A public awareness improvement of nuclear energy by correcting wrong information

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< Introduction >

The general public began to take some interest in nuclear energy with the trend of de-nuclear since the South Korean government's declaration of de-nuclear policy in 2017. The public's interest in the field increases rapidly as soon as they hear negative news that can be a threat to their health or daily life. The main route for non-professional to learn about nuclear energy is through the internet. However, they are repeatedly exposed to exaggerated and wrong information by civic groups advocating de-nuclear, finally the perception of nuclear energy is changing negatively. Thus, if exaggerated and wrong articles or claims on the Internet are collected and refuted by majors and delivered to the public, it could make a great contribution to improving public awareness of nuclear energy.

< Methods and Results>
- Creating Fear of NPP Accidents -

<Chernobyl Accident>

Some civic organizations raised questions about the safety of nuclear energy, arguing that **at least 200,000 people were killed** in the Chernobyl accident and **millions suffered from radiation exposure**, along with calling for speeding up de-nuclear policy.

However, according to a report written by the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the actual number of victims is same as below.

Additionally, '**Effect of Acute Disease in Long Period**' in the '**Type of Death**' was confirmed that there were cases that were unrelated to radiation exposure among the causes of death.

Type	Victims	Type of Death	Death
Plant Worker	134	Excessive Exposure	28
		Effect of Acute Disease in Long Period	19
Public	About 6000	Thyroid Cancer by I-131	15 (by 2005)

Table 1. The actual number of victims in Chernobyl accident

<Fukushima Accident>

In fear of the wider range of radioactive contamination after the Fukushima accident, exaggerated and wrong information is spreading indiscriminately in neighboring countries, as well as the Japanese people.

A Korean professor who claims to be de-nuclear cited PNAS's data and claimed that about 70 % of the land is colored, so **70 % of Japan's land is contaminated by radioactivity**. And in the process of spreading it to the public, a **'Fake radioactive map' was created in which all the colored parts of the data were painted black.**

However, according to 'Actual radioactive map' provided by the PNAS, this data does not refer to all of the painted areas as seriously contaminated areas.

So, depending on the type of color, **it is necessary to distinguish the areas that maintain the same level as the soil's radioactive concentration before the accident.**

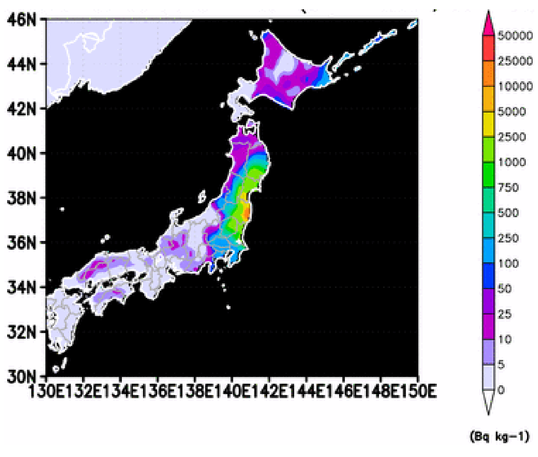

Fig 1. The actual radioactive map provided by the PNAS

Fig 2. The fake radioactive map circulating on the internet

< Methods and Results>
- Creating Fear of Radiation Exposure -

<Difference in risk between natural and artificial radioactive materials>

The non-professional public sometimes thinks that artificial radioactive materials made in nuclear facilities and nuclear tests are more dangerous than natural radioactive materials present in nature.

However, whether it is natural or artificial radioactive materials, it affects the human body by exposure to radiation (ex. beta-ray, gamma-ray, etc.) that is not the substance itself. **So the nature of radiation from artificial radioactive materials or natural radioactive materials is the same.**

As a result, the effects of radioactive materials on the human body are related to the total amount of energy transferred by the radiation emitted, whether natural and artificial radioactive materials are not.

<Difference in exposure dose limit between general public and workers>

The Nuclear Safety Act differs from the dose limit of the general public and radiation workers. The reason for the separation of the public from the radiation workers in radiation protection is **whether they have intentional exposure**.

In addition, the most significant difference between exposure to radiation workers and exposure to the public is **the presence of 'agree of understand'** to understand and agree to that exposure, and differences arise at the level of acceptance of risks.

Therefore, the public was conservatively set at 1 mSv per year because it was impossible to manage exposure and **included radiation-sensitive children**.

Also, Radiation workers were set at 100 mSv for five years, within the range of not exceeding 50 mSv per year, because they were able to manage exposure.

Type	Dose Limit	The presence of 'Agree of understand'	The possibility of 'Managing exposure'
Radiation Worker	100 mSv/5y (< 50mSv/y)	Yes	Yes
Public	1 mSv/y	No	No

Table 2. Dose Limit of Radiation Workers and General Public

< Conclusion>

The exaggerated and misleading information spreading to the non-professional public has been scientifically refuted from the perspective of a major through this project. The project is expected to improve the perception of nuclear energy that is currently spreading to the public, while contributing significantly to the possibility of objective thinking and judgment that is not biased to either side when the public looks at the de-nuclear policy.

< References>

[1] "Gyeongnam Environmental Organization, 32nd year of Chernobyl, 200,000 dead. We need to get out of the nuclear power plant", Yonhap News, last modified Apr 24, 2018, accessed Mar 15, 2021, https://www.yna.co.kr/view/AKR20180424103800052?input=1195m.

[2] UNSCEAR Report, Evaluation of Data on Thyroid Cancer in Regions Affected by The Chernobyl Accident, Source and Effects of Ionizing Radiation, p. 9-13, 2008.

[3] "Japan, the Land of the Dead [Korea, Why is it De-Nuclear? Part 1]." YouTube video, 27:20, posted by "Deeper10," September 28, 2017, https://www.youtube.com/watch?v=XLFB06M371c&t=820s.

[4] "The seriousness of radioactivity in Japan", ezday, last modified Sep 11, 2013, accessed Mar 15, 2021, http://www.ezday.co.kr/bbs/view_board.html?q_sq_board=5275226.

[5] Cesium-137 deposition and contamination of Japanese soils due to the Fukushima nuclear accident, PNAS April 30, 2013 110 (18), p. 7525-7528.

[6] Article 2(4), the Enforcement Decree, the Nuclear Safety Act.