

# HEAT AND AIR TRANSFER OF THE NEW SAFE CONFINEMENT OF CHERNOBL NPP WITH ENVIRONMENT

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**The goal of the work.** The purpose of the work is to carry out preliminary analysis and forecasting of the radioactive aerosols distribution in the New Safe Confinement (NSC) during the period of operation under typical work in the Shelter Object (OS) and the influence of climatic conditions on the radioactive aerosols (RA) distribution outside the NSC with the developed three-dimensional computer CFD (Computational Fluid Dynamic) models of thermo-gas-dynamic processes in the OS, NSC and the environment.

**Results.** The NSC is not a fully sealed object, therefore there is a flow of air outside and inside the NSC. The values of these leakages (in conditional  $\text{m}^2$ ) are currently estimated as follows: for the outer shell of  $1.7 \text{ m}^2$ , the inner shell is  $5 \text{ m}^2$ , for the Western wall clearance -  $3.1$  and for the eastern wall -  $3.9 \text{ m}^2$ . As can be seen, the values of the leaks are significant and this means that the air exchange between the main volume of the NSC with annular space and especially with the environment is also significant. It should be noted that the value of such air exchange with the environment, in turn, depends significantly on the direction and magnitude of the wind speed flowing around the NSC. The paper shows the results of the emission of RA in partial partitioning of the roof of the turbine hall under the NSC, the separation of the roof of the OS and other work, which leads to a significant increase in the concentration of RA in the NSC, which is related to the closure of the NSC volume and release into the environment.

In order to estimate the radiation state of the NSC internal space at significant emissions of RA, a non-stationary calculation with the model of the OS and the NSC was performed during the work on removal and loading of fuel materials in the OS. The analysis and forecasting of the distribution of radioactive aerosols in the main volume of the NSC in other typical work in the OS and influence of climatic conditions, in particular, the flow of the NSC by wind, leads to a complex distribution of pressures on the surface of the NSC (Fig. 1,a) and RA output outside the boundary NSC (Fig. 1,b).

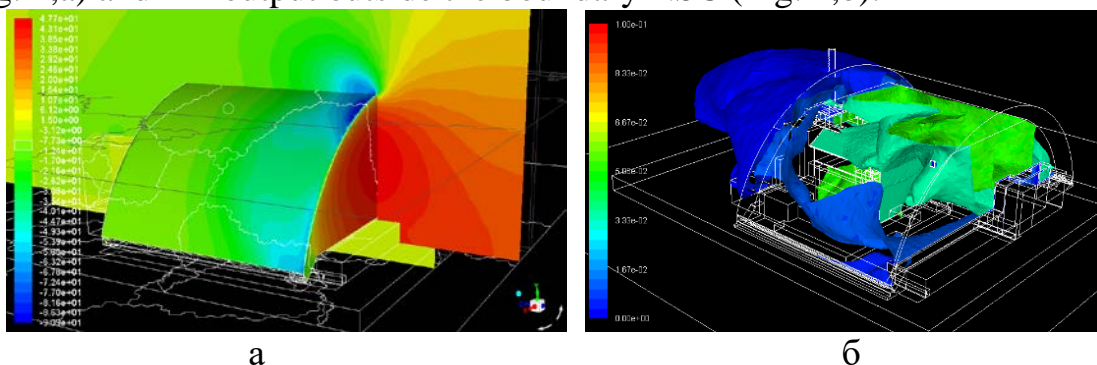


Fig.1 Distribution of pressures on the surface of the NSC when the West wind flows (a) and typical isosurfaces of RA concentrations inside and outside the NSC (b).