

3.4 Initial Test Program

Design Description

This section represents a commitment that combined license applicants referencing the AP1000 certified design will implement an initial test program.

An initial test program is performed during the initial startup of each AP1000 plant. The initial test program consists of a series of tests categorized as construction and installation, preoperational (prior to fuel load), and startup (during and after fuel load). All ITAAC will be completed prior to fuel load; therefore, no ITAAC are performed during the startup test phase of the initial test program.

Construction and installation tests are performed to verify the adequacy of construction, installation, and preliminary operation of components and systems. Various electrical and mechanical tests are performed including cleaning and flushing, hydrostatic testing, electrical checks, operability checks, and instrumentation calibration. The completion of the construction and installation test program demonstrates that the system is ready for preoperational testing.

Preoperational tests are performed for each system after construction and installation tests, but prior to initial fuel loading to demonstrate that equipment and systems perform in accordance with design criteria so that initial fuel loading, initial criticality, and subsequent power operation can be safely undertaken. Preoperational tests include, as appropriate, logic and interlock tests, control and instrumentation functional tests, component functional tests, operational and performance tests, and expansion, vibration, and dynamic effects tests.

Startup tests begin with the initial fuel loading and are performed to demonstrate the capability of individual systems, as well as the integrated plant, to meet performance requirements. Startup testing is conducted in four categories: tests related to initial fuel loading, tests performed after initial fuel loading but prior to initial criticality, tests related to initial criticality and those performed at low power (less than 5 percent), and tests performed at power levels greater than 5 percent (ascension to power tests). Startup tests include a controlled fuel load, reactor core and component performance tests, initial criticality, control and protection system operational tests, and plant system performance tests.

Preoperational and startup tests are performed using test specifications and test procedures. The test procedures delineate the test methods to be used in the conduct of the Initial Test Program and the applicable acceptance criteria against which performance is evaluated. Test specifications and procedures are developed and reviewed by qualified personnel. Copies of the test specifications and test procedures for preoperational tests are available to NRC personnel prior to the scheduled performance of these tests. Copies of the test specifications and test procedures for startup tests are provided to NRC inspection personnel prior to the scheduled fuel loading date. Administrative procedures are used to control the conduct of the test program; the review, evaluation and approval of test results; and test record retention.