

Report on Installation of alternative cooling and purification system of spent fuel pool of Unit
3 of Fukushima Daiichi Nuclear Power Station (summary)

1. Summary

In Fukushima Daiichi Nuclear Power Station, offsite power and emergency power source was lost due to the Tohoku-chiho-Taiheiyo-Oki earthquake and the function of Fuel Pool Cooling and Filtering System (FPC system) to remove decay heat from the spent fuel pool stored in the spent fuel pool.

Currently fire hose is connected to the pipes of FPC system and freshwater is supplied from outside periodically to compensate the evaporation.

Therefore, it is necessary to install temporary pump and heat exchanger (cooling and purification system) in replacement with existing pump and heat exchanger so that the decay heat from the spent fuel is continuously removed, evaporation of spent fuel pool water is reduced, the reduction of spent fuel pool water is mitigated, and the spent fuel is flooded.

2. Implementation plan

(1) System structure

The system consists of the primary system in which the spent fuel pool water circulate through heat exchanger and the secondary system in which the heat from the primary system is released to the air through the cooling tower. (refer to attachment 2)

1: primary system consists of pump, heat exchanger, pipes, valves, strainer, instruments and controls

2: secondary system consists of pump, cooling tower, surge tank, pipes, valves, instruments and controls. Heat from primary system moves to secondary system through heat exchanger and is released to the air through cooling tower.

(2) Cooling function

As a result of evaluation analysis of water temperature in spent fuel pool in case using the cooling and purification system, after the operation of the system (reaching the rated flow), the water temperature is expected to go down to 65 degree C after 1.6 day. It is considered to have sufficient cooling function to cool decay heat of spent fuel. It is expected to reach 40 degree C after one month operation.

(3) Installation work process

Installation work is planned to start from late June and finish by the end of June.

3. Basic policy to secure safety

As stable cooling of spent fuel pool is highly important to restore the situation, it will be implemented as safe, certain, and fast as practical.

4. Detailed measures to secure safety

(1) Stability of the facilities

a. structure strength and seismic safety

Facilities will be designed to secure seismic safety at least to the level of ordinary industrial facilities in order to protect the facilities and maintain the operability and functionality of the system from the expected aftershocks.

b. impact from tsunami

In cooling and purification system, it is not likely that primary system get affected from tsunami. Even if it gets affected, flooding of spent fuel can be maintained by irregularly supplying water from outside using the fire engines stored in the west side of main anti-earthquake building.

c. measures to prevent corrosion

Injection of deoxidized freshwater and chemicals has been implemented in order to prevent corrosion.

(2) Measures to prevent leakage

Cooling and purification system will have following measures in order to minimize the potential leakage from the primary system to the outside of system and building.

- Install drain receiver at the bottom of the heat exchanger unit
- Install the alarm and interlock for potential leakage at the time of pipeline break, etc

(3) Protection against radioactivity

Following measures will be implemented in order to minimize the exposure dose of workers during installation work and of operators and supervisors during the operation as a measure of protection against radioactivity.

- Pump and heat exchanger is unitized in order to reduce hours for installation work.
- Shield is installed near the work place

- Remote observation system is installed so that monitoring from main anti-earthquake building is available.

(4) Maintenance and management of facilities

Operation and maintenance management will be implemented in order to sustain the stable cooling of spent fuel pool by cooling and purification system for long term.

a. operation management

- check if there are any abnormal features such as leakage
- detect the abnormal feature and respond to it as soon as practical

b. maintenance management

- replace the durable parts as necessary

5. Operation duration

Implementing maintenance and management of facilities described in 4. (4) will enable continued operation.

End