

Tritium Monitoring in the Environment at the Tritium Separation Facility -ICIT

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The Cryogenic Pilot is an experimental project in the national nuclear energy research program, which has the aim of developing technologies for tritium and deuterium separation by cryogenic distillation from heavy water. The experimental installation is located 15 km near the biggest city of the area and 1 km near Olt River. An important chemical activity is developed in the area and the Experimental Cryogenic Pilot's, almost the entire neighborhood are chemical plants. It is necessary to emphasize this aspect because the sewerage system is connected with the other three chemical plants from the neighborhood. This is the reason that we progressively established elements of an environmental monitoring program well in advance of tritium operation in order to determine baseline levels.

The first step was the tritium level monitoring in environmental water and wastewater of industrial activity from the neighborhood. In this work, a low background liquid scintillation was used to determine tritium activity concentration according to ISO 9698/1998 [1]. We measured drinking water, precipitation, river water, and wastewater. The tritium level was between 1.2 Bq/l and 3.3 Bq/l. In order to establish the base level of tritium concentration in the environment around the nuclear facility, we investigated the sample preparation treatment for different types of samples: onion, green beans, grass, apple, garden lettuce, tomato, cabbage, strawberry and grapes. We used azeotropic distillation of all types of samples, and measured tritium concentration varied between 1.2 Bq/kg (fresh weight, fw) for grapes and 8.4 Bq/kg (fw) for tomato. Interesting values were measured for grass which in spring had values around 6.8 Bq/kg (fw) and in autumn values around 3.4 Bq/kg (fw).

The results of preoperational environmental monitoring are presented and comparisons made with the published tritium level in the environment.

[1] ISO 9698/1989, International Standard Organization, Water-Quality. Determination of tritium activity concentration in water sample. Liquid Scintillation Method, 1989.