

RECONSTRUCTION OF CHERNOBYL SOURCE PARAMETERS USING GAMMA DOSE RATE MEASUREMENTS IN TOWN PRIPJAT

M. M. Talerko

With the help of mathematical modeling of atmospheric transport the calculations of accidental release dispersion from the Chernobyl NPP to town Pripjat during period from 26 till 29 April 1986 have been carried out. Data of gamma rate measurements which was made in 31 points of the town were used. Based on the solution of atmospheric transport inverse problem the reconstruction of Chernobyl source parameters has been made including release intensity and effective source height. The input of main dose-forming radionuclides into the exposure dose during the first 40 hours after the accident (the period of population residence in the town before the evacuation) has been estimated. According to the calculations the ^{131}I deposition density averaged over the town territory was about $5.2 \cdot 10^4 \text{ kBq/m}^2$ (on 29.04.86). Minimum and maximum ^{131}I deposition values were $2.8 \cdot 10^4 \text{ kBq/m}^2$ (western part, distance to the unit is 4.5 km) and $1.2 \cdot 10^5 \text{ kBq/m}^2$ (north-eastern part of town, 2 km from the unit) accordingly. For the moment of the evacuation dated April 27, deposition values were about 90 percent of these values.

Keywords: Chernobyl accident, atmospheric transport modeling, gamma dose rate, release source parameters reconstruction.