

Air Conditioning Condensate Contamination Test in Uranium-using Facility

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1. Introduction

The Korea Atomic Energy Research Institute operates the Nuclear Cycle Experimental Research Facility which has radiation controlled area in the laboratory with the aim of realizing pyroprocessing technology. In this Facility, depleted Uranium feed material and a depleted Uranium mixed with some surrogate material are used for performing experiments. During summer or hot days, the facility should maintain proper temperature and humidity to manage analysis and experiment equipment. However, about few tons of condensate are generated every year due to the air conditioner.

This paper will explain the degree of contamination of condensate liquid waste from the air conditioner in radiation controlled area.

2. Methods and Results

2.1 Air conditioners location

There are twelve air conditioners in this facility. There are installed all over the facility to keep users out of the heat. And also to maintain the experimental equipments. Fig. 1 is the Installation schematic of air conditioners in this facility.

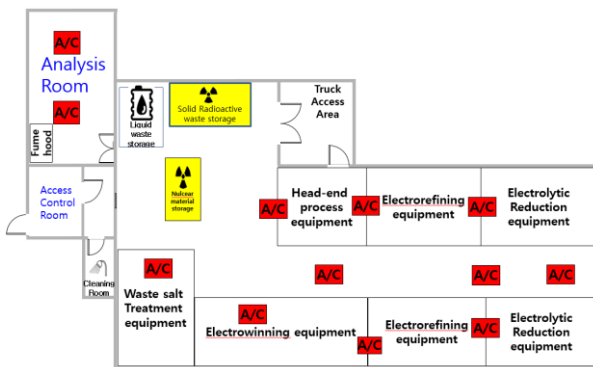


Fig. 1. Installation schematic of air conditioner

Air conditioners are all in radiation control area, so condensate lines were all connected and collected from one place. Air conditioning condensate comes from the radiation controlled area, so it is managed separately because there is a possibility of contamination.

2.2 Sampling

Condensates were collected after operating the air conditioner for two weeks. To Measure Uranium concentration, strain the condensate through a filter paper and place 50mm each in falcon tubes. Three samples were prepared for a definite result value.

Also, three bottles of 100mm were collected to measure pH concentration without filtering. Fig. 2 is the photo of the condensate samples.



Fig. 2. Condensate samples to measure Uranium concentration and pH concentration

2.3 Results

ICP(Inductively Coupled Plasma) mass spectrometry analysis was commissioned to measure Uranium concentration. Fig. 3 is the result table of ICP analysis and pH test. The number 0.611 which is in the Fig. 3 table is the detection limit using the Linest function of the calibration curve.

	^{238}U	pH
Sample 1	< 0.611	7.0
Sample 2	< 0.611	7.1
Sample 3	< 0.611	7.0

Fig. 3. Table of ICP analysis to measure Uranium and pH test

3. Conclusions

According to the data table, the value detected when the air conditioner is turned on for two weeks in Uranium-based facility is less than acceptable. I think the reason for this result is all experiments are conducted in sealed glove boxes, so Uranium can not be detected in the air. Therefore, the air conditioner's condensates that uses that air also can not detect Uranium.

REFERENCES

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