

22. REGULATORY TREATMENT OF NON-SAFETY SYSTEMS

22.5.6 Post-72-Hour Actions and Equipment

In the July 15, 2009, response to Request for Additional Information (RAI)-SRP19.0-SPLA-20 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML091980042), the Westinghouse Electric Company (Westinghouse) clarified its description of supporting equipment that may be needed 72 hours after an accident.

The AP1000 design relies on the following safety functions 72 hours after an accident:

- core cooling, inventory, and reactivity control
- containment cooling and ultimate heat sink
- main control room habitability
- postaccident monitoring
- spent fuel pool cooling

To support these functions, the AP1000 design includes nonsafety-related ancillary equipment. Connections are provided for generators and pumping equipment that can be brought to the site to back up the installed equipment. The ancillary equipment (alternatively, the transportable equipment) is capable of supporting extended operation of the passive safety systems.

- Electrical power is required to supply the following loads:
 - postaccident monitoring instrumentation
 - spent fuel pool monitoring instrumentation
 - ventilation for the main control room, instrumentation and control room, and direct current equipment room
 - power to replenish the passive containment cooling water storage tank (PCCWST) using motor-driven pumps
- After the energy stored in the 1E batteries is depleted, ancillary diesel generators in the annex building provide alternating current (ac) power. A fuel tank stores sufficient fuel for 4 days of operation (both trains). Power from each ac generator is fed to a distribution panel, from which it supplies the associated 1E battery recharger and passive containment cooling system (PCS) recirculation pump, as well as local services (heating for the ancillary diesel fuel tank and lighting for the ancillary diesel space). All of this equipment is in the seismically qualified portion of the annex building, which is also designed to withstand high winds and associated missiles.
- The seismically qualified portion of the annex building is accessible through the auxiliary building, which is a safety-related, seismic Category 1 structure. Seven days are available for plant operators to restore at least one path to the outside, through which the fuel tank can be refilled or a transportable generator can be connected to the distribution panel described above.

- Makeup water is required for the PCCWST, which provides water for the following:
 - containment cooling
 - firefighting
 - spent fuel pool cooling by maintaining the inventory of water in the pool
- The initial inventory of the PCCWST is adequate for 72 hours. An additional 4-day supply of water is stored in the passive containment cooling ancillary water storage tank, which is a seismic Category 2 structure, and designed to withstand high winds and associated missiles. One of two recirculation pumps in the PCS pumps this water to the PCCWST. If normal power is not available, an associated ancillary diesel generator can power each of the PCS recirculation pumps.
- A non-safety-related connection is provided for external makeup to the PCCWST. It is compatible with available firefighting equipment and accessible from the yard outside the auxiliary building (“plant west” of the auxiliary building). Through this connection, any additional water required can be injected at the safety-related return line from the PCS recirculating pump and heater to the PCCWST.

The staff concludes that the design features described above provide adequate assurance that required safety functions can be maintained in the long term (beyond 72 hours postaccident) and after seismic events. This is consistent with the Commission’s staff requirements memoranda on SECY-94-084 and SECY-95-132, both titled “Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs,” dated March 28, 1994, and May 22, 1995, respectively, and NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition.” Therefore, the design described above is acceptable.

22.5.9 Short-Term Availability Controls

AP1000 Design Control Document (DCD) Tier 2, Table 16.3-2, “Investment Protection Short-Term Availability Controls,” identifies short-term availability controls for nonsafety-related structures, systems, and components (SSCs) that are subject to regulatory treatment.

There are no limiting conditions for operation if the completion times for required actions are not met (i.e., there is no requirement to bring the plant to a safe-shutdown condition when operability requirements are not fulfilled). The staff finds this acceptable since these nonsafety-related systems do not meet any of the four criteria specified in Title 10 of the Code of Federal Regulations (10 CFR) 50.36(c)(2)(ii) that would require a limiting condition for operation:

- (1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary
- (2) a process variable, design feature, or operating restriction that is an initial condition of a design-basis accident or transient analysis that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier
- (3) an SSC that is part of the primary success path and that functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of, or presents a challenge to, the integrity of a fission product barrier

- (4) an SSC that operating experience or probabilistic risk assessment has shown to be significant to public health and safety

In addition, inspections, tests, analyses, and acceptance criteria, as described in DCD Tier 1, Section 3.7, "Design Reliability Assurance Program," address these SSCs. They are described in DCD Tier 2, Section 17.4, "Design Reliability Assurance Program," and identified in Table 17.4-1, "Risk-Significant SSCs Within the Scope of D-RAP"; therefore, the staff finds the administrative controls for regulatory treatment of nonsafety systems in DCD Tier 2, Table 16.3-2, to be acceptable.

In DCD Tier 2, Section 16.3.2, "Combined License Information," Westinghouse stated that combined license (COL) applicants referencing the AP1000 will develop a procedure to control the operability of investment protection SSCs in accordance with DCD Tier 2, Table 16.3-2. In DCD Tier 2, Section 13.5, "Plant Procedures," the applicant described the commitment to address operational and maintenance programmatic issues. The staff finds that COL Information Item 13.5-1 provides an acceptable method for ensuring that licensees will develop a procedure to control the operability of nonsafety-related SSCs subject to regulatory treatment.