

Chernobyl NPP cooling pond decommissioning

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Based on the design, the cooling pond (CP) is a source of technical water intake for the Chernobyl NPP needs. The CP was constructed by creating an artificial embanking dam at floodplain area of Prypiat River with the area of about 22.9 km². The CP water volume is designed for cooling of four ChNPP Units in the electrical power generation mode. Losses from filtration and losses for the CP water evaporation are compensated from Prypiat River by delivery pumps up to the design level of 111.00 meters on the Baltic system (mBS) that during most part of a year is higher than the level in Prypiat River for 6-7 meters.

The CP specificity is its location within the area of Exclusion Zone and Zone of Unconditional (Obligatory) Resettlement - the area radioactively contaminated as a result of 1986 accident at the ChNPP Unit 4. According to the Law of Ukraine "On the Legal Regime on the Territory that Suffered from Radioactive Contamination as a result of the Chernobyl Catastrophe", the CP area and adjacent territories are covered by the same rules and restrictions that are applied for the Exclusion Zone and Zone of Unconditional (Obligatory) Resettlement. This means that any activity that does not ensure the radiation safety regime is forbidden. R&D and monitoring works targeted at the CP safety assurance, assessment of its radiation and environmental conditions and justification of measures on its decommissioning and further remediation activities can be carried out within the CO water area and adjacent territories with the permission from the ChNPP management and agreement with the Exclusion Zone's sanitary and epidemiological service.

As a result of the beyond-design-basis accident at the ChNPP in 1986, radioactive aerosols and dispersed fuel particles from the destroyed reactor were deposited onto the CP surface. In addition, about 5,000 m³ of contaminated waters from the Plant's technical supply systems were discharged into the CP. Part of water that was used for fire-fighting at Unit 4 during the accident, as well as partially the waters that were collected in the stormwater sewer system after the ChNPP industrial site decontamination, also arrived there.

As of today, the amount of water in the ChNPP cooling pond has started to exceed by many times the ChNPP needs at the decommissioning stage. In so doing, the annual costs for maintaining the safe level of the CP dam and operation of the pump station are about 5 (five) mln. hryvnias. That is why a decision to decommission the CP has been taken. At the present time, the inlet and outlet channels are cut off from the CP, by that creating an independent technical water body ensuring the SSE ChNPP needs in cooling water and water for fire-fighting systems. The nominal level is maintained in this water body by operation of the pump stations from wells.

Due to the level lowering in the cooling pond, the SSE ChNPP administration fulfilled organizational and technical activities on radiation protection.

The radiation monitoring is arranged along the perimeter of the CP bank line and at dried areas of the CP slopes generated as a result of the water level lowering. Control levels of EDR, activity concentration of α - β -LLN (long-lived nuclides), Cs137 and Sr90 in the air along the perimeter of the CP bank line and at dried areas of the CP slopes were established. The CP bank line perimeter was referred to the free regime area, while the exposed areas of the CP slopes –to the tightened control area.

The Chernobyl NPP CP Decommissioning Feasibility Study (FS) made forecasts for different scenarios of the controlled lowering of the level in the CP, including a scenario of continuous passive water descent without controlling the water levels' regime along the CP surface area. The forecasted calculations allow making a conclusion that exceedance of the control levels, in particular pertaining to concentration of radionuclides in the air, can have sporadic character in situation with extreme climatic conditions. In fact, tendencies to the increase and exceedance of the control levels of aerosol activity of α - β -LLN, Cs137 and Sr90 in the air along the perimeter of the CP bank line have not been recorded currently.

The results of the conducted radiation monitoring, taking into account the forecasted estimates of radiation situation changes given in the CP Decommissioning FS, show the absence of negative impact of the cooling pond slopes' drying process on the radiation situation in a case of possible further lowering of the water level. It should be noted that a wide network of atmospheric precipitation stations was created within the SSE ChNPP industrial site. The stations are located around the CP within and outside the guarded perimeter of the SSE ChNPP industrial site.

Country or International Organization

Ukraine

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