

The Crisis of the International Radiation Community
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Introduction

15 years passed since the Chernobyl accident. Within this period very much data was collected by the Belarusian, Russian and the Ukrainian specialists. These data clearly show that the Chernobyl accident is the most severe accident in the history of peaceful use of nuclear energy in the world. It has caused a heavy impact on the environment in Belarus, Russia and the Ukraine, significant worsening of the economic situation in these countries, disruption of social life in the affected areas, growing anxiety and fears among the people living in the contaminated territories, as well as significant biomedical effects by these people and by other categories of people.

At present there are no controversies about the ecological, economic, social and psychological consequences of the nuclear explosion at the Chernobyl NPP. At the same time there exist significant differences in the assessment of radiological consequences of this accident. Specialists in the affected republics of the former USSR had established a significant rise in the incidence of many somatic diseases soon after the accident. However, the international radiation community either denies such effects at all or rejects any link between the increase in the morbidity in general somatic diseases and the Chernobyl accident and attempts to explain this increase on the basis of purely psychological factors and stresses. Such position of the international radiation community results from some political reasons and from the fact that it recognises only leukaemia, solid cancers, teratogen and genetic effects as late effects of radiation. At the same time even in the case of medical effects recognised by the international radiation community (community that includes specialists in radiation medicine, radiation biology and radiation protection) failed to make a correct assessment of thyroid cancers and hereditary malformations resulting from the Chernobyl accident. As well, it could not realise timely the real reasons and consequences of the Chernobyl accident. These implications may be considered as a sign of a crisis of the international radiation community. It could not assess the seriousness of the Chernobyl accident and its radiological consequences. Instead of taking an objective position in order to help the affected populations of the former USSR the international radiation community practically played a role of an advocate of the USSR government that tried to play down the consequences of this accident from the very beginning. These and other problems are discussed in the present report.

Official Assessment of Reasons and Consequences of the Chernobyl Accident

The Chernobyl accident occurred on the 26th of April 1986 when the personnel of the fourth unit of the Chernobyl NPP attempted to test the capability of a turbogenerator to supply electrical energy for a short period of time in a case of a station blackout. The accident completely destroyed the reactor and as a result large amounts of radioactive materials have been released to the environment. The Soviet authorities initially tried to conceal the fact of this accident. But as it was impossible, they attempted to play down the radiological consequences of the accident.

Soon after the accident the IAEA and the USSR agreed to hold a Post-Accident Review Meeting in Vienna. This meeting had taken place on the 25th-29th of August 1986. At this meeting Soviet specialists presented different information on the accident and its radiological consequences[1].

According to the Soviet point of view the main reason for the accident was a violation by the Chernobyl NPP personnel of the procedures of nuclear power reactor operation developed in the USSR. The Soviet specialists had also delivered their prognoses of the Chernobyl accident radiological consequences. They explained that deterministic effects (acute radiation syndrome, skin erythema etc) were established only among the personnel and the firemen involved in the extermination of the accident. The Soviet specialists had excluded the possibility of deterministic effects among the population and forecasted only negligible stochastic effects (mostly leukemia and cancers). For example, their calculations based on the non-threshold hypothesis of the dose-effect relationship forecasted that the increase in the mortality rate due to additional malignant neoplasms caused in the affected regions of the USSR by the Chernobyl accident had to be less than 0,05% of the spontaneous cancer mortality rate. This result covered the population of the European part of the USSR (about 75 mln. people).

The explanations presented by the Soviet part have been fully accepted by the participants of the meeting. This can be seen from the Summary Report of the Post-Accident Review Meeting in Vienna, published by the IAEA in September 1986 [2]. On page 28 of the above mentioned report one can read the following: "The foregoing account is based on the Working Documents submitted and information volunteered by the Soviet experts. On the basis of this information we have a plausible explanation for the sequence of events at Chernobyl Unit 4, and no attempt has been made to find alternative." On page 17 of the Summary report of the IAEA it is stated that: "The errors and violations of procedures were the major factors contributing to the accident."

The participants of the IAEA meeting have also agreed with the prognosis of radiological consequences suggested by the Soviet specialists. Such conclusion can be drawn on the basis of the following statement made on page 7 of the Summary Report of the Post-Accident Review Meeting: "... it appears that over the next 70 years, among the 135000 evacuees, the spontaneous incidence of all cancers would not be likely to be increased by more than about 0,6%. The corresponding figure for the remaining population in most regions of the European part of the Soviet Union is not expected to exceed 0,15% but is likely to be lower, of the order of 0,03%. The relative increase in the mortality due to thyroid cancer could reach 1%" [2]. This assessment of the international radiation community was not changed until the present time.

The Post-Accident Review Meeting has delivered plausible explanations of the reasons of the Chernobyl accident and its radiological consequences accepted by the international radiation community. However, these explanations have been rather incorrect. It is known at present, that different shortages of the RBMK-type reactor project (four reactors of this type were in operation at the Chernobyl NPP at the time of the accident) made the greatest contribution to the accident [3] compared with mistaken of the personnel of the NPP, as it was stated in the Post-Accident Review Meeting in Vienna [2].

The most important of these shortages were [3]:

- large positive void coefficient;
- unstable operation at low reactor power;
- possibility of power excursion;
- imperfect construction of absorber rods (use of graphite water displacers linked with absorber rods).

One needs to notice that the IAEA had to correct its explanation of the direct reasons of the Chernobyl accident only 7 years after the Post-Accident Review Meeting in Vienna.

A question arises: why did the experts not even try to look for other explanations of the reasons of the Chernobyl accident, especially after the Soviet experts had told at the Vienna Meeting, that special remedial actions were planned to improve the safety of the RBMK reactors operation. These actions include an increase of the full enrichment from 2,0% to 2,4% and installation of additional absorbers into the core (these two measures were developed to mitigate the problem of the positive void coefficient of the RBMK-type reactors - one of the main reasons of the accident). The usage of fast shutdown system and some other systems had also been foreseen. Suggestion of such measures for assuring of nuclear safety indicated, that Soviet specialists knew very well shortages of the RBMK project.

Two different explanations can be suggested for the fact, that the participants of the Post-Accident Review Meeting in Vienna could accept the official Soviet explanation of reasons of the accident. First is, that the experts at this meeting did not understand the specific features of the RBMK-type reactors. Second is, that they were unwilling to doubt the official Soviet point of view in order to save the image of nuclear energy.

The first explanation is quite unreasonable, because all remedial actions to improve the nuclear safety of reactors of the RBMK-type, that were suggested by Soviet specialists at the Post-Accident Review Meeting in Vienna indicated clearly the project shortages of such reactors.

It seems to us, that the second explanation is more adequate and unpleasant for it means that the specialists in the field of nuclear safety are ready to conceal the real dangers of the peaceful use of nuclear energy. The publication of the document [3] has practically put an end to the inadequate explanations of the reasons of the Chernobyl accident. However, a different situation remains in case of the radiological consequences of the accident. In fact, up to now the international radiation community insists that the radiological consequences of the Chernobyl accident are almost negligible. Only in 1995 did the international radiation community recognise the relation between irradiation and the high increase in the thyroid cancer incidence among children in Belarus, the Russian Federation, and the Ukraine [4]. All other effects established by the Belarusian, Russian, and the Ukrainian specialists are completely rejected [5].

For example, the international radiation community does not recognise the data of Prof. G.Lazjuk and his colleagues [6,7] on hereditary malformation in the affected areas of Belarus. As well, nobody recognises the valuable statistical data on the significant increase in the morbidity rate in different somatic diseases, established soon after the Chernobyl accident in Belarus, the Russian Federation, and the Ukraine. As far as the radiological consequences of the Chernobyl accident are considered, the international radiation community continues to advocate the idea suggested by the Soviet specialists and accepted at the Post-Accident Review Meeting in Vienna, that the radiological consequences of the Chernobyl accident cannot even be determined.

Such position of the international radiation community was of great importance for the Soviet authorities that have been trying from the very beginning to play down the Chernobyl radiological consequences. At the time of the accident the Soviet Union was in a state of a deep economic crisis and could provide only limited assistance to the affected populations of Belarus, Russia and the Ukraine. Another important reason for the Soviet Union to play down the real reasons and consequences of the Chernobyl arose from the common practice of the former USSR to tell the Soviet people, that any bad accidents are usual for capitalistic countries and can not never happen in the USSR. And due to this reason all information related to the Chernobyl accident and its radiological consequences in the former USSR was concealed not only from the general public but in many cases from the specialists in the field of radiation protection. For example, the data presented by the Soviet experts at the Post-Accident Review Meeting in August 1986 were closed in the USSR for a long time. The same happened to different documents regulating protective measures in the contaminated areas of the USSR.

Medical Effects by People Affected by the Chernobyl Accident. The “350 mSv concept”

The complicated economic state of the USSR was possibly the main reason for elaboration of the so-called 350 mSv concept or the lifetime dose concept that established a limit of irradiation of the affected population. This concept was developed by the National Commission on Radiation Protection of the USSR (NCRP) in the late autumn 1988 [8].

The 350 mSv concept was based on the following assumptions:

- the sum of external and internal doses that can be delivered to a person as a result of the Chernobyl accident will not exceed 350 mSv within 70 years period beginning from the 26th of April 1986 in the majority of the contaminated areas of the USSR;
- an additional dose of radiation equal or less than 350 mSv accumulated within the whole lifetime on the contaminated territory will have no significant medical consequences for the people.

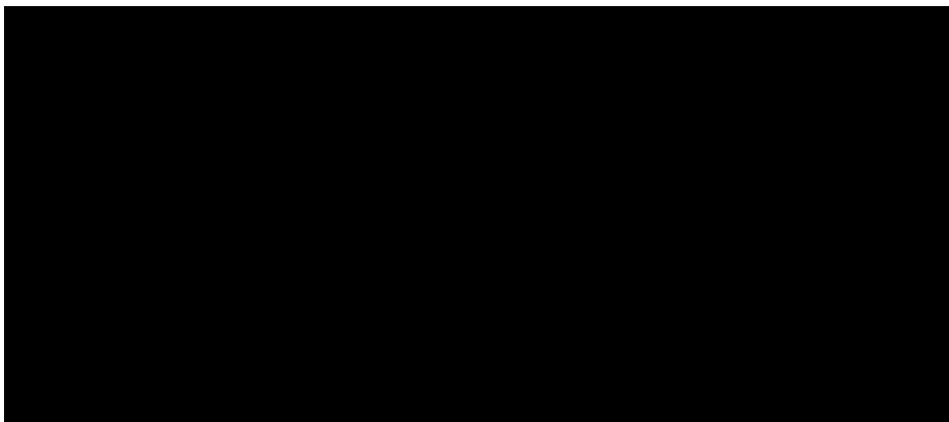
In accordance with these assumptions there was no necessity to carry out different protective measures including relocation practically in all areas of Belarus, Russia and the Ukraine affected as a result of the Chernobyl accident. It was foreseen to implement the 350 mSv concept beginning from the 1st January 1990. Along with its implementation all restrictions introduced in the contaminated areas after the accident had to be lifted.

The 350 mSv concept was based on prognoses of medical consequences made by the Soviet specialists in the summer 1986 [1], as well as on the basis of a revised assessment carried out under supervision of Prof. L.Ilyin et al. late in 1988 [9]. The new predictions agreed very well with the old

ones. However, they were incorrect as the previous ones. This is especially well seen in the case of thyroid cancer.

According to the assessment [9], only 39 additional thyroid cancers would have induced by children of Belarus as a result of the Chernobyl accident. They had to appear within the 30-year period after the latent period of 5 years. This means, that manifestation of radiation-induced thyroid cancers by children of Belarus has to be expected only beginning since 1991.

This prognosis of Prof. L.Ilyin et al.[9] were completely wrong. It can be seen from Table 1, where the data on the thyroid cancer incidence in Belarus [10] are given. Only 7 cases of children's thyroid cancer have been registered in Belarus within the 9-year period before the Chernobyl accident in 1977-1985 (Table 1). This gives 1 thyroid cancer per year as a spontaneous morbidity rate by children in Belarus in thyroid cancer. Taking this value into consideration one had to expect only 5 children's thyroid cancers in Belarus within the first 5 years after the Chernobyl accident. On the contrary, 47 cases of this cancer have been established over 1986-1990. This is 9 times more as compared to the expectations based on the assumptions made by Prof. L.Ilyin et al.[9].



The total number of excess children's thyroid cancers established in Belarus in 1986-1999 or in the first 13 years after the Chernobyl accident, reached 662 cases [11]. It exceeded 17 times the total number of radiation-induced children's thyroid cancers predicted by authors [9] for the 30-year period after the accident beginning since 1991. It was also established in the study [11] that a significant increase in the incidence of thyroid cancers by adolescents and adults of Belarus occurred after the Chernobyl accident. According to the assessment [11], about 3,236 radiation-induced thyroid cancers manifested in Belarus in 1986-1998 by adolescents and adults. This number of excess thyroid cancers is 62 times higher than the number of thyroid cancers by adolescents and adults of Belarus, that was forecasted by Soviet specialists for the time period 1986-2025 [9] and that was accepted by the international radiation community. It is very interesting, that specialists in the field of the radiation protection reject up to present even the possibility to establish the increase in the incidence in thyroid cancers and other malignant neoplasms by adolescents and adults of the affected regions of the former USSR. As can be seen from the comparison of predicted and real data, the prognoses of the Soviet specialists [1,9] had underestimated to a great extent manifestation of radiation-induced thyroid cancers in Belarus resulting from the Chernobyl accident. The same may be concluded in regard of the hereditary malformations in the contaminated areas of the former USSR. Predictions [1,9] excluded practically even the possibility of such effects being established. The incorrectness of this conclusion was demonstrated by Prof. G.Lazjuk and his colleagues [6,7].

The mentioned facts are without doubt an indication of the serious underestimation of the radiological consequences of the Chernobyl accident made by the authors of the assessment [1,9]. This fact was evident for many specialists in the contaminated areas of Belarus, Russia and the Ukraine. They had established a significant worsening in health of the affected population soon after the accident.

However, the results of the assessments [1,9] as well as the 350 mSv concept were considered by Soviet authorities and the international radiation community as valid.

One needs to notice here, that the international radiation community had known in details the new Soviet assessment of the Chernobyl radiological consequences[9] and the 350 mSv concept. The report of Prof L.Ilyin et al. [9] was discussed in March 1989 at the Session of the USSR Academy of Medical Sciences and has been submitted then to the World Health Organisation. Later it was published as a scientific article in a famous international journal [12]. The same happened to the 350 mSv concept. The report on the 350 mSv concept was delivered by Prof. L.Ilyin at the 38th Session of the United Nations Scientific Committee on Effects of Atomic Radiation (UNSCEAR), that was held in Vienna on 8-12 May 1989 [13]. The 350 mSv concept was also presented on the 12th of May 1989 at an informal meeting on the Chernobyl consequences organised by the Secretariat of the IAEA [14].

The new Soviet prognoses made in 1989 [9] did not cause any criticism of the international radiation community. Such conclusion can be made from the fact that the contents of the article by Prof. L.Ilyin and his colleagues [12] did not significantly differ from the report [9] and from the extensive help of the international radiation community to the Soviet government in its attempts to implement the 350 mSv concept.

Experts from WHO and League of Red Cross and Red Crescent Societies.

This help was demonstrated by a visit of a group of the WHO experts to the Soviet Union in June 1989. This visit found place due to a request of the Soviet Government. The group of the WHO experts included the following specialists: Dr. D. Beninson, Chairman of the International Commission on Radiological Protection (ICRP), Director of License Department of Argentina Atomic Energy Commission; Prof. P.Pellerin, Chief of Radiation Protection Services of the French Health Ministry, member of the ICRP; Dr. P.J.Waight, Radiation Scientist of the WHO Division of Environmental Health [15].

The WHO experts attended a meeting of the USSR National Commission on Radiation Protection in Moscow, where they had taken part in a discussion of the principles and implementation of the 350 mSv dose. They had also taken part in meetings and discussions with other specialists of the affected Soviet republics and people from contaminated areas. In Minsk the WHO experts had visited a special meeting on Chernobyl problems held at the Academy of Sciences of Belarus. Such well-known specialists of the Ministry of Health Care of the USSR as Prof. L.Ilyin, Prof. L.Buldakov, Prof. A.Guskova and other had participated in that meeting. At all of these meetings and discussions the WHO experts had completely approved of the official Soviet point of view that the Chernobyl accident could not cause significant health effects by the affected populations. They not only agreed upon the 350 mSv concept, but even volunteered the view that, had they been requested to set a level for the lifetime dose, they would have chosen a value of the order of two to three times higher than 350 mSv [15].

The WHO experts had also rejected any relation between radiation and the significant increase in the morbidity in many somatic diseases established in the affected areas of Belarus, Russia and the Ukraine soon after the accident. In regard to this problem they said in their report to the USSR government: "... scientists who are not well versed in radiation effects have attributed various biological and health effects to radiation exposure. These changes can not be attributed to radiation... and are much more likely to be due to psychological factors and stress. Attributing these effects to radiation only increases the psychological pressure in the population and provoke additional stress-related health problems, it also undermines confidence in the competence of the radiation specialists. This has in turn, led to doubts over the proposed values. Urgent consideration should be given to the institution of an education programme to overcome this mistrust by ensuring that the public and scientists in allied fields can properly appreciate the proposals to protect the population" [15].

The quotations given above from the report [15] clearly show that the WHO experts played a role of advocates of the Soviet authorities which tried to play down by any means the scale of the Chernobyl accident and its radiological consequences. In January 1990 the special Mission of the League of the Red Crescent Societies had also visited the affected areas of Belarus, Russia and the Ukraine [16]. This Mission comprised 6 members - qualified specialists in different branches of medicine from the United Kingdom, Sweden, the Netherlands, the Federal Republic of Germany and Japan. The experts of the Mission of the League of Red Cross and Red Crescent Societies were more careful in their assessment of the radiological situation in the affected areas. However, they too could not understand

the real reasons for the worsening of the health state of the population affected by the Chernobyl accident. In the summary of their report compiled after returning from the affected areas they had stated the following conclusions: “Among the health problems reported it was felt that many of these, though perceived as radiation effects both by the public and by some doctors, were unrelated to radiation exposure. Little recognition appears to have been given to factors such as improved screening of the population and changed patterns of living and of dietary habits. In particular, psychological stress and anxiety, understandable in the current situation, cause physical symptoms and affect health in a variety of ways” [16].

Nevertheless, the Mission of the League of Red Cross and Red Crescent Societies was able to understand the seriousness of the situation in the affected areas of Belarus, Russia and the Ukraine. They had managed to come to the correct conclusion that in some cases relocation of people must have been accepted as one of the countermeasures. Taking this into account, they stated that the indications for relocation should not only be based on radiation doses, but on considerations of socio-economic conditions of inhabitants of the affected areas as well. This conclusion has been a very important one because the central authorities of the USSR were making all attempts to avoid the relocation as a measure of radiation protection.

International Chernobyl Project

In 1990 the International Chernobyl Project has been carried out under the aegis of the IAEA. The Project was initiated on the letter of the Soviet government sent on October 1989 [17]. The letter requested the IAEA to conduct an evaluation of the countermeasures taken in the USSR after the Chernobyl accident and of the future protective measures.

Conclusions made on the basis of this evaluation were published in 1991 in a special report [17]. The report stated in regard of the biomedical consequences of the Chernobyl accident: “There were significant non-radiation-related health disorders in the populations of both surveyed contaminated and surveyed control settlements studied under the Project, but no health disorders that could be attributed directly to radiation exposure. The accident had substantial negative psychological consequences in terms of anxiety and stress due to the continuing and high levels of uncertainty, the occurrence of which extended beyond the contaminated areas of concern. These were compounded by socio-economic and political changes occurring in the USSR. The official data that were examined did not indicate a marked increase in the incidence of leukaemia or cancers. However, the data were not detailed enough to exclude the possibility of an increase in the incidence of some tumour types. Reported absorbed thyroid dose estimates in children are such that there may be a statistical increase in the incidence of thyroid tumours in the future.

On the basis of the doses estimated by the Project and currently accepted radiation risk estimates, future increases over the natural incidence of cancers or hereditary effects would be difficult to discern, even in large and well designed long term epidemiological studies” [17].

This abstract shows that the participants of the International Chernobyl Project practically repeated the conclusions of the official Soviet predictions presented at the Post-Accident Review Meeting in August 1986 in Vienna [1] as well as the conclusions of the documents [2] and [9].

The following conclusions were made in the Report of the participants of the International Chernobyl Project in relation to the increase in the morbidity in general somatic diseases that have been registered by medical specialists of Belarus, Russia and the Ukraine in the contaminated areas: “Reported adverse health effects attributed to radiation have not been substantiated either by those local studies which were adequately performed or by the studies under the Project.

Many of the local clinical investigations of health effects had been done poorly, producing confusing often contradictory results. The reasons for these failures induced: lack of well maintained equipment and supplies, poor information through lack of documentation and lack of access to scientific literature; and shortages of well trained specialists” [17].

In accord with these statements radiobiological consequences of the Chernobyl accident must have been relatively insignificant. However, such conclusion was wrong and that was proved just a couple of years after the International Chernobyl Project. Thus, one could wonder about the reasons for the experts participating in the International Chernobyl Project to be so optimistic in the evaluation of the

radiological consequences of the Chernobyl accident. This question sounds especially justified in case one notices that practically all participants of this project had materials showing a picture contrary to their optimistic assessment. It is known that the international experts who had taken part in the International Chernobyl Project were aware of the report by the Minister of the Ministry of Health Care of Belarus [18] delivered at an informal meeting arranged by the IAEA Secretariat on the 19th of December 1989 in Vienna.

The Belarusian Minister reported about a significant increase in the morbidity of thyroid by children especially in heavily contaminated districts of the Gomel region. He also informed the participants of the meeting about an increase in the rate of hereditary malformations in new-born: “The frequency of the birth of children with congenital developmental defects (with stricter recording) in the areas contaminated with radionuclides over recent years has increased somewhat more significantly than in remaining areas of the Republic (except the Grodno region). This index is 5.65 (per 1000 newly born) for Byelorussia but 6.89 for the contaminated areas [18].

In regard of the worsening of the general health state of the affected population the Minister stated: “Among adults in 1988 there was a two- to fourfold increase, in comparison with preceding years, in the number of persons suffering from diabetes mellitus, chronic bronchitis, ischemic heart diseases, nerve diseases, ulcers and chronic bronchopulmonary diseases. There was also a noticeable rise in the proportion of children with various functional disorders, neurasthenic and anaemic syndromes, chronic diseases of the tonsils and nasopharynx, etc. At the same time, doctors of all specialities have noted a more difficult and more prolonged course of many diseases, a higher frequency of complications and an increase in adequate drug response” [18].

Despite of the official character of the information presented by the Belorussian Minister it was completely ignored and was not considered during implementation of the International Chernobyl Project. This disregard is often explained by the international radiation community by the low competence of the specialists working in the contaminated areas of Belarus, Russia and the Ukraine and by lack of reliable data on the morbidity in these and clean areas. Such explanation is not correct, at least in Belarus. For example, the monitoring of hereditary malformation of stricter recording has been carried out in Belarus since 1982 [6]. One needs to know, that submission of data on hereditary malformations of stricter recording such as reduction of extremities, spina bifida, polydactyla, etc. to the national register is compulsory in Belarus. Such conditions allow to acquire reliable statistics related to the hereditary malformations.

Thyroid cancer by Belarusian children

The Belarusian specialists could also prove their high professional skills in the case of children's thyroid cancer. Different doubts were expressed by specialists of other countries after a group of Belarusian specialists had published their data on thyroid cancer by children in Belarus in the scientific journal “Nature” in September 1992 [19]. These data were immediately criticised as no valid. According to [20,21] a significant rise in the incidence of children's thyroid cancers in Belarus could be caused by the improved screening after the Chernobyl accident. Specialists of the World Health Organisation had suggested two rather exotic hypotheses [22]. According to the first, the growth in the thyroid cancer incidence by children of Belarus could have been caused by giving stable iodine substances to children in the affected areas after the decay of radioactive iodine in order to prevent endemic goitre. The second hypothesis was based on the assumption that children's thyroid cancer in Belarus has been induced by chemical species (nitrates, etc.) in fruit and vegetables brought to the Republic from the Soviet Middle Asia, where mineral fertilisers and pesticides are heavily used.

It is evident that these hypotheses are not plausible. The drugs of stable iodine were used in Belarus over a number of years before the Chernobyl accident because the soil in Belarus, especially in the Gomel and Brest regions are short of stable iodine. However, no increase in the thyroid cancer incidence has been registered in Belarus prior to the Chernobyl accident. On the other hand, the amounts of fruit and vegetables from the Soviet Middle Asia have not been large enough to be accessible to a significant number of children in Belarus.

The specialists of the WHO believed, that their hypotheses could be valid because at the time of publishing of the paper [19] only a minor increase in the thyroid cancer incidence has been registered

in the Ukraine and no increase at all in Russia. Thus, a large increase in the incidence in thyroid cancers by children of Belarus could indicate some special Belarusian peculiarities.

In reality, this difference in the morbidity in thyroid cancer in Belarus, Russia and the Ukraine had another reason. It is known [23], that the highest thyroid doses have been delivered to the affected children in Belarus and the lowest to the children in Russia. This fact explains the difference in the manifestation of thyroid cancers in the affected republics of the former USSR as it is known that the latency period is shorter by higher doses of irradiation.

Some specialists denied that radiation could have been the reason for the increase in the children's thyroid cancers in Belarus because of a very short latent period by this cancers in Belarus. Such specialists simply could not understand that the duration of the latent period depends strongly on the number of irradiated persons. It can be also lessen if the number of exposed persons increases. This very important idea was suggested by a famous specialists in the field of radiation medicine Prof. J. Gofman [24] a long time before the Chernobyl accident. The Belarusian specialists have managed to prove the validity of this idea by Prof. J. Gofman in the case of thyroid cancers, thus making a significant contribution to the study of radiation effects on the organism. In 1993-1995 it was confirmed that their data have been correct [4, 25, 26].

Increased morbidity in general somatic diseases

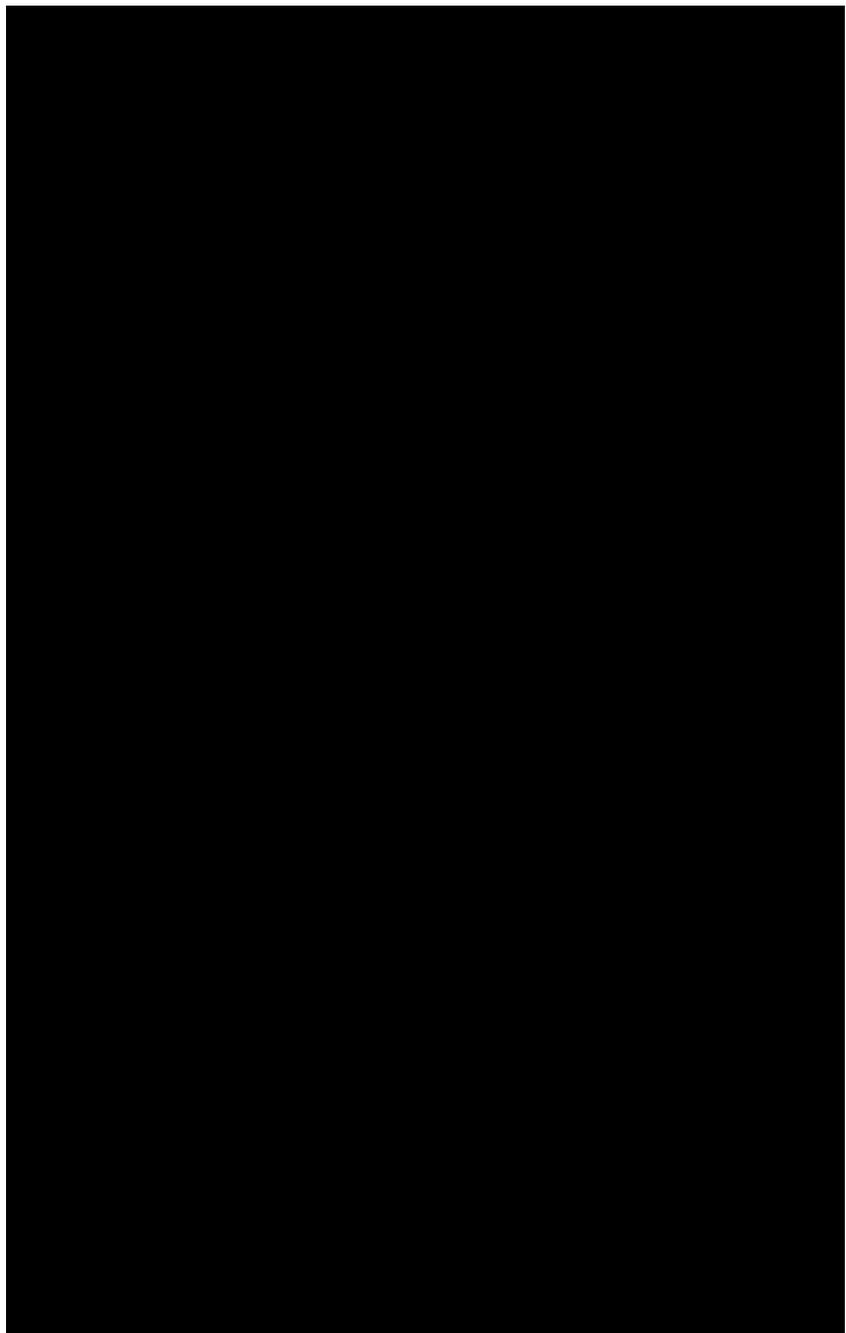
Another very important contribution on the part of the Belarusian specialists is the establishment of a significant increase in the incidence of the general somatic diseases among the affected populations. Many specialists doubt that an increase in the incidence of general somatic diseases exists. The fact that such doubts have no serious grounds becomes evident from the data given in Tables 2 and 3 of this report. These data are results of epidemiological studies carried out by Dr. P. Shidlovsky for the residents of the contaminated and control districts of the Brest region [27, 28].

As can be seen from Tables 2 and 3, there had been a significant difference in the morbidity in many classes of general somatic diseases in adults and children living in the contaminated and clean areas of the Brest region. In the case of adults such difference may be observed in infections and parasitogenic diseases, diseases of the endocrine system, maldigestion, disorders of metabolism and immunity, psychic disorders, diseases of the circulatory system, cerebrovascular diseases, diseases of the respiratory system, diseases of digestive organs, etc [see Table 2].

In the case of children a significant difference was established in infections and parasitogenic diseases, diseases of the endocrine system, psychic disorders, disease of the nervous system, diseases of the sense organs, diseases of digestive organs, etc [see Table 3].

Dr. P. Shidlovsky had surveyed a large number of persons in his studies of the contaminated and control districts. This provides a significant reliability of his results. For the cohort of residents of the contaminated districts he had used all residents of Luninets, Stolin and Pinsk districts of the Brest region. The total number of people living in these districts constituted in 1990 approximately 182,900 persons. The average caesium-137 contamination is 37 to 185 kBq/m² (1-5 Ci/km²) [27,28]. As the control cohort Dr. P. Shidlovsky had used residents of Kamenetsk, Brest, Malorita, Zablinka and Pruzany districts of the Brest region with total number of 179,800 persons [27, 28].

These novel findings of the Belarusian scientist Dr. P. Shidlovsky were later confirmed by many other specialists of the CIS. In February 1993 the official magazine of the Ministry for Health Care of Belarus "Zdravookhranenie Belarusi" published results obtained by the Ukrainian epidemiologists [29]. They analysed the morbidity among 61,066 persons evacuated from the 30-km zone in 1986. The Ukrainian have found data similar to that of Dr. P. Shidlovsky for this category of people. Nearly the same results have been established for Belarusian and Russian liquidators [30, 31].



The studies [30, 31] established reliable data showing that the difference in the morbidity of liquidators and the general public increases with time. A similar increase is to be found in all other categories of the affected populations. Table 4 compiled by the author of the present report on the basis of data of the National Medical Register published by authors [32] indicates this fact clearly.

An analysis of Table 4 shows the existence of an evident correlation between doses of irradiation or levels of surface contamination and the morbidity of the affected populations. The highest incidence in somatic diseases in comparison to the total population of Belarus is to be found by liquidators and people evacuated from the 30-km zone in 1986, the lowest – in the residents of territories contaminated with caesium-137 less than 555 kBq/m² (15 Ci/km²).

Comparison with Japanese data

One needs to stress a very interesting fact. Very often specialists who doubt in the significant increase in the number of non-specific somatic diseases in populations affected by the Chernobyl accident state that such an effect has not been observed in citizens of Hiroshima and Nagasaki which survived the atomic bombardment in August 1945. However, such statements are wrong. It was shown by specialists of the Hannan Chuo Hospital (Osaka, Japan) [33].

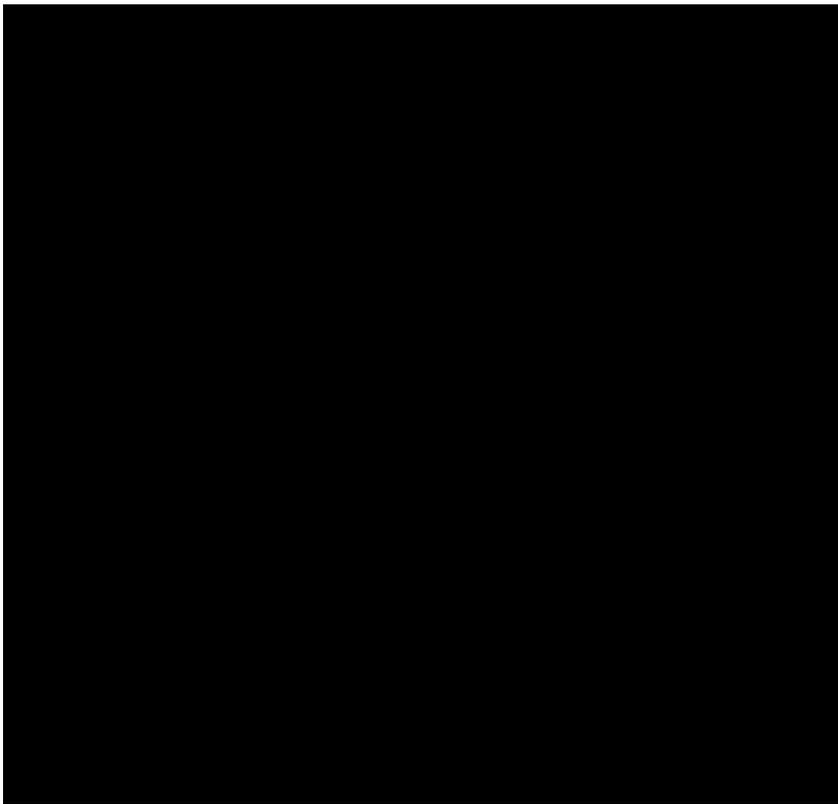
They examined 1232 victims of the atomic bombardment within the period of 1985-1990. According to [33]: “Lumbago was 3.6 times more frequent, hypertension 1.7 times, eye diseases 5 times, neuralgia and myalgia 4.7 times, similar tendencies were established for gastralgia, gastritis, etc.”. The data of Japanese specialists are presented in Fig. 1. There are no data in Fig. 1 for such diseases in Japanese general public as dental disease, headache arthritis, loss of physical strength, cervical spondylitis in Fig.1 because the authors [33] could not find them in “The Basic National Life Survey of Japan”.

Qualitative of data established in people affected by the Chernobyl accident and victims who had survived Hiroshima and Nagasaki indicates that worsening of the health state by different categories of people affected by the Chernobyl accident was caused by radiation.

This information indicates that at present there are no objective grounds for any scepticism in relation to such phenomena as the increase in the incidence in general somatic diseases in all categories of people affected by the Chernobyl accident that is often expressed by the international radiation community [5, 34]. About 20 scientific papers describing various somatic effects by liquidators, adults and children exposed to radiation as a result of the Chernobyl accident have been presented at the International Conference “One Decade after Chernobyl. Summing up the Consequences of the Accident” held in Vienna, Austria, 8-12 April 1996 [35, 56]. This conference was sponsored by the European Commission, the International Atomic Energy Agency and the World Health Organisation in co-operation with the United Nations Scientific Committee on the Effects of Atomic Radiation and other United Nations divisions, as well as with the Organisation for Economic Co-operation and Development (Nuclear Energy Agency). Practically all international organisations involved in peaceful use of nuclear energy took part in the preparation of this conference which was to become the most important step in the assessment of the Chernobyl accident and its radiological consequences. However, the conference could not fulfil the task to carry out an objective analysis of this severest accident in the history of peaceful use of nuclear energy. Such conclusion may be drawn from the following statement of given in the conference summary: “Increases in the frequency of a number of non-specific detrimental health effects other than cancer among exposed populations, and particularly liquidators, have been reported. It is difficult to interpret these findings because exposed populations undergo a much more intensive and active follow-up of their state of health than does the general population. Any such increases, if real, might also reflect effects of stress and anxiety” [5].

It is evident from this quotation that the participants of the conference “One Decade after Chernobyl. Summing up the Consequences of the Accident” who had prepared the most important document of the conference — the summary, doubted even the reality of the increase in the incidence of general somatic diseases in the affected areas of Belarus, Russia and the Ukraine. It seems very strange because, as was mentioned above, a number of scientific papers [35-56] have been presented at the conference that demonstrated the manifestation of this phenomena in all categories of people affected by the Chernobyl accident. The significant increase in the morbidity in different somatic diseases in the affected population has been recognised by the author of the Background Paper 4 of the Conference [57], that explained this increase on the basis of psychological factors and stresses.

The conference also rejected the possibility of hereditary malformations in the affected areas of Belarus, Russia and the Ukraine as a result of the Chernobyl accident despite of the existence of reliable data on such effects. Practically it has not changed the conclusion of the international radiation community made in August 1986 at the IAEA Post-Accident Review Meeting in Vienna about the consequences of the Chernobyl accident. The only exception was made for the strong growth of the thyroid cancer morbidity. Possibly, because there are no more arguments to reject the reality in this case. However, even in a case of thyroid cancers by children some speculations about other possible reasons were expressed.



otices:

Belarus – all adults and adolescents;

1st Group – liquidators;

2nd Group – residents of the 30-km-zone;

3rd Group – residents of settlements in

areas with caesium-137 contamination

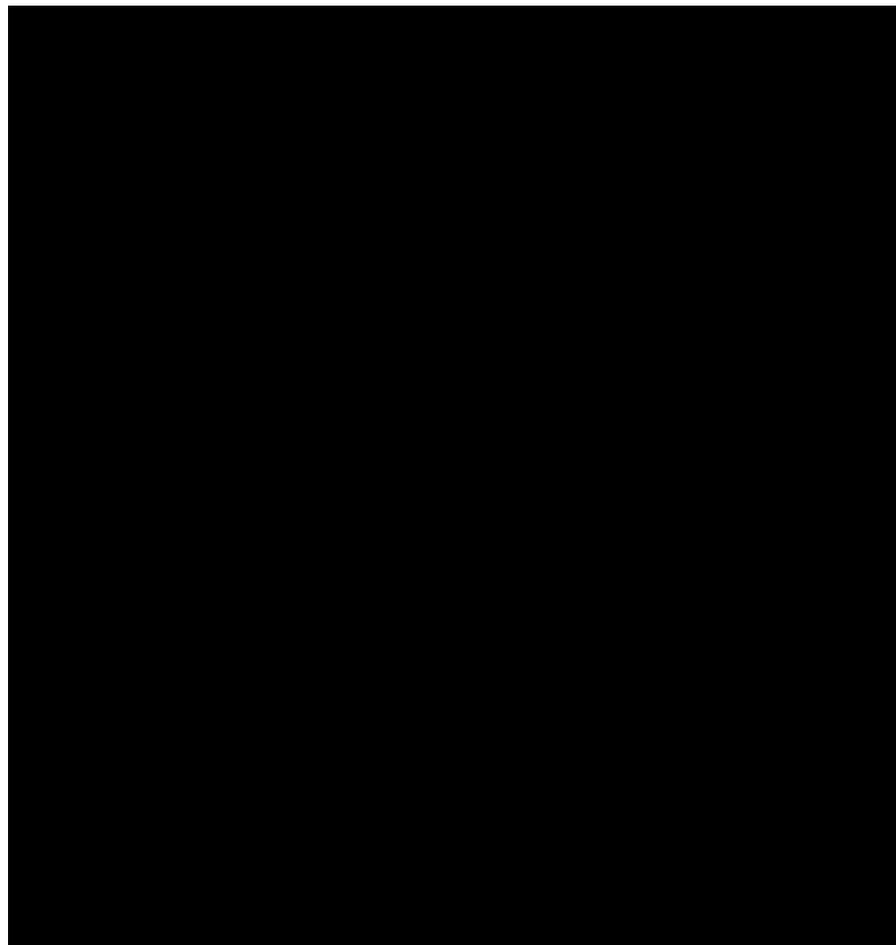
level higher than 555 kBq/m²

(15 Ci/km²);

4th Group – residents of settlement in areas with

caesium-137 contamination level from 37 to

35 kBq/m² (from 1 to 5 Ci/km²).



It is necessary to note, that such doubts in the radiation origin of a very significant increase in thyroid cancers by children of Belarus, the Ukraine and Russia are alive even now. This demonstrated the 49th Session of the UNSCEAR), that was held in Vienna on 2-11 May 2000 [58]. At the same time participants of the UNSCEAR Session excluded fully all other medical effects than thyroid cancers by children of Belarus, the Ukraine and Russia ignoring fully valuable data established after the Chernobyl accident in these countries.

Discussion

Information discussed in the present paper demonstrates clearly an unusual situation for the scientific community. It is well known that the main aim of each objective specialist is to study some phenomenon in the nature or in the community with the task of establishing new knowledge. The Chernobyl accident created an unique possibility for specialists in radiobiology and radiation protection for examination of their hypotheses and theories. However, the majority of specialists have no interest to use this unique possibility. They are sure that the Chernobyl accident could not cause some medical consequences that could be different from those consequences that were established by other irradiated groups of people. They reject any findings of scientists of Belarus, the Ukraine and Russia that differ from their expectations. In some cases they do this because they believe in the superiority over specialists in Belarus, the Ukraine and Russia. However, this disinterest in medical consequences caused in Belarus, the Ukraine and Russia could have another important reason. It could be caused due to an unwillingness of the international radiation community in revealing of real consequences of the Chernobyl accident in order to exclude problems existing by the nuclear industry. This can explain reasons of the policy of the international radiation community regarding the Chernobyl accident and its medical consequences.

In both these cases one can speak about the serious crisis of the international radiation community. And this crisis is very dangerous that indicates an absence of the link between science and moral as well as an erosion of the science. It has to be fully unacceptable for everybody such situation when specialists in radiation protection are more interesting in the state of the nuclear industry than in the state health of people. A very plausible explanation for the above attitude of the international

scientific radiation community has been given by the famous expert in the field of the radiation medicine Dr. Rosalie Bertell at the Session of the Permanent People's Tribunal [59].

According to Dr. Rosalie Bertell, the harmful impact of radiation caused interest of the specialists and the military because of the possible use of nuclear weapons in wars. A very important problem for planners of such wars is how more enemies could have been killed by nuclear weapons. As a result specialists in the field of radiation biology, radiation medicine and radiation protection had worked since the very beginning mostly for the military purposes. Later they have switched to problems of use of nuclear reactors for electricity generation. Such involvement in solving of military and industrial problems by specialists in radiobiology, radiation medicine and radiation protection did not allow them to pay attention to the problem of the protection of health of public from the harmful influence of radiation. This is also a reason for the international radiation community not to consider any medical effects of radiation other than fatal cancers and leukaemia, some teratogen and genetic effects as consequence of irradiation. And in case of these effects there is a common practice by specialists to compare risk of the impact of radiation with risks of other harmful factors, for example, such as tobacco. Such practice allows playing down the real dangerous of ionizing radiation. It is clear, that it is unacceptable, because it leave affected people without an effective protection from impact of ionizing radiation or other harmful factors. The life standard, not the pure number of fatal cancers should be considered in case of a radiological accident like the Chernobyl accident. This has to be the main task for specialists in the field of radiation protection.

It seems, that unfortunately, the international radiation community was not able to fulfil this very important task and therefore we consider the situation that arose after the Chernobyl accident as a sign of a deep crisis of the international radiation community.

Summary

The information given in the present report about the Chernobyl accident and its radiological consequences indicates a serious crisis of the international radiation community. The following signs of the mentioned crises can be discerned:

- The international radiation community could not recognise the real reasons of the Chernobyl accident for a long time.
- It could not make a correct assessment of the damage to the thyroid gland of the affected populations of Belarus, Russia and the Ukraine.
- Up to present time it rejects the reliable data on hereditary malformations.
- It is not able to accept reliable data on the increase in the incidence in general somatic diseases by all categories of people affected by the Chernobyl accident.
- The international radiation community supported the Soviet authorities in their attempts to play down the radiological consequences of the Chernobyl accident for a long time.

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