

Environmental radioactivity monitoring around the Jeongeup ARTI in 2008

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1. Introduction

Because the Jeongeup ARTI was designed so that there was no possibility leakage based on the use of radioactive material and has been operated after acquiring usage permission according to the relevant laws associated with making use of radiation. It is judged that there may not be a radioactive influence on the surroundings of the Jeongeup ARTI.

However, an investigation on the radioactivity distribution before radiation-use-facilities are installed was not performed, and there is also a possibility that those can be installed additionally. Therefore, it is judged that a preliminary investigation is required to prevent local dwellers from feeling anxious about the radiation-use-facilities.

The objective of this investigation is to guarantee the health and safety of local residences by detecting a possible radiological effect a prior due to an operation of the Jeongeup ARTI, providing the basic data that can estimate environmental effect by radiation, and also to establish a stable research mood by acquiring confidence on analysis results from local dwellers through an scientific and a continuous inspection

2. Investigation Method

2.1 Sample

In this investigation, an analysis of artificial nuclides for ten samples such as water, soil, pine, cabbage, rice, honey was carried out.

For investigating the radioactivity distribution, ten selected samples were gathered not only monthly, quarterly, half-yearly but also in the harvesting season. Also, after the pre-treatments of the collected samples, measurements of the samples by using instruments were carried out. And, based on these measurement results radioactivity distribution was analyzed.

2.2 Location

Analyses of the samples collected in and around the Jeongeup ARTI, and the Yeonggwang province located in a remote area from the Jeongeup ARTI were carried out. Also, to guarantee the objectivity on the sampling methods and the analysis results, radioactivity analyses of the samples were performed by the Yeonggwang Nuclear Power Supply Supervisory for an Environment Radiation & Safety

Fig 1. Samples picking points



3. Investigation Result

The range of all-beta-radioactivity analyzed for the rain samples was from 4.66 to 81.8mBq/L, and that in the Yeonggwang province also was included within the range presented above. The range of all-beta-radioactivity of rain which exists in all over the country were from 0 to 344mBq/L.

For the rain samples, an analysis on the ³H radioactivity was performed. ³H concentrations in all of rain samples were detected below MDA.

By the gamma analysis result of the samples such as soil, pipe, cabbage, rice, honey etc, ¹³⁷Cs concentration detected in other regions - namely, in and around the Jeongeup ARTI - was below 2Bq/kg-dry. The range detected in the soils of the whole country was <0.565 ~ 43.5Bq/kg-dry.

¹³⁷Cs concentration which was detected in honey samples around the Jeongeup ARTI was 0.128Bq/kg-fresh. However, there was no data is available for comparison results presented by this investigation, and also because ¹³⁷Cs concentration might be varied according to the factors such as the altitude, soil characteristic, topography etc, it was judged that further research on these factors should be followed.

By the ⁹⁰Sr analysis results on soil samples, the range of ⁹⁰Sr concentration detected in and around the Jeongeup ARTI was 0.093Bq/kg-dry to 0.112Bq/kg-dry. However, the values-that was, 0.240 ~ 1.16Bq/kg-dry, presented through this investigation was within that detected around nuclear facility for the recent five years.

Among samples of the Jeongeup ARTI surroundings, Radioactivity analysis result as to all beta and ^{137}Cs are displayed Fig 2 and Fig 3

Fig 2. All beta radioactivity analysis result on rainwater

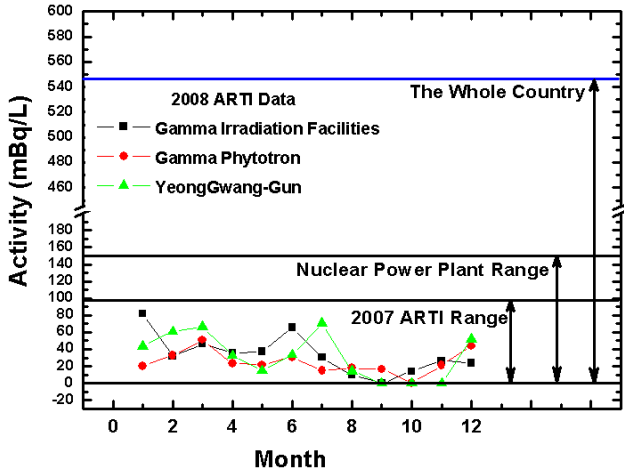
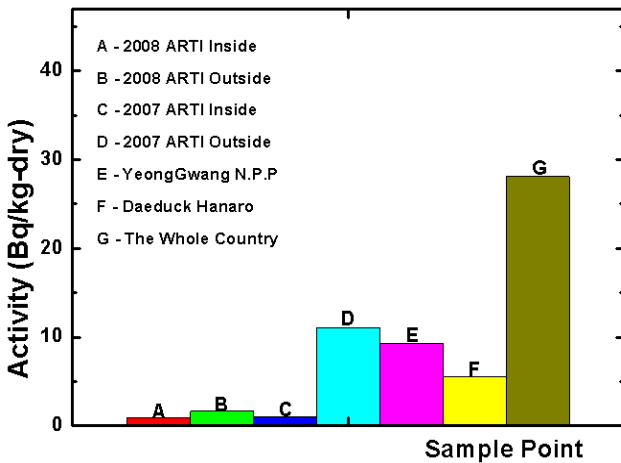


Fig 3. ^{137}Cs analysis result on soil



4. Conclusion

In this investigation, after the pre-treatments of the samples, measurements of the samples by using instruments were carried out. Also, these measurement results were analyzed and compared with the range of the radioactivity concentration of the whole country. By the analysis results, there was no trend of a diffusion or an accumulation of the radioactivity materials.

REFERENCES

1. Radiation Detection and Measurement, Glenn F. Knoll.

2. Handbook of Radioactivity Analysis, Second Edition, Michael F.L'Annunziata.
3. Environmental Radioactivity Survey Data in Korea, KINS/ER-028, Vol.39, 2007.
4. The Annual Report on the Environmental Radiological Surveillance and Assessment around the Nuclear Facilities, KINS/AR-140, Vol.18, 2007.