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Commission on Chernobyl Catastrophe Issues

On some issues in the elimination of the consequences of the accident at Chernobyl NPP

The State Security Committee [KGB] is receiving information about several unresolved problems arising in the course of work to liquidate the consequences of the accident at the Chernobyl NPP and to ensure its safe operation.

Specialists continue to raise concerns in regards to the unresolved defects in the design of RBMK reactors, as well as about the forthcoming decommissioning of the Chernobyl NPP. The controlling authorities conclude that the power units, especially No. 1 and No.2, do not meet modern requirements for the safe operation of nuclear power plants, especially due to the impossibility to construct the protective shells at the potential accident locations. The condition of the equipment also raises concerns among specialists, especially the reliability of the reactors themselves. Technological controls indicate that the dimensions of the channels are close to the maximum allowable and further operation of these could lead to emergency situations *[due to the "swelling" of graphite blocks because of irradiation]*. For example, in 1989-1990, there were 5 cases in which spent fuel rods jammed when they were being removed from the core.

The solutions to issues associated with the end of service life of reactor control and protection systems, of main pumps and other equipment have not yet been found by the USSR Ministry of the Nuclear Power and Industry. The tests have confirmed that the emergency cooling systems for the RBMK reactors of Units 1 and 2 are non-serviceable, due to the fact that their technical specifications do not meet the established norms.

The measures for the reconstruction and modernisation of the station are planned for 1993-1994, in accordance with USSR Council of Ministers Decision No. 722 from 21 July 1987. Should these measures be implemented, the plan to replace the equipment will coincide with the deadlines for the decommissioning of the power units. The specialists have expressed a concern that during the period of preparation for dismantling of the equipment and close-out of the station, a further deterioration in the level of safety at the station will take place. According to preliminary calculations these activities will take at least 5-7 years.

One of the most important issues is ensuring the safety of the "Ukrytiye" *[Shelter]* facility. The information was obtained by scientists of the Kurchatov Institute of Nuclear Energy about the deep sub-criticality of fuel masses in the collapsed reactor; however, the USSR State Committee for Oversight of Industrial and Nuclear Safety determined it to be a nuclear hazard. The determination of facility's status, as well as the documentary justification of its nuclear and general safety, has still not been made.

Research data obtained in 1990 confirms the destruction of the concrete structures, the transformation of the fuel-containing mass from a vitreous to a powdered state. There is a threat of the collapse of the reactor's upper cover, which would lead to the ejection of radioactive dust into the atmosphere. Under these conditions, the task of the utmost importance is to ensure the constant oversight over the condition of the core, the walls and the foundation of the destroyed power unit. The reliability of the dust suppression systems must be ensured and confirmed in case of the development of an emergency situation.

According to specialists' assessments, the "Shater" information-diagnostic complex, developed by the Ukrainian Academy of Sciences Institute for Nuclear Research to be used for these purposes, does not fully meet the requirements of independence, modernity and completeness of information about the processes occurring within the collapsed reactor. Therefore, it requires modernisation. Additionally, the possibility of operational deployment of the dust suppression system in an emergency situation was not anticipated.

The resolution of these and other problems at the "Ukrytiye" unit and at the Chernobyl NPP as a whole continues to be constrained, due to the lack of a scientifically justified concept that takes into account all issues as a whole, including those connected with the forthcoming decommissioning of the station. Its development has been unjustifiably delayed by the USSR Ministry of Nuclear Power and Industry.

One of the most important aspects of the elimination of the medical and biological consequences of the Chernobyl catastrophe is the identification of the details of radiation exposures, the development of the forecast of radiation situation and the dose estimates for the population. Taking these indicators into account, there is a need to formulate a concept for public residing in contaminated areas. It needs to be determined which population will be subject to resettlement and continuous medical monitoring.

The existing approach for dose estimation by the National Commission for Radiation Protection of the USSR Ministry of Health is based on a calculation of the exposure of the thyroid to iodine-131, of the whole body to caesium-137 and overall exposure to external gamma radiation.

However, the results of the research that was undertaken recently by a group of scientists from the Institute for Epidemiological and Preventive Treatment of Radiation Effects at the Scientific Centre for Radiation Medicine of the USSR Academy of Medical Science demonstrate that such method does not address all radiation effects. In their opinion, following the Chernobyl catastrophe, people were subjected to the simultaneous sustained effects of several types of external and internal radiation from radionuclides considered to be a high biological hazard, including strontium, transuranic alpha-emitters and others elements. The impact of these radionuclides in the estimation of radiation exposure and the impact on the health of the population was previously not considered.

The scientists estimate that, due to the above consideration, there is a very significant underestimation of the volume of the population that was affected, of their radiation exposures and of the extent of radiological contamination. According to calculations by this group of scientists, the zone of dangerous contamination after the catastrophe is up to 450-

500 km, and the critically dangerous area is up to 120-130 km [*radius from the accident location*]. More than 4.5 million inhabitants of Ukraine, Belarus and Russia could have been exposed to internal and external radiation at the levels that are higher than the acceptable emergency exposure standards.

The general evaluation of the Chernobyl catastrophe described above has had a mixed reaction in Kiev's scientific circles, since it contradicts the concept accepted by the Soviet and global scientific community, in accordance with which the scale of the accident was less significant. For example, a number of scientists from the Ukrainian Academy of Sciences expressed their support for this approach to the estimation of radiation exposure. At the same time, the majority of scientists specialising in radiation dosimetry at the Scientific Centre for Radiation Medicine at the USSR Academy of Medical Sciences consider that this approach requires detailed scientific investigation.

Considering the fact that at the present time there is a lack of a unified scientific approach to the problem described above, it has been proposed to discuss the merit of the establishment of an inter-agency commission to provide expert review of newly obtained data. This commission would include scientists and specialists with the background in physics and radiobiology. Such commission is necessary for the forecast of the actual changes in the health status of the population. It is also needed to establish a more objective approach to the development of principles for the safety of people in the areas subjected to radiological contamination.

In current circumstances, where the ecological conditions have worsened due to the accident, the work to develop new selective sorbents plays an important role. These sorbents prevent the accumulation of radioactive and toxic substances and enable them to be excreted from the body. The level of scientific research by Ukrainian scientists in this area is demonstrated by the efforts by the representatives from Western companies to either obtain information about the technological processes (which they value as "know-how"), or to patent these inventions abroad.

The "Ekosorb" state consortium was created in 1990 by a Decision of the Republic's government, uniting around 20 organisations and enterprises. The Institute for Sorption and Problems of Ecology was also created in January of this year by the Ukrainian Academy of Sciences. The efforts of these organisations will be directed towards the commencement of the production of all types of sorbents. As advised by the specialists, in order for these activities to achieve a significant social and ecological effect, it is necessary to establish a targeted financing from the funds allocated for the elimination of the consequences of the accident.

The Committee on State Security [*KGB*] of Ukraine is continuing the work in supporting the Republican program to eliminate the consequences of the Chernobyl catastrophe, by provision of classified foreign scientific and technical materials, and other documentation. The specific activities are being carried out, taking into account the exceptional significance of the work, and are considered a priority in the intelligence-gathering tasks. In addition to the documentation sent earlier to interested ministries and agencies, at the present time more than 100 additional documents are being prepared for transmission to the newly-

created Ukrainian State Committee on the Protection of the Population from the Consequences of the Accident at the Chernobyl NPP. These materials address issues of radiation medicine, biology, decontamination and NPP safety.

The above is provided for information.

Committee Chair