

**ESTIMATION OF LIRA OBJECTS INFLUENCE CONTRIBUTION IN
TOTAL RADIATION DOSES OF NEIGHBOURING SETTLEMENTS
POPULATION**

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According to recommendations of International radiation defence commission, it is strongly

recommended to consider social factors taking into account that presence of potentially dangerous object at the inhabitation territory is stressful factor for it.

In this connection we added all 16 settlements located near LIRA objects to the list of research objects: Akbulak, Aksay, Aksu, Berezovka, Bestau, Burlin, Dmitrov, Zhanatalap, Zharsuat, Karakemir, Karachaganak, Oblavskoye, Priuralskoye, Pugachevo, Tungush, Uspenovka.

Investigation of all these settlements was executed under a single methodology. 20 points inside and 20 - around the periphery were selected for every settlement for soil sampling.

At every point ground samples were taken by trier $S = 0.01 \text{ m}^2$, in layers: 0-5 cm, 5-10 cm, 10-30 cm.

Water samples were taken from draw-wells and water pipes. 3 water samples with 1.5 l volume were taken in every point. Vegetation samples were taken from hay prepared by inhabitants.

In all sampling points geographic coordinates were determined using GPS. In living quarters and basements, measurements of radon concentration in the air were carried out – 10 metering in every settlement. Excess in sanitary standards (200 Bk/m^3) was detected in living quarters of Zhanatalap (390 Bk/m^3) and in many basements (about 5000 Bk/m^3) of different settlements.

In all sampling places, EDR measurement was carried out using dosimeter-radiometer DCS-96 at a level 5 cm and 1 m from the subgrade. The results of these meterings have shown that EDR was 7-15 mkR/hour and was within the limits of background values for given region.

Radionuclide composition of soil samples (^{137}Cs , ^{40}K , ^{226}Ra , ^{228}Th) was analyzed within gamma spectrometric method. At present time we performed analysis more than 80% of all taken samples. Values of natural radionuclides concentrations in the soil of all 16 settlements are presented at the table 1. Also average values of these radionuclides concentrations were determined at all investigated points, Bk/kg: ^{40}K - 588; ^{226}Ra - 23.6; ^{228}Th - 32.1.

By results of settlements investigation we recognized following basic sources of population effective radiation dose:

- Cosmic radiation
- External gamma radiation of soil
- External gamma radiation of radon and toron daughter decay products
- External gamma radiation of building material
- Effective dose from artificial radionuclides
- Inhalation of radon daughter decay products
- Neutron radiation and beta radiation
- Dose from natural radionuclide in food.

Population effective radiation dose of settlements, located around LIRA object, were calculated. Total radiation dose is about from 2000 to 6000 $\mu\text{Sv/year}$, at that basic radiation dose is for inhalation of radon daughter decay products (43, 6 %), part of artificial radionuclides is only 0.1 %.