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Physical Features of Pollutants Spread in the Air During the Emergency at NPPs

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Abstract

The authors carried out a thorough study of the features of the spread of hazardous chemicals in the surface layer of the atmosphere in the event of an emergency at the site of a nuclear power plant. In order to ensure the continuous operation of the stations in their territories, various ancillary technogenic facilities are located and operate, which release emissions of non-radiation pollutants into the atmosphere. Under various negative circumstances of a technical and natural nature, emergencies may occur due to significant chemical pollution of the atmospheric air in and outside the sanitary protection zone. The prevention of such emergencies is based on

environmental monitoring in the locations of man-made objects and their preventive forecast. Implementation of these measures is not possible without the use of effective methods based on mathematical models of environmental pollution by anthropogenic objects, and the hardware and software that implement these methods. The main stages of the development of information and technical methods of prevention of such emergencies are given and described. Different scenarios of emergencies are described as a result of the release of chemicals into the atmosphere at these sites. A conceptual scheme for the distribution of impurities in the atmosphere due to man-made emissions has been developed. The peculiarities of atmospheric air propagation under stationary and non-stationary emission conditions are described in detail. It is established that the most determinants of influence on the concentration distribution of impurities are: mode and conditions of emission, type of source, direction, and velocity of the wind, state of the atmosphere, chemical interaction with other substances in the atmospheric air, gravitational deposition, leaching of sediments, absorption of the underlying surface. surface, terrain. The results obtained will be used in the process of developing mathematical models for the propagation of pollutants in the atmospheric air from the emissions of nuclear power plants during relevant emergencies.

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