

CHAPTER 6

SCIENTIFIC PROVISION OF THE PROBLEMS OF OVERCOMING THE CHERNOBYL CATASTROPHE CONSEQUENCES

The Chernobyl NPP catastrophe has put a number of the most complicated ecological, medical, agricultural, economic, social, legal, demographic and other problems before the state. All the available scientists and experts of the corresponding specialty have been attracted to participation. For coordination of the scientific research the scientific and technical Council and by the Presidium of the Academy of Sciences - operative group have been formed.

The main task at the first stage after the accident was the estimation of the radiation situation and working out emergency measures for reduction of the negative effect of the radiation on the man's organism. The scientists of the Academy of Sciences, the Ministry of Health, the State Committee on Agricultural production, the Ministry of higher education and other departments of Belarus took part in the solution of these problems.

The results of the investigation have allowed to draw the cartogrammes of the radioactive contamination of the Belarussian territory that became the basis for the solutions adopted by the Government including settling out of the inhabitants of the affected territories, building of new housing facilities, radiation safety norms, etc.

However, it was obvious that for elimination of the accident consequences it is necessary to realize not only emergency primary measures but adoption of long-term scientifically substantiated measures as well. The available international experience of the liquidation of the nuclear incidents consequences did not allow to work out clear recommendations for the solution of the problem of such a scale. The Programme of complex investigations on the problems of liquidation of the Chernobyl catastrophe consequences has been worked out and approved. It has envisaged the carrying out of scientific - research and experimental designing in four main directions:

- The research of the radioactive contamination of the ecological systems, genetic and physiological and biochemical estimation of its possible consequences;
- The elaboration of the technology and ways of agricultural economy under the conditions of the radionuclides contamination of the environment;
- Investigation of the radiation influence on the functional systems of the organism, beginning and the course of man's disease, working out of diagnostics and treatment methods;
- elaboration of technologies of reduction of the radioactive contamination of the environment and separate installations, methods and means of radiometric and dosimetric control.

It is necessary to note that prior to the accident Belarus had practically no scientific teams specializing in these fields. Research was primarily concentrated in Russia.

The Government had to create specialized scientific establishments, to organize personnel training. In the republic there were established the Institute of Radiobiology of the Academy of Sciences of Belarus (Minsk), the Research Institute of Radiation Medicine (Minsk) with its three branches in Vitebsk, Gomel and Mogilev, the Belarussian Institute of Agricultural Radiology (Gomel). In the solution of the problems arisen practically all scientific and higher educational establishments that had required specialists and material base took part. In particular, the Institute of Nuclear Energetics of the Academy of Sciences, Belarussian State University, the Belarussian Research Institute of Soil Science and Agrochemistry, Belarussian Research Institute of Hematology and Blood Transfusion, the Institute of Oncology and Medical Radi-

ology and many others. The majority of the scientific teams solved the problems on the voluntary base.

The coordination of the efforts of the scientific institutions within the framework of the programme has allowed to transfer from the fulfillment of the operative tasks to systematic planned research of the accident consequences for the purpose of the working out of measures for their minimization. The Programme has been implemented by 18 institutes of the Academy of Sciences and more than 20 scientific and higher educational establishments of the Ministry of Health, the State Committee on the Agricultural Production, the Ministry of Education and other institutions of the republic. On the basis of this interrepublican programme there has been worked out the Complex Programme of scientific research on the overcoming of the accident consequences in Belarus.

For the fulfillment of its tasks the annual plans of research work have been made up and approved by the Academy of Sciences and the Council of Ministers Commission on the problems of the Chernobyl catastrophe consequences. The course and results of these works have been regularly discussed at the special republican and international seminars, sessions and conferences and the conclusions and suggestions have been presented to the Government.

At the same time there have been created and approved the programme of monitoring and forecasting of the radiational situation in the republic.

To sum up, the complex estimation of the radiation-ecological situation in the republic has been made, the radionuclides forms in different ecosystems have been defined, the main ways of their migration, there have been received the first results on the effect of the situation on the functional systems of the organism, morbidity of the population, the complex of medical and prophylactic measures have been realized, there have been prepared a number of recommendations on the agricultural works on the contaminated territories, rational nature use, the ways of decontamination and cleaning from radionuclides of the environmental objects, the primary forecasting of the radioactive contamination dynamics for the nearest future has been done.

The gained results have become the basis for realization of protective measures, elaboration of the concept of the population residing in the radioactively contaminated territories, the confirmation of more strict norms of radionuclides content in food products and drinking water, prohibition and restriction of a number of economic activities on the affected territories and others. They became the basis for the working out of the State Programme of its consequences liquidation for 1990-1995 that was approved at the XII session of the Supreme Soviet of Belarus on October 26, 1989.

There is a special chapter that foresees the scientific provision of the works. For coordination of scientific research there was created the Co-ordinate Council established on 13.12.89 by the Commission of the Presidium Of the Council of Ministers of Belarus on the problems of scientific and technical progress.

At present in the republic there are personnel of its own and scientific schools on all the main fields connected to the problems of radiation effect on the man and environment.

The research works are carried out in the following directions:

- radiation protection of the population;
- health of the population affected by the Chernobyl NPP catastrophe;
- complex radiation-ecological estimation of the environment, conditions of the life activity of the population;
- rehabilitation of the contaminated territories;
- instrumental and methodical provision of the radiation control.

The researches in the field "Radiation protection of the population" are oriented for the elaboration of methods and means of reduction of the radiation risk, stipulated by the radioactive fall-outs, by means of reduction of the individual and collective exposure doses on the basis of the special protective measures. Within the framework of this field the dose monitoring of the population is carried out, the complex of measures on effective land use, reduction of radionuclides contamination of the agricultural products is being improved and optimized, complex technologies, ways and means of processing and concealment of radioactive waste are being improved, recommendations on the reduction of radiation effect on the population and normative acts on radiation protection are being worked out.

The study of the health state of the population affected by the Chernobyl NPP catastrophe is directed to the verification of data on morbidity dynamics including hematological and oncological morbidity, the state of immune, endocrine and other systems of different categories of the affected population, working out the new methods and means of diagnostics, treatment and prophylactics of the disease. On the problems of mothers and children protection under the conditions of the effect of the Chernobyl catastrophe consequences there have been worked out and introduced new methods of treatment and prophylactics of diseases of pregnant women and children affected by the Chernobyl NPP catastrophe. The study of genetic consequences of the accident for the purpose of prevention of the birth of children with congenital defects, reduction of mortality and hereditary diseases is carried out and will be continued.

The complex radiation-ecological estimation of the environment, living conditions is directed to the investigation of dynamics and forecasting of radiation situation in the settlements and environmental objects, the study of processes of interaction and development of natural complexes and ecosystems in the radiation-ecological situation. There have been studied the mechanisms and consequences of the chronic effect of small radiation doses on flora and fauna, combined effect of ionizing radiation and other injuring factors on the organism, the ways of correction of the revealed disorders are worked out. There are estimations of the contamination of environment and separate ecosystems by radionuclides from the Chernobyl catastrophe and nuclear plants, situated on the borders of the republic, fall-outs. Monitoring works allow to verify short-term and especially, long-term forecasting of redistribution of radionuclides in the ecosystems, build forecasting cartogrammes of different themes and scale, to work out recommendations for different branches and institutions on rational and safe nature use on the contaminated territories.

The aim of investigations conducted within the framework of "Rehabilitation of contaminated territories" is the elaboration of scientifically substantiated projects of rehabilitation of the concrete administrative districts and settlements on the contaminated territories of Gomel and Mogilev regions. This task has a complex character and requires the generalization of the investigation results in all other fields, their profound, systematic analysis aimed at the provision of complex, optimized solution of medical, radiation-hygienic, social-economic and socio-psychological problems caused by radiation catastrophe. The investigation results in this field are the basis for planning and realization of practical measures on providing normal life activity in the affected regions.

For the purpose of creation of radiometric and dosimetric base in the republic on December 21, 1990 the Republican scientific and technical programme on design and output of apparatuses and equipment for providing radiometric and dosimetric control has been approved. In the result of the realization of the programme there has been worked out and organized the industrial output of modern gamma-radiometers "Adani", "Vityaz", RKG-01A and -02A,

gamma-spectrometers "Prypiat", MKG -01A and others, beta-radiometers RUS-91, RUB-91, RIS-01A, etc. Mobile spectrometers for determining radiocaesium content in the man's organism have been manufactured.

There has been accumulated considerable and unique factual material about the results of radiation effect on man, flora and fauna, components of the environment. There have been determined the radiation doses and the combined effect of radiation and chemical factors are being investigated, clinico-epidemiological and medico-genetic estimation of the population's health state has been done. Technologies for agriculture under the conditions of the radioactive contamination have been worked out and introduced. The normative base for decontamination works and radioactive waste concealment has been created.

The acquired experience on organization and realization of measures in case of nuclear incident on reduction of its negative effects is of great importance.

The scientific research conducted within the framework of the State programme have allowed to estimate objectively ecological, medical, economic and social catastrophe consequences, to propose the number of measures aimed at their minimization.