# Decay Heat Evaluation of Spent Fuel Assemblies in SFP of Kori Unit-1

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## Abstract

Kori Unit 1 is the first permanent shutdown nuclear power plant in Korea and it is on June 18th, 2017. Spent fuel assemblies began to be discharged from the reactor core to the spent fuel pool(SFP) within one week after shutdown of Kori unit 1 and the campaign was completed on June 27th, 2017. The total number of spent nuclear fuel assemblies in SFP of Kori Unit-1 is 485 and their discharging date is different respectively. So, decay heat was evaluated considering the actual enrichment, operation history and cooling time of the spent fuel assemblies stored in SFP of the Kori Unit-1. The code used in the evaluation is the ORIGEN-based CAREPOOL system developed by KHNP. Decay heat calculation of PWR fuel is based on ANSI/ANS 5.1-2005, “Decay heat power in light water reactors" and ISO-10645, "Nuclear energy - Light water reactors - Calculation of the decay heat power in nuclear fuels. Also, we considered the contribution of fission products, actinide nuclides, neutron capture and radioactive material in decay heat calculation. CAREPOOL system calculates the individual and total decay heat of all of the spent fuel assemblies in SFP of Kori Unit-1. As a result, the total decay heat generated in SFP on June 28th, 2017 when the spent fuel assemblies were discharged from the reactor core, is estimated to be about 4,185.8 kw and to be about 609.5 kw on September 1st, 2018. It was also estimated that 119.6 kw is generated in 2050 when it is 32 years after the permanent shutdown. Figure 1 shows the trend of total decay heat in SFP of Kori Unit-1.

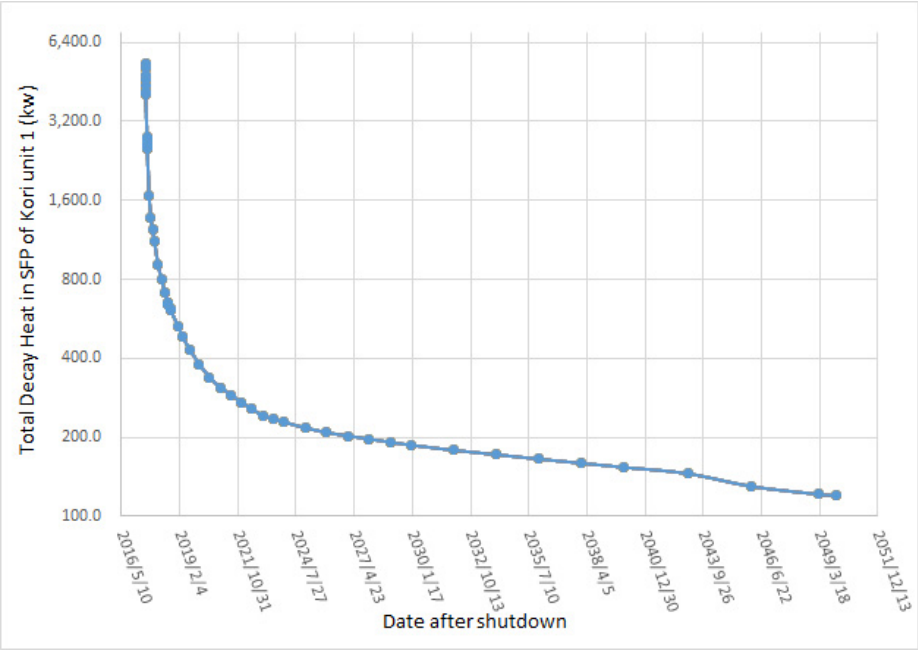


Fig. 1. Total Decay Heat in SFP of Kori Unit 1 according to the Storage Time.