

W-I-2-2

Characteristics of Long-lived Radionuclides in the Chernobyl Contaminated Area.

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5 years Research Project between RIAP (Research and Industrial Association PRIPYAT, Ukraine) and JAERI has been conducted from 1995 concerning secondary migration of radionuclides released and deposited in terrestrial and aquatic environment around the Chernobyl NPP. This research project strongly focuses on the speciation of radionuclides and their mobilities in the surface environment, especially for long lived nuclides including transuranic elements. Radiological characteristics of the 30km exclusion zone is that most of the deposited radionuclides was originally included in hot particles (HPs). With time passing, some of the radionuclides eluded from the HPs, because of the aging effect of HPs. Most of the radioactivities in undisturbed soil still existed in top first 5cm of the mineral horizon. Chemical speciation of surface soil showed that major parts of transuranic elements existed in humic/fulvic acid fraction and humin/undissolved fraction. On the contrary, major parts of Sr-90 existed in exchangeable fraction. Analysis of dissolved radionuclides at Sahan river (tributary of the Pripyat river, sampled at 6km west of Pripyat town) showed that concentration of Am-241 has already exceeded those of plutonium isotopes except for Pu-241, even though the contribution of the transuranic elements to the total dissolved radioactivities was quite small.

W-I-3

 ^{137}Cs concentration among children in the Chernobyl area and related dose reconstruction

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Chernobyl Sasakawa Medical and Health cooperation Project began in April, 1991 as a five year project. The project planned to examine from 0 to 10 years old children at the time of the Chernobyl accident in the fallout area. We report the level of whole body ^{137}Cs concentration in the examined children in this study and introduce dose reconstruction study related to these children. We determined whole body ^{137}Cs concentration using chair type ^{137}Cs counters. The total examined subjects were 87,430 during the period from May 1991 to December 31, 1994. The whole body ^{137}Cs counts per body weight by sex and age were compared. It is found that the results of the median levels are almost less than 50 Bq/kg. Since annual effective dose equivalents of 1 mSv correspond about 1000 Bq/kg, the levels are lower than the public dose limit of 1 mSv y^{-1} . We are estimating also external exposure based on the thermoluminescence dosimetry technique using brick samples and measuring contamination in soil and food samples for dose reconstruction.

W-I-4

Investigation of Health Consequences in Thyroid Diseases.

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We have screened more than 100,000 children, who were younger than 10 years old at the time of the accident from May 1991 to December 1995 at the five diagnostic center around Chernobyl. Children with thyroid cancer confirmed by histology were as follows: 3 in Mogilev, 39 in Gomel, 6 in Kiev, 9 in Korosten and 8 in Klincy. Since about 20,000 children were screened in each center, the prevalence of thyroid cancer was remarkably high when compared to that of USA, Europe and Japan. However, no significant correlation between whole-body Cs-137 radioactivity and thyroid abnormalities were observed at any of 5 centers.

The total number of childhood thyroid cancers found after the Chernobyl accident (1986-1994) is 880 in Belarus, the Ukraine and Russia. Childhood thyroid cancer has been increasing rapidly since 1990 around Chernobyl and signs of a decrease are in sight. Although many international experts agree that the increase of thyroid cancer is probably due to the radioactive fallout from the Chernobyl accident because of the geographical distribution of the cases and of the time trends, it is still unknown what kind of radioactivity is the main cause of the increase in thyroid cancer. Likely cause is iodine-131, but when used in medical practice this isotope has not been shown to cause thyroid cancer. Therefore there is need to investigate the role of iodine-131, of short acting isotopes, of external radiation. And such a rapid increases in cancer incidence is probably unprecedented and provides a unique opportunity to understand cancer causation mechanisms and to identify factors which may be important for cancer prevention.