws and regulations and to foster and maintain a nuclear security culture, and the PDCA cycle is run with continuous evaluation and improvement.

- Message from the President
- Patrol and exchange of information by senior management
- Walkdown patrols by the head of the site, etc.
- Case study
- Voluntary improvement through PPCAP (Physical Protection Corrective Action Plan) activities
- Assessment conducted by headquarters

This report presents a case study to increase the sensitivity of awareness of nuclear security risks, which was newly started in FY 2021, one of the legal compliances and culture building activities related to nuclear security conducted by JAEA headquarters.

Case study is efforts to develop skills for legal compliance and nuclear security culture, as well as sensitivity for employees to become aware of nuclear security risks themselves, based on cases at each facility and headquarters, and by examining these cases, acquire skills for legal compliance and developing a nuclear security culture.

It could overlook the potential of nuclear security risks when operations are conducted with a lack of awareness of nuclear security. For this reason, from the viewpoint of nuclear security, it is important for employees to become aware of nuclear security risks as soon as possible, and treat it before affect the performance of security measures. Therefore, we conducted case study with the aim of increasing the sensitivity of awareness.

1. PROCEDURE

In this case study, case study materials were prepared at the JAEA headquarters, and the case study activity was conducted at 9 relevant sites (six nuclear sites and headquarters, etc.). At each site, groups are formed according to the materials to conduct case studies. After conducting case study, each site submitted a report of the results to headquarters. Based on these reports, headquarters evaluated overall of case study activity.

Details of these procedures are provided in the following sections.

1.1. Procedure manual

Headquarters prepared a procedure manual to ensure that all groups could conduct case studies. The facilitators of each group that mentioned in section 1.3, followed this procedure manual and conducted group discussions.

1.2. Case study materials

A wide variety of 23 cases were prepared so that case studies could be conducted in any kind of job (in charge of nuclear security, security guards and office workers). The cases provided were those related to nuclear security in their work. For example, cases for in charge of nuclear security were related to the operation of equipment and information management,

cases for security guards were related to patrols and the confirmation of belongings, and cases for office workers related to handling of ID cards.

JAEA has six nuclear security sites, and there are many types of facility such as research reactor, use facilities, reprocessing facilities, etc. There are also differences in protective measures because structures are different among these facilities. Taking advantage of this feature, we prepared a wide variety of cases so that those who participate in the case studies could have opportunity to see many cases.

In addition, case study materials were prepared with reference to KY-Training, which is conducted as part of safety education in Japan, in order to enhance sensitivity of awareness. In the KY-Training, participants discuss given illustrations and description to increase their sensitivity to risks in their work. The questions were also prepared with reference to KY-Training from four point of view: I) raising the issues, II) focusing on one, III) predicting what would happen, and IV) considering what to do. Discussions were carried out along with case description and four questions, ultimately they reached one conclusion. Examples are shown in Figure 1-a and Figure 1-b.

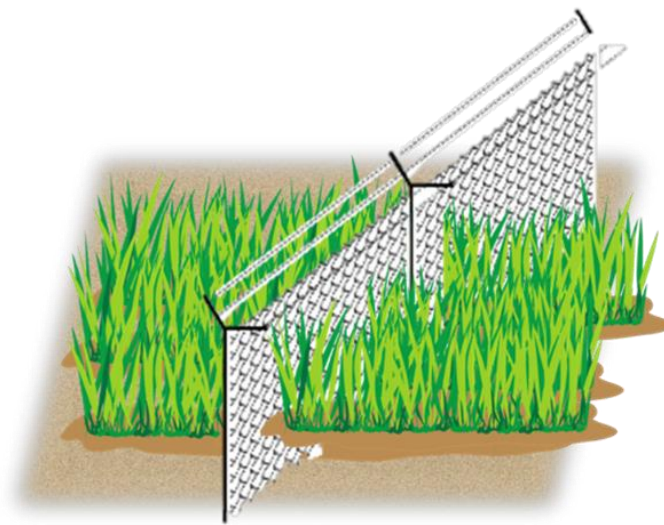


Figure 1-a Example of case study

Situation: Weeds about the height of a person grew around the fence surrounding the nuclear material protection facility.



Figure 1-b Example of case study

Situation: Mutual inspection with metal detectors is being conducted at the entrance of the protected area to ensure that there is no unauthorized removal of nuclear material. One person was definitely inspected, but the details of the other person's head, arms, and feet were not thoroughly checked.

Each group discussed one or more of the 23 cases, including the two examples mentioned above, and discuss the following questions within the group. Note that the questions are common to all cases.

Questions

Q1: Please list all the security issues you noticed in this situation. (raising the issues)

Q2: Among the issues listed in the previous question, which one is the essential problem in this case? Please choose one point. (focusing on one)

Q3: What would happen if the issues listed in the previous question are left unaddressed? (predicting what would happen)

Q4: Based on the above, how should we respond to this situation? (considering what to do)

1.3. Group formation

Case studies are typically conducted in a group setting. In order to effectively achieve the objective of enhancing awareness and sensitivity to nuclear security risks, it is important for all participants to engage in discussions. To facilitate these discussions, we have decided to adopt a small group approach, with up to about six participants, and recommend appointing a facilitator to lead the discussion, and include a manager in the group to provide guidance.

1.4. Conduct case studies

Each group selected one or more cases from the 23 cases prepared by the headquarters and discuss them in accordance with the procedures and questions (Q1-Q4) outlined in section 1.1 and 1.2.

1.5. Confirmation of discussion

After all questions have been answered, the group referred to the example answers prepared by headquarters. These examples include brief descriptions of the situation and example answers to each question. The group reviewed the examples to identify any new insights or major mistakes, and share them with the group. However, the sample answers are not intended to constrain each group's discussion, but rather to be used only as a reference.

1.6. Evaluation by each group

After completing the case study, the facilitator prepared a report and submitted it to heads of section responsible for nuclear security. The report includes a questionnaire form, as shown below, for evaluating the case study.

Q1: Do you think that this case study, your sensitivity to awareness has improved and can be linked to improvement activities for nuclear security measures? (Yes/No/Don't know)

Q2: Do you think it was worthwhile to conduct this case study? (Yes/No)

1.7. Evaluation in each site

The heads of section responsible for nuclear security at each site evaluated the effectiveness of the case study based on the questionnaire results from each group, as outlined in section 1.6. They prepared a report in an open-ended format and submit it to headquarters.

1.8. Evaluation in headquarters

The headquarters evaluated the case studies based on reports from each site. The

evaluation indicators were as follows:

- Aggregated results of questionnaires in section 1.6
- Results of evaluation by the head of each site in section 1.7

As shown in 1.2, total of 23 case studies were prepared so that conducted in any kind of job (in charge of nuclear security, security guards and office workers). However, because this case study is a new attempt, only who in charge of nuclear security were required as the subjects and aggregated for evaluation.

2. RESULTS AND DISCUSSIONS

A case study was conducted at 9 sites, including 6 sites and headquarters, involving a total of 322 participants (57 groups) engaged who in charge of nuclear security. In FY2021, 208 individuals (44 groups) participated, an increase of 114 individuals (13 groups). The increase in the number of participants and groups is thought to be due to the growing establishment of case study activities from the previous fiscal year.

2.1. Results

The results of the questionnaire mentioned in section 1.6 for each group are as follows.

Table 1 Result of questionnaire (number of responses)

Survey content	FY2021 Results	FY2022 Results
Q1: Do you think that through this case study, awareness sensitivity can be improved and lead to actions to improve protective measures? (Yes/No/I don't know)	Yes: 44 No: 0 I don't know: 0	Yes: 57 No: 0 I don't know: 0
Q2: Do you think it was worthwhile to conduct this case study? (Yes/No)	Yes: 44 No: 0	Yes: 57 No: 0

Table 1 shows that all groups responded positively to both Q1 and Q2.

The results of the evaluation conducted in Section 1.5 (free description) were compiled from the heads of sections responsible for nuclear security at each site. We have summarized the free description comments in the following table.

Table 2 Contents of evaluation (number of responses)

Evaluation Contents	FY2021	FY2022
This case study was valid. (We were able to achieve the objective of this case study, "heightened sensitivity of awareness").	9	9
Enhanced understanding of protective measures	2	3
We were able to review the protection measures at our own site.	3	3

As shown in Table 2, positive responses were obtained from all 9 sites, suggesting that this case study was effective as increase awareness of nuclear security risks.

Additionally, since 3 evaluations each of "Enhanced understanding of protective measures" and "We were able to review the protection measures at our own site." were obtained, it can be considered that this was an effective activity for acquiring skills for compliance with laws and regulations, and for developing a nuclear security culture. This is thought to be because a variety of case study materials were provided, as described in Section 1.2. This enabled

discussions on topics beyond the participants' own facilities.

3. FUTURE WORKS

The case study was a new initiative, and therefore, it was mandatory for those in charge of nuclear security to participate while security guards and general employees participated voluntarily. Based on these results, it was found that this case study method is an effective technique for enhancing awareness sensitivity. To promote compliance with laws and regulations and to foster the nuclear security culture, it will be considered to gradually expand the scope of case study participants to include all general employees in the future.

4. CONCLUSION

In order to increase awareness sensitivity to risks related to nuclear security, we developed a case study method based on the KY-Training program, which is conducted as part of Japan's safety training. To take advantage of the benefit of having various facilities in JAEA, we created a total of 23 cases so that participants could see a wide variety of situations.

We implemented this method targeting who in charge of nuclear security at each site (security guards and general employees participated voluntarily). As a result, it was evaluated as an effective activity to achieve the objective from all site. Furthermore, we obtained evaluations that it deepened the understanding of nuclear security measures and enabled participants to review their own nuclear security measures. We consider that it was also effective as an activity to acquire skills for complying with laws and regulations related to nuclear security and promoting the culture.

From these results, it can be considered that the case study method is an effective technique for enhancing awareness sensitivity. To promote compliance with laws and regulations related to nuclear security and to foster the nuclear security culture, we will consider gradually expanding the scope of case study participants to include all general employees in the future.

References

[1] Japan Atomic Energy Commission, White Paper on Nuclear Energy 2021 (in Japanese), p. 140.