

Survey Analysis on Nuclear Security Culture Recognition of Nuclear Facility in 2014

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1. Introduction

It is emphasize that the importance of Nuclear Security Culture in a variety of an international treaty and recommendation such as Convention on the Physical Protection of Nuclear Material(CPPNM), Nuclear Security Series (NSS) No. 13(INFIRC/225/Rev.5), Nuclear Security Series (NSS) No.7 and so on. All organizations involved in implementing physical protection should give due priority to the security culture, to its development and maintenance necessary to ensure its effective implementation in the entire organization. It is specified that 'The foundation of nuclear security culture should be the recognition that a credible threat exists, that preserving nuclear security is important, and that the role of the individual is important' in nuclear security series.

In this context, Korea Institute of Non-proliferation and Control(KINAC) confirms recognition about protection of people who work in nuclear field and developed questionnaire for utilizing fundamental data for nuclear security culture enhancement activity and conducted a survey.

2. Questionnaire amendment for nuclear security culture recognition level

2.1 Questionnaire amendment direction

For more effective questionnaire than the existing that, we revised questions which were clarity, the possibility of evaluation, understanding ease and importance.

2.2 Acceptance of opinion for questionnaire amendment

First of all, it was revised that all employees in Korea Hydro & Nuclear Power Co.(KHNP) are to be responded about questions of questionnaire. For example vague and comprehensive questions were modified by a specification, clear questions and an easy-to-understand sentence for respondents of nuclear facility.

In addition, there were many comments on the minimum questions because many questionnaires could be increased the fatigue of the respondents and had an

impact on survey participation rate and evaluation result. And external experts have not special comments about configuration and method on index calculation but as well as employees of nuclear facility have commented.

2.3 Result of survey amendment

2.3.1 Survey structure and content

Dimension of the revised questionnaire is composed of four the same as conventional.

- Beliefs and attitudes: An individual's recognition and attitude for nuclear security.
- Operating system: Organization of the system for a nuclear security, regulatory and infrastructure and general operating system.
- Leadership: Actions of managers and executives of the organization affect the nuclear security.
- Personnel actions: Work behavior of all members affects the nuclear security.

3. Nuclear security culture recognition research

3.1 Promotion system

- Survey amendment: 2014 survey has been developed based on 2013 survey result analysis and acceptance of an opinion of employees and experts.
- Survey design and performance: The online survey was conducted for about two weeks after selection of survey division and design of questionnaire sample.
- Result derivation: Responded data was verified and then calculated the nuclear security culture recognition level and shared results of vulnerability and improving measures and so on.

3.2 Score calculation method

Nuclear security culture recognition index was calculated as the average of the four-dimensional score (Beliefs and attitudes, Operating system, Leadership and Personnel actions). All questions are designed by a 5 points scale. In order to help understand the exponential and the analysis of the evaluation, in terms of score of 100 points analyzed as following equation (1). Dimension score was derived by applying a scaled score of 100 points to overall question. The conversion

score of 100 points was applied to dimensional overall questions and, the results of correlation analysis of between dimensional overall questions and detailed questions, the score of overall questions could be applied to dimension score because the result was analyzed to be statistically significant by 0.01 levels. Nuclear security culture recognition index was calculated as average of four dimension scores. It showed that the gap between results analyzing dimension average values was not large after measuring with 5 points scale whether survey questions are important factor in nuclear security and nuclear security culture by internal opinion

Therefore, with the analysis that all dimensions are important factor in nuclear security and nuclear security culture, nuclear security culture recognition index was reflected in even rate without applying dimension weight.

- Conversion equation

$$\text{Conversion equation of total 100 points} = (\text{respond value})/4*100 \quad (1)$$

- Conversion score of detailed respond value

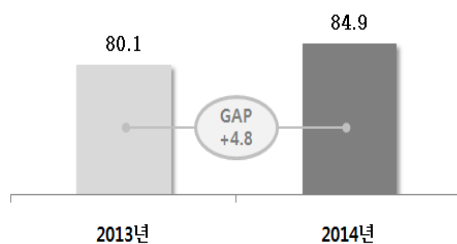
- 1 point = 20 point → Never
- 2 point = 40 point → No
- 3 point = 60 point → Normal
- 4 point = 80 point → Yes
- 5 point = 100 point → Very yes

3.3 Nuclear security culture recognition level research analysis

858 employees of all of KHNP 2014 responded to nuclear security culture recognition survey. Case by age, '30~40s' employees were accounted for more than 50%. Case by position, 'director' who is more than deputy head of department is accounted for 30.2%, 'worker' who is less than deputy head of department is 69.8%. 'licensee' employees were accounted for the best part by 97.7%. Especially 'Kori nuclear division' employees took part in 52.6% of total.

4. Results

4.1 Year on year analysis



2014 nuclear security culture recognition level score of employees in nuclear facility rose 4.8 points year on year and that was 84.0 points.

4.2 Responder characteristics analysis

4.2.1 Age analysis

It has trend that the older increases that the recognition is higher. '20s' recognition was the lowest by 80.5 points, '30s' was 81.3 points, '40s' was 88.0 points and 'more 50s' was 88.4 points.

4.2.2 Position analysis

The score of 'director' is 5.5 points higher than 'worker' as 88.7 points. The case of 'worker' was 3.8 points higher than the last but was lower than 'director'. However, the gap of between 'director' and 'worker' decreased than the last by 7.9 points to 5.9 points.

4.3. Dimensional comprehensive analysis

The result of dimensional comprehensive analysis results for 2014 nuclear security culture recognition is that 'Personnel actions' score was the highest by 87.6 points, the rest of dimensions show similar level by approximately 84 points. Dimension score order is 'Personnel actions' (87.6 points) > 'Leadership' (84.1 points) > 'Operating system' (84 points) > 'Beliefs and attitudes' (83.9 points). Every dimension increased than the last year.

5. Conclusion

2014 nuclear security culture recognition research result is that 'Beliefs and attitudes' of every dimension showed the lowest level. As a result, systematic education needs to employees. Choosing differentiated topic is required to consider employees because recognition level of age, position and division is different. And a variety of education technology as obligatory education such as filling the course time or the one-off thing has limitation. And taking complementary measures needs since there were many opinions that employees feel difficult to understand papers such as regulation and guidelines and so on related security. Finally, we hope to make fundament available to evaluate nuclear security culture recognition level based on the existing questionnaire would be changed to realistic and enhancement in recognition survey for future nuclear security culture

Besides we will lead activity participation by implementing workshop for nuclear facility employees, share survey result after complement of that and try to enhance concern for nuclear security culture.

REFERENCES

[1] IAEA, Amendment to Convention on the Physical Protection of Nuclear Material (CPPNM), 2005.

[2] IAEA, INFCIRC/225/Rev.5, "The Physical Protection of Nuclear Material and Nuclear Facilities", Jan.2011.pp.15