

RECENT TRITIUM LEVELS IN TAP WATERS COLLECTED AT THE EASTERN PART OF CHINA

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At the time of the recent sampling of tap waters in 2015, there were 29 operated nuclear power plants in China and we compared the tritium levels sampled in the early 1990s regarded as the baseline level of tritium concentrations of environmental waters before the operation of the first Chinese nuclear power plant. Nine tap waters were collected at Eastern part of China, Shanghai(Pudong), Qingdao(Shandong), Beijing(Chaoyang), Dalian(Ganjingzi), Jiling(Hunchun), Nanchang(Xinjian Xian), Jingdezhen(Luojiacun), Shenzhen(Bao'an), and Zhuhai(Jinwan) during July – September, 2014 and August 2015.

There are several methods to measure tritium by liquid scintillation counter (LSC), such as a direct addition of sample mixing with cocktail, an electrolytic enrichment, and a benzene synthesis, etc. We utilized a low background LSC (Hitachi-Aloka LB-7) with RO pure water apparatus (5 µm filter, charcoal, and RO filter). Recently a direct counting of the sensitivity less than 1 Bq/L is possible with a low background LSC¹ and the conditions that a low temperature of 10 degree and waiting for a few days to avoid peculiar scintillation, purging ²²²Rn in the air by N₂ gas, measurement time of 1000 min, and comparing with the zero tritium water (older than one million years), which was collected at Tohno underground mine. The measured tritium concentrations were in the range of 0.1 – 1.4 Bq/L, while the average tritium concentration sampled in the early 1990s was 4.04±0.10 Bq/L². The regional distribution of a tendency being of higher in the north and northwest and lower in the south and southeast was suggested and its latitude and longitude distribution tendencies will be discussed.

TABLE I. Results of environmental monitoring utilizing LSC method.

Sampling site of tap water in 2014, 2015	³ H activity(Bq/L) ² in 1991, 1992(Shanghai)	³ H activity(Bq/L) in 2014, 2015	Reduction factor of ³ H
Beijing	4.37 ± 0.74	0.7 ± 0.2	~1/6
Jiling	4.80 ± 0.75	0.3 ± 0.2	~1/16
Qingdao	11.1 ± 0.85	0.3 ± 0.2	~1/37
Shanghai	1.37 ± 0.01	0.5 ± 0.2	~1/3
Dalian	N.A.	1.4 ± 0.3	
Nanchang	N.A.	0.4 ± 0.3	
Jingdezhen	N.A.	0.6 ± 0.4	
Shenzhen	N.A.	0.4 ± 0.3	
Zhuhai	N.A.	0.1 ± 0.1	

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