

Social Aspects of the Chernobyl Activity in Belarus

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Introduction

The Chernobyl accident has caused heavy impact on the environment in Belarus, Russia and the Ukraine. It has also resulted in a significant worsening of the economic situation in the affected republics of the former USSR, as well as in disruption of social life in large territories, growing anxiety and fears among the people living in contaminated areas and significant medical effects on all categories of the people affected by the accident. The USSR authorities knew about the seriousness of the radiological situation caused by the Chernobyl accident from the very beginning. However, at the time of the accident, the Soviet Union was in a state of deep economic crisis and was unable to implement necessary measures to mitigate the radiological consequences of the accident. That was one of the reasons for the USSR to conceal the true information about the accident and its consequences from the Soviet people. The traditional Soviet policy of concealing all data on any unpleasant event happening in the Soviet Union had played a very important role too.

The collapse of the USSR created the formal possibility to develop appropriate policy aimed at mitigation of the Chernobyl consequences in Belarus, Russia and the Ukraine. However, implementation of this policy has been limited due to lack of necessary material and financial means. These and other problems are the subject of the present report.

Official Soviet Policy of Chernobyl Consequences Mitigation

Today it is well known that the Chernobyl accident had been the severest accident in the history of the peaceful use of nuclear energy in the world. However, understanding of this fact had become a very difficult problem for the international community.

On the other hand, the Soviet leaders recognised the disastrous character of the Chernobyl accident already several hours after the explosions at the Chernobyl reactor had happened. Chief of the General Staff of the Soviet Army, Marshall of the USSR S.Achromeev recalled 5 years later that the first information about the accident came to him 1 hour after the explosions at the Chernobyl reactor [1]. Immediately after receiving this information, the General Staff had begun its efforts on assessment of the scale of the accident. Approximately at 10 a.m. (8-9 hours after the explosions) this assessment was

finished and it became clear for the General Staff that the accident at the Chernobyl NPP had catastrophic dimensions, and that resources of the whole of the USSR were needed to overcome its consequences. This information was reported to the General Secretary of the Central Committee of the CPSU (Communist Party of the Soviet Union), M.Gorbachev in the morning of the 26th of April 1986.

Early in the morning of this day, the Government of the USSR had formed a Special Commission headed by the Deputy Prime Minister, E.Scherbina. This commission had to organise the necessary measures for liquidation of the Chernobyl accident.

Also, in the early morning of the 26th of April 1986 the USSR Ministry of Power had formed its own commission in order to study the reasons of the accident and for development of necessary measures. The member of this commission, the former Deputy Minister of the USSR, G.Shasharin wrote in his article published in 1991 in the Russian magazine "Noviy Mir" that he was informed about the accident at the Chernobyl NPP approximately at 4 a.m. on the 26th of April 1986 [2]. At that time he was on his vacation in Yalta in the Crimea.

Two days later the Politburo of the Central Committee of the CPSU had formed the Operative Group of the Politburo headed by the Prime Minister of the USSR N.Ryzhkov. The Operative Group had to co-ordinate the activities of all Ministries and organisations engaged in liquidation of the Chernobyl accident.

The above-mentioned facts clearly demonstrate that the Soviet leaders had all necessary information at their disposal from the very beginning, and recognised the seriousness of the situation caused by the accident. However, this information was not accessible for local authorities that had to organise countermeasures for radiological protection of the population. Sometimes, such information can be received only unofficially.

The former chief of police of Gomel region, General S.Sazonkin recalled later [3] that he had received the first information about the accident at the Chernobyl NPP in a telephone conversation with the chief of the KGB department of the Gomel region. This conversation had taken place in the morning on the 26th of April 1986. The KGB chief told General S.Sazonkin that something had happened at the Chernobyl NPP, and that this information originated from the KGB colleagues from Kiev.

After this conversation General S.Sazonkin had

ordered the police of the Gomel region to collect information about the radiation situation in the region. Thus, already on the 26th of April 1986, he had received data that the exposition dose rate in some villages of the Choiniki rayon reached 500 mR/h or 500,000 micro-roentgen per hour. This was about 50,000 times higher than before the accident.

According to General S.Sazonkin [3], the radiological situation in the Gomel region had become more clear to him only on the 1st of May 1986 when he was told by Gomel region authorities about the decision to evacuate all pregnant women and children under the age of 15 years from 25 settlements of Bragin, Choiniki and Narovlya district.

It seems that at first the Soviet leaders had decided to conceal even the fact of the Chernobyl accident. Such conclusion can be drawn from the fact that the first official statements about the accident was made only on the 29th of April 1986, when the Soviet television had given a short statement about the accident at the Chernobyl NPP in its evening programme [4]. However, this statement did not allow to make adequate conclusions about the scale and radiological consequences of the accident.

The Soviet Union was forced to deliver information about the accident due to the position of Sweden, which had established a very high increase in the background radiation on its territory soon after the explosions at the Chernobyl NPP took place.

As a result of the information blockade in the USSR, the general public was assured for a long time that the Chernobyl accident had affected only a limited number of Ukrainian settlements bordering the Chernobyl NPP. Sometimes, this caused surprising results.

It is well known that the territory of the Mogilev region is one of the most affected areas of Belarus. There are many settlements contaminated by caesium-137 to levels higher than 1,480 kBq/m² (40 Ci/km²) [5]. During the first three months after the accident at the Chernobyl NPP even regional authorities of Mogilev did not possess objective information about the radiation situation in the region. Consequently, instead of countermeasures to protect the population from the harmful impact of radiation in the Mogilev region, the region had to carry out various activities outside its territory in the course of liquidation of the consequences of the Chernobyl accident.

These and other interesting facts are given in the secret report submitted by the Special Commission of the Central Committee of the CPSU to the Central Committee of the CPSU. This commission had visited the heavily affected areas of the Mogilev region in January 1987 [6]. For example, the Commission reported that inhabitants of 8 settlements of the Mogilev region have been contaminated by caesium-137 with levels of 1,480 kBq/m² (40 Ci/km²) and higher, and have not received financial support established by a special decision of the Central

Committee of the CPSU on the 22nd of August 1986 [7].

According to this document, each member of a family residing in the area with caesium-137 contamination level of 550 kBq/m² (15 Ci/km²) and higher, had to be paid 30 roubles monthly. Such payment was meant for compensation of the financial damages inflicted to the families due to the restriction on consumption of the food-stuffs produced in their private households. Everywhere in the contaminated areas people called this money "coffin money".

The above-mentioned decision of the Central Committee of the CPSU from the 22nd of August 1986 also supposed a 25 percent increase in the salary of each working member of a family living in the area with caesium-137 contamination level of 550 kBq/m² (15 Ci/km²) and higher.

The Commission of the Central Committee of the CPSU had found other violations in the Mogilev region. It reported to the Central Committee of the CPSU that the authorities of this region did not even know about the necessity to use special agrochemical measures developed by Soviet specialists to decrease the transfer of radionuclides into vegetable and animal production [6]. The same situation subsisted in the private sector.

In reality, only some restrictive measures have been introduced in the Mogilev region before January 1987. Most of these measures were related to school children. They had to stay in school 12 hours each day without permission to leave the school building [6].

The facts about the Mogilev region given above were not unique only for Belarus. Alla Yaroshinskaya reported in her brilliant book "Chernobyl: Top Secret" that residents of the Ukrainian village Voroneve (Korosten rayon of Zhitomir region of the Ukraine) had begun to receive their "coffin money" in June 1989, i.e. three years after the accident at the Chernobyl NPP [8].

The situation with the payment of "coffin money" and other financial support was even worse in Russia than in Belarus and the Ukraine. Many regions had been affected by the Chernobyl accident in Russia. However, until April 1990, the authorities had been reporting only about the Bryansk region.

In September 1989 a group of Ukrainian liquidators had sent a letter to the General Secretary of the Central Committee of the CPSU of the USSR, M.S.Gorbachev, the Prime Minister of the USSR Council of Ministers, N.Ryzhkov and the Chairman of the Soviet Trade Union, S.Shalaev [9]. The Ukrainian liquidators complained about the worsening of their health state and about denials of doctors to attribute their illnesses to radiation. They also complained about the absence of social assistance. The liquidators have written in the letter: "We know that the party and the government had agreed and issued a number of documents, but they were not brought to us."

The liquidators from the Ukraine not only asked for social assistance, but also insisted on publication of all

documents regulating privileges and compensations for the people affected by the Chernobyl accident. The authors of this letter could not understand that lack of information on medical and social aid was reflecting the official Soviet policy toward the accident at the Chernobyl NPP and its consequences.

Practically, from the beginning, the authorities of the USSR considered this accident an ordinary accident with consequences that could have been liquidated within a couple of years. One should also remember that the human health and the life of the Soviet people had not been the highest priority in the former USSR. Moreover, the Soviet state had no means required for adequate social protection of the population affected by the Chernobyl accident. The inefficient economic system, arms race, the war in Afghanistan, large expenditures for the support of "democratic" movements in their struggle against the "world imperialism" had led the USSR to a state of deep economic crisis in the middle of 80's.

Due to these reasons, the Soviet state attempted to limit the programme of social assistance to the people affected by the accident at the Chernobyl NPP, and even to cease the implementation of this programme at all. Because of that, the inhabitants of the affected areas and liquidators could not get access to the documents establishing their privileges and compensations.

Such policy of the Soviet state in regard to social assistance had caused significant tensions in many cases. Sometimes residents of a village received their "coffin money" and a 25 percent increase in their salary, while the residents of a neighbouring village, that lived in similar conditions and worked together with the residents of the first village, did not receive any such assistance.

Medical Consequences and Problem of Relocation

The other problem of high importance which contributed to the social and psychological tension was the permanent worsening of the health state of the affected population.

In the case of children, a significant increase in different dysfunctions of thyroid, in the morbidity of iron deficiency anaemia, chronic diseases of the throat and nose, chronic bronchitis, bronchial asthma and pneumonia was found in comparison with the preceding years [10].

An increase in the morbidity of cerebrovascular system, hypertonia, chronic bronchitis, ulcers, rheumatism and other diseases was registered by adults living in the contaminated areas[10].

The Belorussian specialists have also established a reliable increase in the rate of congenital anomalies. Thus, the rate of inborn anomalies in the 17 most affected districts of the Gomel and Mogilev regions had increased from 4.27 cases out of 1,000 births in 1984-1985 to 6.89 cases out of 1,000 births in

1987-1988 [10].

However, all these medical effects were not recognised neither by Soviet specialists in radiobiology and radiation medicine nor by foreign specialists [11]. This resulted in the fact that Belarus had to face medical problems by the affected population without any medical assistance from the Centre and other countries of the world. Because of many shortages in the supply of medicines, as well as due to insufficient number of specialists in radiobiology and radiation medicine, the Republic was not able to implement adequate medical assistance to people affected by the accident. The medical situation in the contaminated areas of Belarus was also aggravated because the state did not pay the necessary attention to the problem of summer health improvement by children living in the affected areas.

This situation in this regard had begun to improve only in 1991 when the Belorussian authorities undertook a number of independent actions for liquidation of the Chernobyl consequences in Belarus. In early spring 1989 they declassified secret data on radiological situation in Belarus without asking permission to do so from Kremlin. This allowed the republican newspaper to publish geographic maps with data on levels of radioactive contamination of the territory of Belarus. The published data demonstrated that 23 percent of the Belorussian territory has been contaminated with caesium-137 to levels higher than 37 kBq/m^2 (1 Ci/km^2). It was also told that more than 2 million people were living in the affected territory.

After the secret data on contamination levels as a result of the Chernobyl accident have been published, a number of improvements were made in different areas connected to mitigation of the consequences of the Chernobyl accident in Belarus. For example, 59 thousand children living in the affected areas of Belarus could improve their health in summer in rest establishments, pioneer camps and different sanatoriums located in clean areas in 1989. However, this was only a small fraction of the children from the contaminated areas. The total number of such children constituted approximately 500 thousand.

All problems and shortages in social and medical fields in relation to overcoming of the Chernobyl consequences led the inhabitants of the affected areas to a conclusion that the only way to escape potentially dangerous radiation effects was to move from the contaminated areas to clean ones. Many inhabitants of the contaminated areas had come to this conclusion already some months after the accident at the Chernobyl NPP and left their homes.

As can be seen from the secret report of the Special Commission of the Central Committee of the CPSU cited above, approximately 20 percent of people living in areas of the Mogilev region with the caesium-137 contamination level of $1,480 \text{ kBq/m}^2$ (40 Ci/km^2) and higher had moved to clean areas of Belarus in 1986.

The desire of the inhabitants of the contaminated villages and settlements to be resettled to clean

territories had become a dominant factor for the people affected by the accident at the Chernobyl NPP after the publication of secret data in March 1989 by the Belorussian newspaper. This urge was so strong that even the party leaders of Belarus had begun to support the resettlement of people on a scale much greater than the one foreseen in Moscow.

For example, the leader of the Communist Party of Belarus E.Sokolov said at the First Congress of the People's Deputies of the USSR in May 1989 that the inhabitants of the affected areas had to be resettled in case the state was not able to provide normal living conditions without imposing any restriction and excluding the risk of damage to their health as a result of irradiation [12].

Resettlement was implemented in Belarus, Russia and the Ukraine in 1990-1995. About 130 thousand people were relocated in each of these countries from the affected to clean areas. This action required very large financial and material expenditures which had worsened the economic situation in the new states formed after the collapse of the USSR.

Many specialists outside the former USSR believe that extensive relocation of residents from the contaminated areas has been a great mistake on the part of Belorussian, Russian and the Ukrainian authorities.

The reason for such belief lies within the fact that the resettlement had given no improvement of the physical and psychological health state of the population from the affected territories [13]. The critics of relocation cannot understand that responsibility for such measures is born by the authorities of the USSR that were unable to understand the importance of psychological factors.

The lack of objective information about the Chernobyl accident and inappropriate protection measures have contributed to the development of extensive psychosomatic syndrome not only among the affected people but also among the inhabitants of clean areas.

The main legacy of the Chernobyl accident has been the anxiety about the state of health and a social disruption manifested in widespread health disorders not induced by radiation [13]. The authorities of Belarus, Russia and the Ukraine were practically pressed by the affected population to undertake extensive measures on resettlement.

One also needs to recognise that practically all protection measures undertaken in the USSR after the accident at the Chernobyl NPP have failed, such as iodine prophylactics, ban on consumption of contaminated foodstuffs, decontamination of affected settlements, attempts to improve the life standards in the affected areas, etc. The same happened to the state financial support of the people from the affected territories because the inevitably arbitrary allocations have produced an opposite effect, i.e. feeling of inequality and jealousy.

The "350 mSv Concept"

This feeling and the absence of adequate medical aid as well as the informational policy of the state over the years after the accident have caused deep distrust in the authorities and their promises to provide safe living conditions in the affected areas on the basis of the "350 mSv concept". This was the reason for many residents of the contaminated areas to believe that only resettlement could solve their Chernobyl problems. Local authorities of the affected territories shared the same point of view. It was clearly demonstrated at the XI Session of the Supreme Soviet of the BSSR, which had begun its work on the 28th of July 1989.

The main topic of this session was the discussion of the State Programme on Mitigation of the Chernobyl Consequences in Belarus, proposed by the government of Belarus. This Programme was developed on the basis of the so-called "350 mSv concept" approved of by the Head Physician of the Soviet Union on the 22nd of November 1988 [14].

The 350-mSv concept was a typical "threshold" concept based on the assumption that there exists such a dose of radiation, below which exposure causes no harm to the organism. The authors established 35 rem (0.35 Sv) as such a dose. According to this concept, all protective measures and restriction had to be lifted from the 1st of January 1990 in areas where irradiation dose over the period of 70 years was assessed to be 35 rem or less.

The "scientific" basis for the "350 mSv concept" was provided by specialists of the Ministries of Health Care of the USSR, BSSR, Russian Federation and the Ukrainian SSR, under the head of Academician L.Ilyin [15]. In 1988 they had carried out an assessment of the radiological consequences of the accident for the population of the USSR. As follows from their assessment, the biomedical consequences of the Chernobyl accident had to be so negligible that even extensive and careful studies could not have demonstrated harmful effects of the Chernobyl accident.

According to the authors of the assessment, in case all restrictions and protective measures were lifted, 80 percent of the inhabitants of the strict control zones (caesium-137 contamination level 555 kBq/m² (15 Ci/km²) and higher) would have received the lifetime dose of irradiation lower than 0.35 Sv (35 rem) over the period of 1986-2060. 14 percent would have received a lifetime irradiation dose of 0.35 Sv to 0.5 Sv, and only 6 percent would have received doses higher than 0.5 Sv. They also predicted that in case protective measures (decontamination of settlements, construction of roads with asphalt covering, use of special agricultural methods, etc.) are taken, people who would have received doses of 0.35 Sv to 0.5 Sv, would receive lifetime doses lower than 0.35 Sv and 6 percent of the inhabitants of the strict control zones would receive lifetime doses higher than 0.35 Sv. The total number of such persons was determined to be

17,900. 7,340 people in the Bryansk region, 7,360 in Belarus, and 3,200 in the Ukraine. These people needed to be resettled to clean areas.

This assessment was approved in March 1989 at the General Session of the Academy of Medical Sciences of the USSR and submitted to the World Health Organisation (WHO), the International Atomic Energy Agency (IAEA) and other international organisations. Later it was published by a world famous magazine on radiation protection [16]. Thus, the assessment of the radiological consequences of the Chernobyl accident made by the official specialists of the Ministries of Health Care of the USSR, Belarus, Russia and the Ukraine became known to specialists in radiation protection around the world and was accepted by the international radiation community as absolutely correct.

However, the data of the Soviet specialists [15,16] have not been correct. They have been too optimistic. For example, only 91 cases of thyroid cancer by children and adults of Belarus were predicted to happen as a result of the Chernobyl accident. The authors of the assessment predicted that these additional thyroid cancers would appear within 30 years (1990-2020), with the latent period of 5 years.

On the contrary, only 10 years passed since the accident (1986-1995), and 424 cases of thyroid cancer have been registered in Belarus by children under 15 years [17]. The morbidity rate of the thyroid cancer by children had been 1 case per year before the Chernobyl accident [18]. This taken into account, the number of radiation induced cancers over the period from 1986 to 1995 turns out to be 414. This is much more than the 91 cases of thyroid cancer predicted by the Soviet specialists in 1988 [15,16].

The given example illustrates the incorrectness of the official assessment of the radiological consequences of the Chernobyl accident. Hence, a conclusion can be made about the incorrectness of the "350 mSv concept".

The Belorussian Activity in Mitigation of the Chernobyl Consequences

The "350 mSv concept" was categorically rejected by the scientists of the Academy of Sciences of Belarus, as they believed that it had no real scientific basis. The same position in regard to the "350 mSv concept" was held by the members of the Supreme Soviet of Belarus. They demanded from the Government of Belarus to revise the suggested State Programme on Liquidation of the Consequences of the Chernobyl Accident in Belarus proposed by the Belorussian Government [19].

According to the members of the Belorussian Parliament, this programme developed on the basis of the "350 mSv concept" was aimed at only a small part of the residents of the strict control zones of Belarus.

The XI Session of the Supreme Soviet of Belarus became into a real public hearing on the Chernobyl problems in Belarus. This Session was broadcast by the Belorussian television. Besides, speeches of the People's Deputies were published by the republican press. Thus, all citizens of Belarus could hear very strong criticism of the authorities of the USSR and the republican authorities. Much was said about insufficiency of protective measures implemented in the affected areas of Belarus. An excerpt from the speech of the Chairman of the Gomel Regional Executive Committee, Member of Parliament N.Grines: "One needs to recognise that for three years we have been trying to realise wrong plans. The attempt to stabilise the situation by means of decontamination, agricultural methods, organisation of a service of residents of the strict control zones has given nothing. If one takes into account the fact that the majority of the affected population lives in rural settlements, one will understand that these measures could not have given any positive results." [20]

Participants of the Chernobyl hearings delivered many facts on the actual situation in the contaminated territories at the XI Session of the Supreme Soviet. For example, it was said that agricultural activities were still being carried out in areas with very high radioactive contamination levels, and even in the 30-km zone. Members of Parliament demanded to stop this dangerous practice because it led to production of contaminated foodstuffs and increased the potential danger for the health of the people living and working in the affected areas.

Very strong criticism was also expressed at the Session of the Supreme Soviet in regard to the inefficient social and medical support of the affected population, as well as to the inefficient organisation of health improvement by children living in the contaminated areas.

The revised State Programme on Liquidation of the Consequences of the Chernobyl Accident in Belarus [21] was heard at the XII Session of the Supreme Soviet of Belarus of the XI Convocation in October 1989. This programme was developed on the basis of the assumption that living in the affected territories, where it is impossible to produce clean agricultural and animal products, has no sense, even in case all possible protective measures have been taken.

The revised programme foresaw relocation of 118,276 inhabitants of the affected areas in comparison to relocation of 11,600 inhabitants suggested by the Government of Belarus in July 1989.

The relocation had to be carried out in three stages. In the first stage planned for 1990-1991, 17,083 inhabitants of the 112 settlements of the contaminated areas had to be relocated to clean areas of Belarus. The second stage was planned for 1991-1992. During this stage 4,685 persons had to be resettled to clean areas. The third stage foresaw resettlement of 96,508 inhabitants of 353 contaminated settlements after 1992 [21].

The new version of the Belorussian State Programme on Liquidation of the Consequences of the Chernobyl Consequences in Belarus also foresaw a number of social benefits and privileges for the inhabitants of the affected areas [21]. It decreased the pension age of the citizens living and working in the strict control zones by women from 55 to 50 years, and for men from 60 to 55 years. It also foresaw an increase in the annual vacation to 30 calendar days. In some cases, it could reach 42 calendar days. The residents of settlements with caesium-137 contamination levels of 185 to 555 kBq/m² (5-15 Ci/km²) received the right for a vacation of 24 calendar days. An increase was foreseen in the pensions for invalids from their childhood and non-employed pensioners. The state planned to pay 30 roubles monthly to each member of the family living in such affected areas, where clean foodstuffs could not be obtained.

Significant attention was paid in the State Programme to the improvement of medical assistance to people living in the affected areas, improvement of their health in rest homes and sanatoriums, development of an infrastructure of public health care and improvement in the supply of medicines and equipment to medical establishments.

The State Programme took into account practically the whole bulk of problems existing in the affected areas of Belarus, for example, problems of production of clean agricultural and animal products, construction of clinics and other medical establishments in the affected areas, supply of ecologically clean fuel (natural gas) to the residents of contaminated settlements, construction of water pipes, etc.

Without any doubts, a conclusion may be drawn that realisation of this extensive programme could mitigate the problems caused by the Chernobyl accident to a significant degree.

In order to reach this goal, however, the Republic needed significant material and financial support of the Centre. According to the decision of the Supreme Soviet of Belarus adopted at the XII Session on the 25th of October 1989, all financial expenditures (16.9 billion roubles) related to implementation of the Belorussian State Programme, had to be provided by the budget of the USSR. This was possible only in case the Supreme Soviet of the USSR had approved the Belorussian State Programme.

Changes in the Official Soviet Policy

The hearing of the Belorussian State Programme was carried out by the Supreme Soviet of the USSR at its Session on the 25th of April 1990. The Ukrainian and Russian programmes were also heard at this Session. Both of them differed strongly from the Belorussian Programme because they were based on the "350 mSv concept". Besides, the Russian Programme took into consideration only the Bryansk region, despite the fact that 16 regions of Russia were affected by the Chernobyl accident [22].

As a result of the hearing, the Supreme Soviet

issued a special decision in regard to mitigation of the Chernobyl consequences [23]. This document recognised protective measures taken in the USSR after the Chernobyl accident as insufficient, especially in relation to medical and social assistance to the affected residents.

The decision of the Supreme Soviet proposed to the Government of the USSR to develop a united programme of mitigating of the Chernobyl consequences in Belarus, Russia and the Ukraine on the basis of a concept of safe living in the affected areas acceptable for the population. It required from the governments of Belarus, Russia and the Ukraine to correct their programmes considering the comments made by the experts of the Supreme Soviet of the USSR and by the parliament members during the hearing.

In addition, the Decision of the Supreme Soviet of the USSR proposed to the Government of the USSR to develop a project of a special law on the Chernobyl catastrophe and to present it to the Supreme Soviet of the USSR before the end of 1990. The Supreme Soviet also demanded from the Government to elaborate in 1990 scientifically based criteria of safe living in the contaminated areas.

This Decision indicated also the necessity of a more substantial and urgent relocation of residents from the affected areas to clean areas of the USSR and a need for an improvement in the living condition of the people living in the affected areas.

This was the first document that demanded from the authorities to develop a state system of compensations and privileges for residents living in the affected areas, relocated from these areas, and for those residents who had abandoned these areas themselves. This also pertained to the military personnel involved in the liquidation of the Chernobyl accident and of other Soviet citizens involved in the liquidation of different categories.

The first step in the mitigation of the consequences of the Chernobyl accident, proposed to the Government of the USSR by the Decision of the Supreme Soviet, was to develop an urgent programme foreseen for the period of 1990-1992 and to allocate financial resources from the budget of the USSR to urgent measures in 1990 required by the radiological situation in the contaminated territories of Belarus, Russia and the Ukraine.

The document mentioned above indicated the difference in the positions of the highest legislative body of the USSR and the executive authorities. The latter insisted on implementation of the "350 mSv concept" although they attempted to correlate their position. So, in October 1989 under the influence of the events in Belarus, the Council of Ministers of the USSR and the All-Union Central Committee of Trade Unions had approved the decision aimed at improvements of the medical and social assistance to the residents of the affected areas [24].

The latter document included a number of points of

the Belorussian State Programme approved by the Supreme Soviet of the BSSR. However, the scope of the necessary measures established by this document was practically in the frames of the "350 mSv concept" that had to be implemented from the 1st of January 1990.

The Government of the USSR used all possible means to limit its expenditures for mitigation of the Chernobyl consequences because of the very complicated economic situation in the country. On the 19th of October 1989 the Government sent a letter to the International Atomic Energy Agency (IAEA) with a formal request for an assessment by international experts of the "350 mSv concept" and countermeasures undertaken in the USSR after the Chernobyl accident [25].

This letter had initiated the International Chernobyl Project which was carried out in 1990 under the aegis of the IAEA. Conclusions of international experts that took part in this project are well known [25]. The experts recognised the medical consequences of the Chernobyl accident as relatively small in contrast to the socio-economic consequences of this accident for Belarus, Russia and the Ukraine. The experts approved the countermeasures taken in the USSR after the accident and rejected the necessity of resettlement of the inhabitants of the heavily affected areas. In principle this meant support of the "350 mSv concept" and attempts of the USSR Government to implement this concept at any price.

However, the Government could not reach this goal because of the political situation in the USSR caused in the process of *glasnost* and *perestroika* initiated by M.Gorbachev.

Elaboration of a Legislative Basis for Mitigation of the Chernobyl Radiological Consequences

Due to democratisation of the Soviet Union and new information possibilities, the Chernobyl problem became the main political factor in Belarus. In spring 1990 the new parliament was elected in the republic. All candidates to parliament promised during their election campaign to do their best for mitigation of the consequences of the Chernobyl accident.

On the 19th of July 1990 the Supreme Soviet of the Belorussian SSR declared the republic as a "zone of national ecological disaster" [26]. From this time the republic started to carry out an extensive programme to liquidate the consequences of the accident at the Chernobyl NPP.

The legal basis for implementation of this programme was founded by the Law "On Social Protection of the Citizens Affected by the Chernobyl Catastrophe" approved by the Supreme Soviet of the Belorussian SSR on the 22nd of February 1991 [27]. This law was enforced in accordance with the Decision of the Supreme Soviet of the BSSR on the 22nd of February 1991 [28]. However, according to the Decision [28], a number of paragraphs and articles of

this Law had to be enforced only after the agreement with Moscow because their implementation required allocation of financial resources from the budget of the USSR.

The postponed paragraphs and articles of the Belorussian Law [27] gave a wide spectrum of social benefits, privileges and compensation to all categories of the people affected by the Chernobyl accident (including residents of areas contaminated with caesium-137 in the range of 37 to 185 kBq/m² (1-5 Ci/km²)).

By development of the Law on Social Protection parliament members used many positions of the Belorussian State Programme approved by the Supreme Soviet of Belarus in October 1989 and many positions of the Decision of the Council of Ministers of the BSSR and the Belorussian Republican Council of Trade Unions that supposed a number of measures for improvement of medical and social assistance to liquidators [29].

The Belorussian parliament established two kinds of radiological criteria for social and other benefits, privileges and compensations: level of territory contamination with caesium-137, strontium-90 and plutonium isotopes, as well as doses of irradiation.

According to this criteria all contaminated areas of Belarus were divided into 5 zones:

- the zone of evacuation or the territory around the Chernobyl NPP (30 km zone) and the territory with levels of contamination with strontium-90 higher than 111 kBq/m² (3 Ci/km²) and plutonium higher than 37 kBq/m² (1 Ci/km²);
- the zone of immediate resettlement where the surface contamination by caesium-137 is above 1,480 kBq/m² (40 Ci/km²), by strontium-90 above than 111 kBq/m² (3 Ci/km²), or by plutonium above 3.7 kBq/m² (0.1 Ci/km²);
- the zone of subsequent resettlement where the surface contamination by caesium-137 is in the range 555-1,480 kBq/m² (15-40 Ci/km²), by strontium-90 in the range of 74-111 kBq/m² (2-3 Ci/km²), or by plutonium in the range 1.85-3.7 kBq/m² (0.05-0.1 Ci/km²) and where the irradiation dose may be higher than 5 mSv (0.5 rem) per year;
- the zone with the right to voluntary resettlement with a housing guarantee where the surface contamination by caesium-137 is in the range 185-555 kBq/m² (5-15 Ci/km²), by strontium-90 in the range 185-74 kBq/m² (0.5-2 Ci/km²), or by plutonium in the range 0.37-1.85 kBq/m² (0.01-0.05 Ci/km²) and where the irradiation dose may be higher than 1 mSv (0.1 rem) per year;
- the zone of residence with periodic radiation control with surface contamination of 37-185 kBq/m² (1-5 Ci/km²) and where the irradiation dose is below 1 mSv (0.1 rem) per year.

The Law on Social Protection [27] established rules for compensations to all victims of the accident depending upon the category of the affected

population. The broadest privileges and benefits were given by the Law to those who participated in the liquidation of the Chernobyl accident (liquidators). Their compensation included salary bonuses, access to free health care and free health improvement in rest homes, additional pension payments, etc. The lowest benefits were given by the Law to people living in the zones of periodic radiation control. The inhabitants of such zones received only some additional payment (about 30 roubles monthly in early 1992).

Chernobyl Activities in Independent Belarus

In December 1991 the Belorussian Law on Social Protection was amended in order to consider the new political and economic situation caused by the collapse of the USSR. As a result of this collapse Belarus came to a situation where it had to finance all expenditures required in the frames of the Chernobyl mitigation programme. In the preceding period (July 1990 — October 1991) a significant part of the needed financial and material means was covered from the budget and resources of the USSR.

In order to finance the Chernobyl programme the Supreme Soviet of Belarus set an special 18 percent wage tax (agricultural activities were granted a tax exempt) since 1992 [30]. In 1992 it gave about 60 percent of financial means directed to mitigation of the Chernobyl consequences. In 1994 the extraordinary tax was decreased to 12 percent and in 1996 to 10 percent.

Despite a very complicated economic state the Government of Belarus could allocate a significant part of the budget for mitigation of the consequences of the Chernobyl accident: 16.8% in 1991; 12.6% in 1992; 9.6% in 1993; 6.9% in 1994 and 7.3% in 1995 [30].

The specified expenditures of Belarus for 1997 [31] have to be 7,199 billion Belorussian roubles from the total sum of state expenditures at 72,645 billion roubles or about 9.9 percent of the state budget. As can be seen from this data, the government allocated about 10% of the budget for mitigation of the Chernobyl catastrophe consequences in the period from 1991 to 1997.

The main part of the state expenditures in 1991-1997 was directed in Belarus at implementation of the relocation programme. In the course of realisation of this programme 58,100 residential houses and apartments have been built for resettled families in Belarus [30]. All these houses and apartments were constructed in clean areas of the

Republic. Over the same period different measures have been undertaken in the affected areas in order to improve the social-economic conditions in settlements where people had not moved away.

These measures include construction of 4,621 km of roads in the contaminated territories with hard covering, 1,099 km of water-pipe networks, 310 km of water drain, 1,072 km of gas networks, etc. [30]. A number of secondary schools have also been built with 28,000 places; pre-school establishments with 2,900 places, hospitals for 1,900 places, clinics and medical establishments for 10,700 visits per shift, etc. [30].

However, the real financial means used yearly during this period for the Chernobyl Programme decreased permanently because of decreasing of the state budget as a result of constant worsening of the economical situation in Belarus (the GNP of Belarus decreased by 40 percent in 1990-1996 !). This is the reason for rather small financial compensations of the state to the affected population of Belarus that have to live and work in the areas affected by the Chernobyl accident.

According to the Decision of the Council of Ministers of the Republic adopted on the 26th of May 1997 [32], the following compensations were established for each member of families living in the affected areas:

- 16,800 Belorussian roubles monthly in the zone of periodic radiation control;
- 21,800 Belorussian roubles monthly in the zone with the right for voluntary resettlement;
- 33,500 Belorussian roubles monthly in zones of subsequent and immediate resettlement.

This Decision also established an increase in salaries for employed persons, and payments for non-employed, pensioners, people living on social assistance, students and school children defined by the Law on Social Protection. This sort of financial assistance fluctuates from 13,800 Belorussian roubles in case of school children living in areas with periodic radiation control to 165,600 Belorussian roubles in case of persons working in the zone of evacuation.

One can imagine how small these compensation are, taking into account that \$1 costs about 27 thousand Belorussian roubles (official rate for summer 1997). Considering this fact one needs to understand that inhabitants of the affected areas of Belarus have to confront radiological consequences of the Chernobyl accident practically without assistance of the state.

Another important point is that these people form a rather large fraction of the Belorussian population. The total number of citizens in Belarus was 10 million 276 thousand people in 1996. The number of people living in areas with caesium-137 contamination density of 37 kBq/m² (1 Ci/km²) and higher was 1 million 625 thousand people (Table 1) or 15.8% of the total population in 1996. This number includes 426,591 adolescents and children (Table 2). The data on the number of settlements in contaminated territories of Belarus are given in Table 3.

Analysis of the data presented in Tables 1-3 shows that in 1996 no people have been living in areas contaminated with caesium-137 to levels higher than 1,480 kBq/m² (40 Ci/km²). All of them have been resettled to clean areas of Belarus.

Table 3 also indicates that the total number of settlements in the affected areas has dropped within the period of 1995-1996 from 3,221 to 2,930. Correspondingly the number of inhabitants in the contaminated territories dropped from 1,840,951 in 1995 to 1,625,981 in 1996 (see Table 1) or by 11.7%. The number of adolescents and children in the affected areas changed within the same period from 483,869 to 426,591 (see Table 2) which is 11.9%. These changes have mostly been a result of a contamination levels revision performed in Belarus in 1995 [33].

However, even this revision did not change significantly the fact that a very large fraction of the Belorussian population has to live and work in abnormal conditions of long-term irradiation as a result of the Chernobyl accident. The inhabitants of the affected areas are exposed to additional external and internal irradiation. The irradiation is especially serious in the case of inhabitants of rural settlements who consume foodstuffs produced in private sector that very often have high concentration of caesium-137 [34].

Practically, people living in the contaminated areas of Belarus have become a material of a scientific experiment being carried out to investigate the harm that can be inflicted by an accident at a NPP to heterogeneous population comprising pregnant women, infants, children, adolescents, old people, and the people

suffering from different somatic diseases. It is evident that data established in the course of such an experiment are very important for the whole international community. However, one needs to understand clearly that Belarus is not able to detect all these harmful effects of the Chernobyl radionuclides on hundreds of thousands of people without efficient assistance on the part of the international community. Belarus has simply no means to solve such a problem. The country had to make very large expenditures for implementation of the State Programme on mitigation of the Chernobyl consequences. But these expenditures are only a fraction of the material and financial losses of the republic. Belorussian specialists assess the total material financial damage caused by the Chernobyl accident in Belarus up to 235.4 billion USD only for the years 1986-2015 [30]. The largest share (81.6%) of this damage will be incurred by expenditures connected with the support of production and realisation of protective measures including resettlement. 12.6% will be direct and indirect losses and 5.8% will arise from the lost profit.

Summing up the information given in our paper one can imagine how large could be the economic damage caused by an accident at a nuclear power plant similar to the accident at the Chernobyl NPP.

The very important lesson of the Chernobyl accident, that needs to be considered by planning of countermeasures in case of a nuclear accident at a

Table 1 Number of residents living in the affected settlements of Belarus with levels of caesium-137 contamination 37 kBq/m² and higher [33].

Contamination level, kBq/m ²	Years				
	1991	1993	1994	1995	1996
37-185	1,489,630	1,488,350	1,490,545	1,485,193	1,302,971
185-555	281,309	322,425	317,301	314,193	298,584
555-1,480	79,066	43,198	41,928	41,282	24,426
Higher than 1,480	2,944	353	251	283	—
Alltogether	1,852,949	1,854,326	1,850,026	1,840,951	1,625,981

Table 2 Number of children and adolescents living in the affected settlements of Belarus with levels of caesium-137 contamination 37 kBq/m² and higher [33].

Contamination level, kBq/km ²	Years				
	1991	1993	1994	1995	1996
37-185	—	409,267	409,154	395,309	347,748
185-555	—	80,162	79,870	78,721	72,970
555-1,480	—	9,134	9,125	9,821	5,873
Higher than 1,480	—	34	27	18	—
Alltogether	—	498,597	498,176	483,869	426,591

Table 3 Number of settlements in the affected areas of Belarus with level of caesium-137 contamination 37 kBq/m² and higher [33]

Contamination level, kBq/km ²	Years				
	1991	1993	1994	1995	1996
37-185	2,206	1,935	1,937	1,933	1,752
185-555	999	1,112	1,100	1,102	1,091
555-1,480	307	191	186	176	87
Higher than 1,480	58	13	11	10	—
Alltogether	3,370	3,251	3,234	3,221	2,930

nuclear power plant, is that any lack of objective information and every attempt to downsize the scale of the accident will aggravate the social and economic consequences caused by this accident.

Summary

The information given in the present report demonstrates clearly that the central authorities of the former USSR had known since the very beginning that the Chernobyl accident had a catastrophic scale. However, an attempt was made to play down the scale of the accident because of the very serious economic difficulties and due to political reasons such as the traditional Soviet policy of concealing all information about heavy accidents in the country.

Only the collapse of the USSR has given the possibility to undertake serious countermeasures aimed at decreasing the harmful impact of radiation. However, these measures could not have been carried out in full-scale due to the deep economic crisis in the country and because a very significant fraction of the Belorussian population has to live and work in conditions of long-term external and internal irradiation. Thus, the international community has a chance to study the consequences of a large nuclear accident. Such experience might be very useful in the use of nuclear energy for electricity generation on a wide scale. In order to obtain reliable data related to such accidents the international community has to render Belarus adequate assistance.

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