

3.3 Initial Test Program

3.3.1 Design Description

The U.S. EPR Initial Test Program (ITP) is a program that commences with the completion of construction and is concluded at commercial operation. The initial test program consists of a series of tests categorized as preoperational tests (prior to fuel load), and startup tests (during and after fuel load).

Construction and installation tests are prerequisite tests for preoperational tests and are performed prior to preoperational testing to verify the adequacy of construction, installation, and preliminary operation of components and systems. Mechanical, electrical, and instrument and control (I&C) tests are performed which include system cleaning and flushing, hydrostatic testing, electrical checks, operability checks, and I&C loop calibration. The completion of the construction and installation test program demonstrates that the individual components and associated systems are ready for preoperational testing.

The preoperational testing phase of the ITP will consist of those tests activities conducted prior to fuel loading. Preoperational tests are performed for each system after construction and installation tests, but prior to initial fuel loading to demonstrate and document that the performance of equipment and systems meet or exceed their design criteria. This rigorous preoperational test program ensures that initial fuel loading, initial criticality, and subsequent power operation can be performed safely. Preoperational tests include, as appropriate, logic and interlock tests, control and instrumentation functional tests, equipment functional tests, system and component operational and performance tests, and equipment and system vibration tests, and system dynamic tests.

Startup tests begin with pre-core load prerequisite tests and initial fuel loading and extend to commercial operation. Startup tests are performed to validate the capability of individual systems and confirm that integrated plant performance meets performance requirements at various power levels. Startup testing is conducted in four phases:

- Tests required pre-core load related to initial fuel loading.
- Tests performed after initial fuel loading but prior to initial criticality.
- Tests related to initial criticality and tests 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 prescriptive controlled fuel load, reactor core and component performance and analysis tests, initial criticality and low power physics tests, control system tuning and performance demonstration, protection system operational tests, and plant and system performance tests, both steady-state and transient.

Preoperational and startup tests are performed utilizing step-by-step test procedures to control conduct of each test. Such test procedures delineate established test methods to be used in the conduct of the ITP and the applicable acceptance criteria against which performance is evaluated. The test procedures are developed from preoperational and startup test specifications. Test specifications and test procedures are developed and reviewed by qualified personnel as delineated by site specific administrative procedures. Copies of the preoperational and startup specifications are made available to the NRC. Preoperational test procedures are made available to NRC personnel 60 days prior to the scheduled performance of these tests. Copies of test procedures for startup tests are provided to NRC inspection personnel 60 days prior to the scheduled fuel loading date. Site specific administrative procedures are used to control the conduct of the Initial Test Program; the review, evaluation and approval of test results; and all test record retention.