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# Management problems of the restricted zone around Chernobyl

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## The Problems of Management in the Zone of Exclusion

In this brief report we will try to consider the main problems on minimization of the consequences of the accident and management of actions provided at present in the Chernobyl zone at the territory of Ukraine in decade retrospect

On April,26,1986,at 1.23.58 a.m. the accident occurred at the Chernobyl NPP,the scales and consequences of which have not estimated unambiguously and during the past ten years. The works on researching and understanding of the whole complex of problems related to Chernobyl tragedy most probably will be studied by numerous scientists and practical workers of some nearest generations.

The most important task of the first stage required the urgent managed actions was to reduce the radioactive irradiation of the population, living at the territories around the Chernobyl NPP and personnel,taking an active part in the accident works, up to the most permissible level. Firstly, it was taken a decision to evacuate population from the most contaminated areas and to keep the personal on watch.

As a result of evacuation of more than 92 thousand people from two towns (Pripyat and Chernobyl) and 74 villages it was formed the Chernobyl zone of exclusion ( conventionally named 30km-zone)by square of 2044.4 sq.km in Ukraine.The boundaries of the present zone of exclusion finally was approved by Law of Ukraine " About the Law Regime of the territory,affected the radioactive contamination after the Chernobyl catastrophe" adopted on 27 February,1991.

The radioactive contaminated ground of exclusion zone was out of national economy.

The official tasks of elimination of the consequences of the accident at the Chernobyl NPP, formulated in the initial period, were as follows:

- to provide the normal vital activity for population at the territories,affected radioactive contamination;
- to prevent the distribution of radioactive contamination at the adjacent region to Chernobyl NPP;
- to create the conditions for entering into operation the first and the second units.

Now it should be considered the management by works provided in the exclusion zone at the different stages for the last ten years. In the mid - day of April,26,1986 in the frame of the former USSR the Government Commission on the inquest of reasons of the accident at the Chernobyl NPP headed by B.Scherbina,the Deputy Chairman of the Council of Ministers of the USSR, was organized. The main tasks of the Government Commission were:

to determine the accident scales; to develop and implement the measures on localization and elimination of its consequences; health safety and assistance to population; to study carefully the reasons of the accident and to develop on its basis operative and long-term measures to prevent the similar accident in future.

The Government Commission provided an active work in the difficult conditions and from time to time (due to radiation conditions) changed its staff.Initially the Government Commission was based in Pripyat town and then in Chernobyl. The analysis of the accident scales immediately in-situ, the lack of regulations on the elimination of such out of drafted accident, responsibility of a high level for taken a decision in the limited time determined the special course of activity of the government Commission. Since September 1986 the Commission had been working in unchanged staff.

An example of such important decisions may be the decision of the Government Commission dated 27 April 1986 at 12 o' clock concerning the evacuation of people of Pripyat town when 45 thousands people were evacuated from 10 km-zone for three hours and further it was the staged evacuation of inhabitants from 30 km-zone.It was finished in 1986.

Later the State Commission of the Council of Ministers of the USSR on extraordinary situations headed by V.Doguzhiev,the Deputy Chairman of the Council of Ministers of the USSR, was organized.

Taking into account the great importance of works on elimination of the consequences of the accident at the Chernobyl NPP and the lack of the state system of the actions in such extraordinary situations it was accepted a decision to concentrate the arised problems to be solved in the hands of the government of the country. Since 29 April 1986 the Active group of Political Bureau of the Central Committee of the CPSU initiated the work related to elimination of the consequences of the accident,headed by N.Ryzhkov, the Chairman of the Council of Ministers of the USSR. This Active group had the meetings almost every day.

The most important problems were submitted for consideration of Political Bureau of the Central Committee of the CPSU and the government of the USSR on which it was taken almost 20 resolutions. One of the principal decisions was to fulfill the work concerning elimination of the consequences of the accident at the Chernobyl NPP, including the construction of the encasement under the broken reactor, to the Ministry of the Middle Machine Engineering of the USSR.

The another example may be the meetings of the Active group for considering the radiation situation in the settlements and the predicted irradiation doses of the inhabitants.

It should be noted that one of the main tasks to prevent distribution of the radioactive contamination at the area adjacent to NPP is the scientific and economically justified and realized in the first year after the accident.

After the disintegration of the USSR the work management in the zone of exclusion was provided by subdivisions of the State Committee of Chernobyl of Ukraine, which was later reorganized into the Ministry on affairs of the protection of the people against the consequences of the accident at the Chernobyl NPP (MinChernobyl of Ukraine).

Now it should be discussed the radioecological situations in zone of exclusion. The radioactive contamination of nature environment. Distribution of radioactive contamination on the territory of zone with nonuniform density of radioactive fallouts and radionuclide compound, relations of various forms of radioactive fallouts are present in general by radionuclides of Cs-137, Sr-90 and transuranium elements. Up to 95% of radioactive contamination are concentrated in the upper layer of the ground in thick of 5 cm.

Surface radioactive contamination of this territory (not accounting the sites of localization of the radioactive wastes and industrial square of the Chernobyl NPP) is equal to 110 thousands Ci of Cs-2137, 127 thousands KI of Sr-90 and 800 Ci of Pu-239-240. The territory of the contamination level of up to 15 Ci/km of radiocaesium, 3 Ci/km of radiostrontium and 0.1 Ci/km of plutonium elapsed 1856 sq.km.

The "Shelter" encasement. As to maximum estimation in the "Shelter" encasement there are about 80 tons of nuclear fuel, contained the radioactive materials with the activity of up to 20 mln.Ci. Besides the fuel-contained materials in the encasement "Shelter" there are a large quantity of radioactive wastes, which consists of the portions of the active zone of the unbroken reactor, reactor graphite, contaminated metal and building constructions of the energy unit. Then at the operative units of the Chernobyl NPP a large quantity of waste nuclear fuel and wastes after operation are accumulated.

The sites of disposal and temporary localization of radioactive wastes. There are radioactive materials, the total activity of which is equal up to 380 thousands Ci and in volume of 1 mln. cube m in the built-in three points of disposal and the sites of temporary localization of radioactive wastes, making during the extraordinary and decontamination works. The temporary points are the concentration of 800 constructionally simple installations. The cooling pond of the Chernobyl NPP is a reservoir in square of 22.9 sq.m with the water volume of 160 mln.cube.m. In 1989 - 1993 the mean annual water contamination was between 140-330 pCi/l of Sr-90. The total activity of radionuclides in the bottom sedimentations is reached to 3.5 thousands Ci of Cs-137, 800 Ci Sr-90 and 3 Ci of Pu. The main migration paths of radionuclides out of zone of exclusion are the annual water flow (formed by way of surface flow and outflow of radionuclides by the underground water), air (wind-driven), biogenic and industrial transfer.

Presently industrial activities in the Exclusion Chernobyl zone are being developed in following directions: operating of the Chernobyl NPP, liquidation of the consequences of Chernobyl accident and also management of economical activities in the Chernobyl Exclusion zone. The five major institutions are involved in these activities: Industrial Associates Chernobyl NPP, Research and Industrial Associates (RIA) Pripyat; Building Associated Company of ChNPP; Research and Technical Corporation "Shelter" (Ukrytie) of National Academy of Science and Governmental Specialized Production Associates "Chernobylles". Besides more than

100 different research, design and other institutions have a different research and applied businesses in the Chernobyl close-in zone and their activities require coordination and management.

The Ukrainian Government since the first days following the Chernobyl events is carrying out a huge work aiming to minimize the consequences of the Accident. After the collapse of the Soviet Union the Ukrainian Government took the responsibility for liquidation of consequences of the greatest technological disaster in history. To coordinate all the activities carried out in the Exclusion Chernobyl zone the special Governmental Management Department of Minchernobyl - Administration of the Chernobyl exclusion zone was created. The Administration is to manage and coordinate all the activities carried in the close-zone, deal with funding and provide a security and guard control of the Chernobyl zone and also radiation safety and health management and registration of the personal involved in these activity. The public relations in term of information about social, ecological, economical and research activities are also under responsibility of the Administration. The decisions of Administration are compulsory for all institutions working in the Chernobyl Exclusion zone. The supervision on the institution activities is being carried by the Governmental Supervision Departments of Ukraine.

The funding of activities in the Exclusion zone is carried out via Administration's structure from specially created "Chernobyl foundation" of Minchernobyl Budget. This budged has forming from special taxes income of the any salary payment of all legal persons in Ukraine. Annual expenses on the covering of all activities in the Chernobyl exclusion zone have reach 4-5% of the total amount of the Chernobyl Foundation budget, including funding of the work on providing safety of the destroyed Reactor N-4 and the "Shelter".

The Government implements its policy by development of relevant legislation and documents of central executive institutions.

In 1994-95 a new "Concept of the Chernobyl Zone on the territory of Ukraine" for the period to 2020-25 was developed and adopted. It was created by team of best Ukrainian scientists and specialists. The Concept is based on the laws in force and defines the system of organizational, ecological, medical, scientific and technical principles and priorities of scientific and economical activities in the zone. The main objective of the Concept is minimization of negative ecological, economical and social consequences of Chernobyl accident. The Concept includes: functional district division of the zone territory; the main approaches to building an ecologically secure system around the "Shelter" unit; the issues of radioactive waste management; radiation monitoring of the environment; approaches to building an administrative system in exclusive zone; scientific research priorities; countermeasure priorities; ecological forecast for the zone etc.

According to recent additions to and changes in "Chernobyl" laws of Ukraine all territories of compulsory evacuation (to the West from the exclusive zone) are to be under jurisdiction of Administration of the exclusive zone. Under these circumstances the Administration faces the problem or total evacuation of the population, transfer of lands and forests belonging to different agencies, revision of borders of contaminated land lots, transfer and utilization of infrastructure on these territories and a number of other important issues concerning long-term activities in that zone. In practical aspect there arises the problem of security and management

on territories of compulsory evacuation that are not directly adjacent to the exclusive zone.

**CONCLUSIONS:**

1. At the moment of the accident at the Unit 4 of Chernobyl NPP in USSR there was no developed system of Emergency response.

2. In different phases of post-accidental activities different governmental structures are needed.

3. It is necessary to generalize an experience of Emergency response activities and to develop appropriate law basis.