Ecological problems have taken an important place among the complex of problems which arose in connection with the accident at the Chernobyl nuclear power plant in 1986 – technological, medical, economic, social, and others, because it is precisely the contamination of the environment that was largely determining in overcoming the consequences of this accident [1, 2]. At the same time, the accident shed light on the meaning of the ecological aspects, since proof of the absence of a negative effect on human health and the environment and its stable existence and development is regarded as a necessary condition for achieving progress in using nuclear reactions to produce energy.

When analyzing the consequences of the accident, one should keep in mind not only the direct effect of ionizing radiation on plants and animals and their populations and the ecosystem as a whole, the radioactive contamination of environmental and domestic objects (first and foremost, agricultural, forest, and water spheres), which limits or even eliminates their use by man, but also many allied questions concerning directly the ecological effect of an accident. First and foremost, it is necessary to take into consideration the public’s concerns about the danger of the radioactive contamination of the environment outside the context of the data accumulated on the consequences of radiation accidents and in many cases even in contradiction to this scientific information because of the lack of trust in scientists. Certain medical consequences, undoubtedly among the main consequences of this accident, actually are associated with the influence of ecological factors. Thus, cancer of the thyroid gland, first and foremost in children, which is one of the most significant medical consequences of the accident, in reality, initially, occurs for ecological reasons – the consumption of cow’s milk, mainly, by feeding mothers after animals have been led out to pastures contaminated with radioactive iodine.

The radioecological consequences of the accident in the exact sense of the concept “radioecological” must be considered as aspects of two phenomena. On the one hand, the radionuclides emitted from the damaged unit were the source of irradiation of associations of plants and animals and, as a consequence, their radiation damage. On the other hand, emitted...
into the environment and then incorporated in the trophic chain of the biological cycle, they became a source of contamination of objects in the environment – soil, water, production from the agricultural, forests, wate, nd other spheres, contacts with which resulted in irradiation of humans. The basic radioecological paradigm of the accident was formulated at the very beginning. According to this paradigm, the natural habitats where a visible change of a radiation nature is observed in the natural and agricultural associations of plants and animals are much smaller than the area where human activity is limited or forbidden, since the concentration of radionuclides in environmental objects is higher than the admissible level [3].

The radioecological investigations performed in the region of the accident as a scientific adjunct to measures taken to overcome the consequences of the accident had an important value. Before the accident, a great deal of information was accumulated in this field of knowledge about the behavior of the biologically most important radionuclides in various natural media (agricultural, natural grass, forests, and water ecosystems and elsewhere). It is important to underscore that the USSR had experience in liquidating the consequences of a large radiation accident with contamination of the environment; this occurred at the Mayak Industrial Association in 1957. Unfortunately, information about liquidation of the consequences of this accident while performing remediation measures on the East Ural radioactive track was classified as secret and was known only to a limited circle of specialists. The official first open publication on this accident (medical-biological, ecological, and agricultural problems) appeared only in 1990 [4]. However, the role of information about the accident in the southern Urals and the participation of specialists in the liquidation of its consequences cannot be underestimated in the work on the Chernobyl nuclear power plant.

**Ecological Features of the Accident and Radiation Monitoring.** Ecologically, it should be noted, first and foremost, that the region of the accident encompassed an enormous area. Bounded only by the isoline of the $^{137}$Cs contamination density 37 kBq/m$^2$, it occupied more than a 150,000 km$^2$, which is 3.2% of the territories of the USSR on which extensive agricultural and forested lands and branching system of rivers and lakes are located [5, 6]. The animal and plant world in the region of the accident is rich, and the soil cover is diverse. A substantial part of the soil cover, specially in zones of greatest contamination, consists of low-productivity peaty and soddy-podzol sandy and loamy soils, where very high uptake of radionuclides by plants is characteristic [7, 8].

The radionuclide composition of the fallout from the accident included biologically mobile radionuclides ($^{90}$Sr, $^{131}$I, $^{134,137}$Cs, and others), some of which were long-lived. Plutonium and other transuranium elements had a definite radioecological significance in the near zone of the Chernobyl nuclear power plant. The emission of radioactive substances occurred during the late spring – early summer, during a period of intense vegetation and activity of wild animals. The discharge of radionuclides into the environment during this time of the year gave rise to their active incorporation into the biological chain of migration and created the prerequisites for high accumulation of radioactive substances in plants and animals, a higher dose of radiation to them and a greater radiation damage.

Radioactive contamination of substantial areas of agricultural lands, forested territory, and water objects made it necessary to organize a fundamentally new system of radiation monitoring [9]. A system of monitoring, which included strict sampling and current and predictive monitoring as well as continual examination, was formulated for agricultural production on contaminated territories. New radiometric and dosimetric methods for monitoring environmental objects were developed, and radiation monitoring services were equipped with apparatus for measuring the content of radionuclides. The contaminated territories were extensively mapped. The content of radionuclides in 1 million samples was measured only in four of the most highly contaminated regions of Russia (Bryansk, Kaluga, Tula, and Orel oblasts) with monitoring of agricultural production in 1986–2000.

**Radionuclide Migration Into the Environment.** The liquidation of the ecological consequences of the accident presupposed a large-scale program for studying the migration of radionuclides in various natural media, which at a certain stage took on an international character. The participation of IAEA should be especially noted. The main dose-forming radionuclide in the region of the accident, which determined the long-term radiological danger, was $^{137}$Cs (half-life 30 yr), long-lived $^{90}$Sr was also important on relatively small areas, and plutonium and transuranium elements were important in the near zone. The short-lived radioisotopes of iodine, primarily $^{131}$I, played an important role during the first few months after the accident. The study of the migration of these specific radionuclides in the environment became a problem of radioecological investigations.