Information message on the effectiveness of decontamination work in connection with the liquidation of the consequences of the Chernobyl accident

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Secret

On the Status of Effectiveness of Decontamination Work in Connection with the Liquidation of the Consequences of the Accident at the Chernobyl Nuclear Power Plant

The Directorate of the KGB of the Ukrainian SSR for the city of Kiev and Kiev Region, in cooperation with an operational group of the Directorate of Special Departments of the USSR KGB, using available resources and qualified specialists, studied the status, effectiveness, and prospects of decontamination work conducted in connection with the liquidation of the consequences of the Chernobyl Nuclear Power Plant accident in the 30-kilometer zone and populated areas of the Kyiv Oblast.

The following was established.

In pursuance of the decisions of the Authorities, units of the Ministry of Defence, the USSR Ministry of Medium Machine Building, with the direct participation of specialists from the PO Combinate, the special enterprise Kompleks, the Chernobyl Nuclear Power Plant, and the USSR Ministry of Atomic Energy, carried out a significant amount of special work on the territory and in the surrounding area of the plant, in the cities of Pripyat, Chernobyl, and the villages of the Polesie, Chernobyl, and Ivankovsky districts.

The measures taken have created relatively safe conditions for temporary residence and work for personnel of enterprises and organisations involved in the clean-up of the accident at the nuclear power plant and in several locations within the 30-kilometer zone, as well as improved the radiation situation in populated areas exposed to radioactive contamination outside the zone.

Currently, the radiation situation is characterized by the following data.

The gamma radiation level is:
– In the station's premises, from 0.6 to 2.4 µSv/hr;
– On the station's territory, from 2 to 2,500 µSv/hr;
– In the city of Pripyat, up to 25 µSv/hr;
– In the city of Chernobyl, up to 2.1 µSv/hr;
– In the Chernobyl district, from 5 µSv/hr (Laputki village) to 19 µSv/hr (Zorin village);
– In the Polessky district, from 3 µSv/hr (Tarasy village) to 25 µSv/hr (Poleskoye urban-type settlement);
– In the Ivankovsky district, from 5 µSv/hr (Starye Sokoly village) to 110 µSv/hr (Domanovka village).

After the decay of short-lived elements, the composition of radionuclides is represented mainly by isotopes of caesium, strontium, plutonium, etc.

Decontamination work continues, along with preventative measures, limiting the use of local fuel resources, and providing the population with imported food. This has helped to reduce the negative impact of the accident on human health to a certain extent.

However, the implementation of large-scale decontamination work has revealed a number of shortcomings in its organisation and implementation.

Despite significant progress in recent decades in various fields of knowledge, site clean-up, particularly of industrial and civil facilities, was carried out using poorly mechanised methods.

Furthermore, the use of powerful earthmoving equipment resulted in the mixing of clean and contaminated soils, creating unnecessarily large masses of earth subject to disposal. Decontamination of various types of buildings was carried out primarily manually, using polymer films, SF-2U detergents, scrapers, etc.

The lack of sufficiently effective automated equipment specifically designed for work in high radiation conditions resulted in excessive radiation exposure for personnel and material losses.

These shortcomings, along with individual miscalculations in the work organisation methodology, led to the fact that, despite two, three, and even four-fold treatment, in some populated areas the gamma radiation level remained virtually unchanged or decreased only slightly, and in some cases, after some time, it even increased.

This is evidenced by the following data on the gamma radiation dose rate for the soil:

	Town/village	Gamma radiation dose rate (μSv/hr)		
		Prior to 1987 remediation	After 1987 remediation	Prior to 1988 remediation
Chernobyl region				
1	Gornostaipol	0.8	0.2	7.5
2	Zeleny Mys	0.8	0.2	10.0
3	Zorin	0.8	0.3	19.0
Polessyie region				
1	Polesskoe	2.4	1.8	25.0
2	Vilcha	7.0	1.8	18.0
3	Cheremoshnya	2.1	1.1	8.0
4	Yasen	12.0	2.0	14.0

A similar picture is emerging in other villages and towns affected by radioactive contamination.

According to leading experts, the low effectiveness of the measures taken is also explained by the fact that the area of settlements where decontamination is carried out ranges from 0.5% to 1% of the territory, depending on the region, and recontamination begins almost immediately after its completion, due to natural factors (wind and water transport) and anthropogenic factors related to human economic activity.

Another negative impact is the fact that sufficiently effective methods for cleaning forests, wetlands, and water bodies have not yet been developed.

These problems are also pressing because particularly strong winds, which, according to the USSR State Hydrometeorological Committee, are recorded in the Polessiya region approximately once every 10-12 years, can lead to significant secondary contamination of the surrounding area due to the transfer of radioactive dust.

A number of difficulties are caused by the fact that, aside from civil defence units and military units of the Ministry of Defence, other interested agencies (State Agricultural Industry, Ministry of Forestry and Paper Industry) are not actively participating in the ongoing work. There are shortcomings in supplying the USSR Ministry of Defence units with necessary building materials used for roofing, fencing, etc.

Taking this into account, according to highly qualified specialists, to effectively address the task of returning the zone and surrounding areas to full economic activity, it is necessary to address a number of problems that have arisen at this stage.

First and foremost, with the involvement of scientists, economists, and representatives of interested organisations, analyse all aspects (social, economic, and environmental) related to the zone, develop a decision on its status, and determine the future direction of research and decontamination work.

Regardless of the decision regarding the zone's status, the following must be implemented:
– ensure the preservation of forest stands, which significantly prevent wind erosion and limit the transfer of radioactive dust, and also grass open areas;
– implement water protection measures so that peatlands and swamps remain flooded and do not become a source of dust;
– re-specialise agricultural enterprises located in the radioactively contaminated area to eliminate agricultural operations associated with significant dust generation;
– decide on the future fate of various buildings and structures, primarily those whose mothballing is economically impractical, as well as those in a dilapidated state.

At the same time, the country's existing scientific resources, accumulated experience, and certain advances at PO Spetsatom and SP Kompleks should be mobilised to develop modern methods for decontaminating large areas, forests, and water sources based on the latest scientific and technological advances.
This primarily concerns methods for removing a soil layer up to 5 cm thick, which contains up to 99% of radioactive substances, burying soil from the surface in a subsurface layer, removing silt sediments, flame treatment of concrete structures, and mechanised application and removal of bentonite and polymer mixtures.

Despite a number of economic contradictions associated with the need to decontaminate the 30-kilometer zone, primarily the high costs, many experts strongly agree that it is worthwhile. Contrary to the requirement for a complete clean-up of the zone, some employees believe that available resources should be used to locate and eliminate the most hazardous areas, where contamination levels exceed certain thresholds.

It is envisaged that only the Chernobyl Nuclear Power Plant staff will work within the zone. With regard to settlements currently occupied by people, decontamination personnel express a clear opinion on the need to continue the work, with the requirement for a comprehensive approach being emphasized. Treatment should cover not only the villages themselves, but also the surrounding area for a distance of 1–1.5 km. Simultaneously, measures to improve these areas (asphalting streets and roads, switching to imported fuel, etc.) should be carried out.

Resolving these issues will improve the efficiency and safety of the work being carried out, reduce radiation exposure for personnel, and contribute to the normalisation of the morale and psychological situation in work teams working in and outside the zone.

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