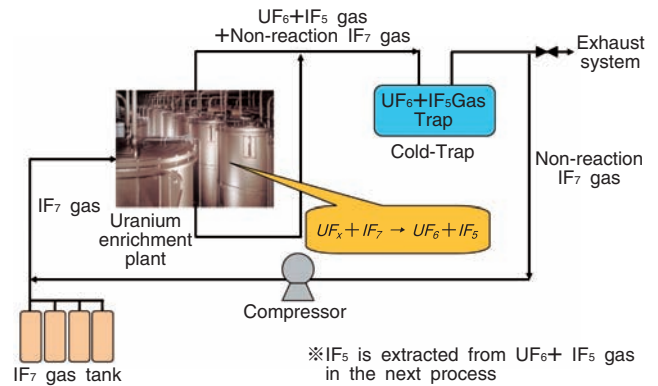


14-11 To Accomplish Decommissioning of Uranium Enrichment Plant Safely and Economically

-System Treatment Chemical Decontamination Technology by Fluoride Gas-

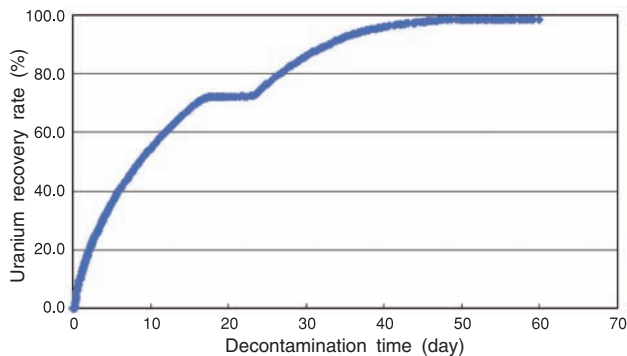


(a) Uranium enrichment plant

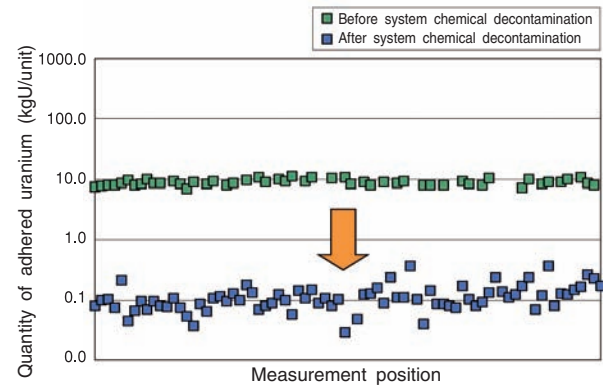


(b) Decontamination method

Fig.14-24 Outline of system treatment chemical decontamination technology



(c) Uranium recovery progress



(d) Quantity of adhered uranium

Fig.14-25 Results of system treatment chemical decontamination

The Ningyo-toge Environmental Engineering Center is now entering into the decommissioning stage of the plant. This center has a gas centrifuge uranium enrichment plant, which produced the enriched uranium by supplying Uranium Hexafluoride (UF_6) gas into the cascade for about 10 years. As a result, the uranium compounds have adhered in the equipments of the plant.

Therefore, we have developed the decontamination technology for uranium enrichment plants. The basic policy for this development is to decontaminate equipments in the plant to a level below the clearance level (assumed clearance level: 0.1 Bq/g).

Our decontamination method is performed by the combination of two technologies as follows:

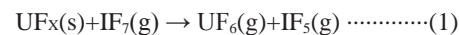
- System treatment chemical decontamination technology
- Sulfuric acid immersing decontamination technology

These are new technologies, and the knowledge has not yet been reported. However, we could reveal that these technologies have a very high decontamination performance through our development.

In this paper, the system treatment chemical decontamination technology is explained.

The main uranium compounds in the uranium enrichment plant are estimated to UF_x ($4 \leq X \leq 5$). We decontaminate the uranium compounds by supplying Iodine Heptafluoride (IF_7)

gas into the plant because the UF_x ($4 \leq X \leq 5$) is changed to UF_6 gas and Iodine Pentafluoride (IF_5) gas, by the chemical reaction such as in equation (1). (Fig.14-24)



After the basic experiment, the decontamination of the actual uranium enrichment plant in our center was performed. The following results were obtained.

- Decontamination time was about 60 days.
- About 99% of the uranium compounds in the plant could be recovered. (Fig.14-25 (c))
- Average of decontamination level was about 1.0 Bq/g. (Fig.14-25 (d))

As a result, we confirmed that the system treatment chemical decontamination has a very high performance. Therefore, we could obtain the prospect that equipments of the plant are decontaminated below the clearance level by using a combination of the system treatment chemical decontamination technology, and sulfuric acid immersing decontamination technology.

In a few years, the system treatment chemical decontamination technology we have developed will be moved to the uranium enrichment plant of private company's.

Reference

Ema, A. et al., Technology Development of System Chemical Decontamination Using Iodine Heptafluoride Gas -Evaluation of IF_7 Treatment Condition and Uranium Decontamination Result-, JAEA-Technology 2008-037, 2008, 50p. (in Japanese).