

dose formation is the period of track formation. During this period, the concentration of radioactive substances in the air could be 10000 times higher than after track formation.

Underground nuclear tests are therefore quite dangerous for all living things, including human beings. If made near populated areas, the population would be in real danger of radiation exposure from low-spreading radioactive clouds and inhaled air contaminated with highly toxic radionuclides.

In 1987, the contamination density of Cs-137 in the Semipalatinsk region was 0.006 to 0.11 Ci per km². The rate of exposure to gamma-ray dose in air was $4.8 \cdot 10^{-7}$ 2.14 milliroentgen per second or 0.0324 roentgen per year. Under this circumstances, the rate of absorbed dose in air was 0.028 cGy per year. The relationship of the rate of absorbed dose in air to the exposure dose was $0.028/0.0324 = 0.864$. The rate of absorbed dose in air (if contamination density of Cs-137 was 1 Ci/km²) would be 3.76 microrad per hour. In this case, the rate of exposure would be 4.35 microroentgen per hour. Using this coefficient, the rate of exposure to gamma-ray dose from Cs-137 contamination was calculated to be from 0.027 to 0.50 microroentgen per hour. Therefore, the additional dose contributed by Cs-137 to the background radiation dose from natural sources was no more than 3.3%.

The internal irradiation dose was estimated from the data on the specific activities of Sr-90 and Cs-137 in the diet of the residents of the Semipalatinsk region (tables 1.8 - 1.12), and the data on the average annual consumption of main food products in the diet of Semipalatinsk region residents (table 1.7).

Table 1. 7. Average annual consumption of meat and milk of the population of radiation risk zones (per day) for the period from 1981 to 1990

	Meat (kg)	Milk (l)	Bread (kg)	Water (l)
Adults	0.28	0.3	0.4	2.2
Children	0.14	0.6	0.2	0.9

Table 1. 8. Average radioactivity of Sr⁹⁰ and Cs¹³⁷ in beef (picocurie/kg)

Years	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Sr ⁹⁰	3.4	4.5	7.4	8.1	11.1	11.1	12.4	12.6	13.1	13.4
Cs ¹³⁷	13.8	17.5	10.9	4.9	4.0	52.8	30.0	12.5	16.5	14.3

Table 1. 9. Average radioactivity of Sr⁹⁰ and Cs¹³⁷ in milk (picocurie/kg)

Years	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Sr ⁹⁰	11.2	8.9	5.8	12.7	11.4	8.4	13.8	13.4	16.2	15.1
Cs ¹³⁷	5.7	5.2	4.1	2.1	1.5	105.0	13.9	6.8	11.3	12.1

Table 1. 10. Average radioactivity of Sr⁹⁰ in cattle bones (picicurie/kg)

Years	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Sr ⁹⁰	1189	622	459	611	981	2351	3081	3432	3531	3472

Table 1. 11. Average radioactivity of Sr⁹⁰ and Cs¹³⁷ in bread (picocurie/kg)

Years	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Sr ⁹⁰	6.2	5.9	5.1	2.2	2.5	2.3	1.7	1.8	2.1	2.2
Cs ¹³⁷	5.2	5.1	3.8	2.9	1.1	1.5	3.9	2.8	3.9	3.1