



Construction Experience of Advanced Power Reactor (APR) 1400

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Abstract

Advanced Power Reactor 1400 (APR1400) is a generation-III pressurized water reactor, which is developed based on one of the government-supported G-7 projects. Using Optimized Power Reactor 1000 (OPR1000) as a reference, APR1400 adopted System80+ design, EPRI URD, and state-of-art safety technologies. The latest model has also implemented the improved seismic resistance, an extended design life from 40 to 60 years, a lowered core damage frequency, full-scale Man-machine interface system (MMIS), and many other features. Korean regulatory body issued the design certification for APR1400 in 2002 after ten years of design development since 1992, and Shin-Kori #3,4 project is its first construction of the kind. The project was initiated in 2001 as construction plan was confirmed. The project had successfully accomplished the milestone schedule in a timely manner starting from the first concrete pouring in October 2008 to the cold hydraulic test(CHT) in 2012. After CHT, the quality document scandal revealed deficiencies in test reports, and resulted in replacing the entire safety class cables. Adding to the delay, Fukushima follow-up actions were also implemented, and GE recalled its safety class valves due to the non-conformance in post welding heat treatment. The regulatory body issued Operation License in October 2015 for the initial fuel load and the following Power Ascension Test. The plant had to undergo temporary maintenance periods for reinforcing low-pressure turbine blade and replacing main feedwater venturi pipe, and etc. In Dec. 2016, Shin-Kori #3 construction was finally completed after 39 months of delay. It is still a remarkable accomplishment compared to all other generation-III plants worldwide such as EPR, AP100, and etc., which are yet to be completed.