

The data on internal radiation exposure of the residents of the same populated areas from intake of the radionuclides from this explosion with food and water are shown in the table 1. 2.

Table 1. 2. Internal irradiation doses from intake of radioactive substances with food and water (cSv) (after atomic bomb explosion in 1949)

Time after irradiation (days)	7	30	90	365	50 years
Thyroid gland	62	110*	130*	130*	130*
Digestive tract	7	8	11	13	13

Note: * - Tissue doses to children's thyroid are 5-10 times greater because of higher milk consumption

It is evident that due to the radioactive fallout and intake of radionuclides the thyroid glands of the population were exposed to significant doses, mainly from radioactive iodine. The doses to the digestive tract and the skeleton were significantly less. However, using a screening coefficient of 0.6 the tissue doses were found to be about 240 cGy to the bone marrow, 100 cGy to the digestive tract, and 300 cGy to the thyroid gland.

The extremely harmful effects of this explosion to the residents of the area are attributable to two factors. First, the explosion was made practically on the ground, "on the table," and, as a result, a huge radioactive cloud formed. Second, the explosion was made at 7⁰⁰ a.m., when almost all adults of agricultural region were out harvesting their crops, and when the cloud came to the villages at 9 a.m., they had no shielding, with only open fields around them.

The yield and danger of the radioactive cloud were so high that even 6 cities and 26 districts in the Altaisky region of Russian Federation situated 500-1000 kilometers from the nuclear test site, were exposed. The radioactive track of this explosion (1949) was the reason for forming two zones of radiation exposure risk: zone A, with a dose equivalent of the exposed population ranging from 35 to 100 cSv, and zone B with a dose equivalent less than 35 cSv. These zones are in the Altaisky district of Russian Federation, several hundred kilometers away from the Semipalatinsk nuclear test site.

There are also documents giving evidence of the occurrence of acute radiation sickness in some exposed people. In the Beskaragaisky district radiation skin burns were reported among the residents exposed when radioactive cloud came over their areas.

Four years after the first atomic bomb explosion on August 12, 1953, the first hydrogen bomb was exploded in USSR. The altitude of explosion was 1 kilometre, the yield of the bomb was 470 kilotons, and the wind velocity was 80-85 kilometres per hour.

Taking into account the enormous danger of future hydrogen bomb explosion to all living creatures, the government and the headquarters of the nuclear test site took some measures for radiation safety. Most important among them was the evacuation of the population from the supposed areas of radioactive fallout to the so called "safe zones". For three days, the populations of small and large villages were evacuated from a "corridor" 120 kilometers wide, extending from the hypocenter of explosion in the direction of the supposed movement of the radioactive cloud southeasterly to Karaul village, the centre of Abaisky district. But the "experiment" was not conducted, as it was supposed to be. The wind velocity in reality was 2 times higher, than it was supposed to be (40-45 kilometres per hour), and the direction of the wind also was not what it was supposed to be. Three hours after the explosion a huge radioactive cloud came over those villages and populated areas that were not expected to be contaminated, and also over Karaul village, to which the population had been evacuated. The official data shows that the population was not evacuated when the radioactive cloud appeared over Karaul village, to which the population had been evacuated. As the result, 191 people were exposed to huge dose of radiation.

All areas of Abaisky, Jana-Semeisky, Abiralinsky and some Tchubartausky districts in the Semipalatinsk region were contaminated by the radioactive fallout. At the time of evacuation of the population (9 - 19 days after the explosion), the rate of gamma irradiation in Sarjal, Kainar, and Karaul villages, Kizil-Tu and some other populated areas was 40-60 milliroentgen per hour. The total doses of external radiation exposure were calculated taking into account this data. They are shown in the table 1.3.