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Chornobyl NPP Cooling Pond: Decommissioning

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According to "Feasibility Study of ChNPP Cooling Pond Decommissioning," the radiological and ecological conditions have been monitored throughout the water level lowering period (2014-2023).

Cooling pond design

ChNPP cooling pond (CP) was created by constructing the artificial embankment on the right bank of the Prypiat River. It was commissioned along with start-up of Power Unit 1 in 1976.

Radioactive contamination

According to the estimates, the total content of radionuclides in the CP before 1986 accident was the following: ^{137}Cs – 77.7 GBq, ^{90}Sr – 1.5 GBq.

The 1986 accident changed the situation drastically. Due to radioactive aerosols and fuel particles falling on the surface, the pond was exposed to extremely high contamination. In addition, about 5,000 m³ of extremely contaminated water was discharged into the pond from the primary circuit of the damaged reactor, fire fighting water and other process systems of the plant.

Based on the assessments, the current contamination levels of the pond are in the order of: ^{137}Cs – 260 TBq, ^{90}Sr – 54 TBq.

Water level and direction of groundwater flow

Following the shutdown of the last operational power unit, it was not reasonable to continue using the pond. Creation of the CP, as well as measures performed in 1986, raised the groundwater level in the adjacent area, which resulted in flooding of a part of existing foundations of radiation-hazardous facilities and radioactive waste storage sites. It led to spending additional costs for pumping out and treatment of radioactively contaminated water from the bottom premises of the Plant.

Monitoring of surface layer of the atmosphere

In order to ensure radiation protection of personnel and environment, radiation situation is being monitored from the start of water level lowering and drying of bottom areas of CP. The monitoring points were selected along the pond perimeter towards places of personnel presence.

Monitoring of groundwater

Monitoring of groundwater, change of water level, radiation and chemical conditions is being carried out at the observation wells located at the enclosing dam.

Monitoring of geobotanical changes within the dried sections

Formation of stable vegetation cover at the dried bottom sections is the factor which reduces danger of erosion processes, and the factor which retains entry of radioactive aerosols into the surface layer of the atmosphere due to wind transfer from the pond area to the adjacent areas.

During the growing season the dried areas are being visually inspected to reveal the soil erosion development. Once such sections are identified, a decision is made on the necessity to implement engineering measures.

Monitoring of hydrobiological changes

Hydrobiological observations during lowering of the CP water level are being performed seasonally by the Institute of Hydrobiology of the NAS of Ukraine. Hydrophysical, hydrochemical, hydrobiological and bacteriological parameters are being monitored at sampling points along the CP water space and in lakes.

Ecosystem changes of the CP are being analyzed based on data of spatial and quantitative distribution of aquatic organisms.

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