

Assessment of Public Health Risk Induced by the Environmental Pollution nearby NPP Construction Site

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Extended Abstract

The purpose of this paper is to determine and assess the main risk-factors to public health due to the environmental pollution nearby an NPP construction site.

Potentially harmful to the public health factors of environmental pollution were analyzed. The factors were of both radiation and non-radiation origin. Current chemical and radiation characteristics of the environment nearby the NPP construction site were studied. Potential environmental contamination from radioactive gaseous and aerosol emission during normal operation of two VVER-1200 units was estimated.

Calculations showed that maximal soil surface contamination would not exceed 0.144 Bq/m^2 ($3.89 \cdot 10^{-6} \text{ Ci/km}^2$) during the first year of the NPP operation. Individual annual exposure of population due to gaseous and aerosol emissions is $4.5 \cdot 10^{-4} \text{ mSv}$ (0.045% of the annual dose limit as recommended by radiation safety norms) in the maximal contamination spot during normal operation of two VVER-1200 units.

Experimentally obtained data on radioactive contamination of atmospheric air nearby the NPP construction site indicates that the concentration of radioactive aerosols in the air is very close to that due to natural radiation background. The current radiation situation in the vicinity of the NPP construction site cannot be considered as a risk factor to public health.

The values of maximal ground-level concentrations of pollutants emitted by point stationary facilities located in Ostrovets were calculated for the most adverse weather conditions. Calculations showed that the concentration of certain substances (hydrocarbons, xylene, toluene, ethylbenzene) under certain circumstances may exceed the Maximum Permissible Concentration (MPC).

An *in-situ* experiment was performed to determine the concentrations of chemical pollutants in the atmospheric air in the vicinity of the Belarusian NPP construction site. The results of the experiment showed the absence of risk factors to public health. Specifically, the concentration of lead was 115 – 750 times less than MPC, and that of cadmium was 2000 times less than MPC. For the considered location, the dust concentration in the air was 1.5 times lower than the calculated values, that of nitrogen dioxide was 6 times lower, that of carbon monoxide was 2.5 – 4 times lower.

Therefore, currently there are no public health risk factors due to the environmental pollution nearby the NPP construction site.

References

- Gichev Y. (1996). Environmental aspects of medicine (in Russian). Novosibirsk: Siberian Branch of RAMS.
- Saltanova, I. (2006). Methodological principles of ecological risk assessment in Belarus after the Chernobyl accident: thesis: 03.00.16 (in Russian), Baltic state. tehn. University "VOENMECH" them. DF Ustinov. - Saint-Petersburg.
- Stozharov, A. (2007). Medical Ecology: Textbook. (in Russian). *Vysshaja Shkola* Publishing house, Minsk.

Estimate radiation doses to personnel and the public in the operation of nuclear power plant incidents and beyond design basis accidents Ostrovetskaya site. (2008). Research report (in Russian), JIPNR NASB. Minsk, 108, ref. number 577.

Estimation of the quantity and content of the cross-boundary transport of non-radiative atmospheric pollutants to Grodno region around the NPP construction site (2012). Research report (in Russian), JIPNR NASB. Minsk, 50, ref. number 1228.