CHAPTER 14.0 - INITIAL TEST PROGRAM

A description of the initial test program for the LaSalle plant, including construction tests and equipment demonstrations, preoperational tests and system demonstrations, and startup tests and operational demonstrations, is located in Chapter 14.0 of the FSAR.

During the Unit 2 Startup Test Program, the changes indicated on the following pages were made per discussion with the Nuclear Regulatory Commission.

TABLE 14.2-134 OF FSAR

RESIDUAL HEAT REMOVAL SYSTEM STARTUP TEST

PURPOSE

The purpose of this test is to demonstrate the ability of the Residual Heat Removal (RHR) system to remove residual and decay heat from the nuclear system so that refueling and nuclear system servicing can be performed.

DESCRIPTION

The condensing mode of the RHR system will be tuned. Condensing heat exchanger performance characteristics will be demonstrated. During a suitable reactor cooldown, the shutdown cooling mode of the RHR system will be demonstrated. The heat removal capacity of the RHR heat exchangers will be demonstrated in the suppression pool cooling mode.

The decay heat load is insignificant early in the startup test program. Use of this mode with low core exposure could result in exceeding the 100 °F/hr cooldown rate limitation of the vessel. Late in the test program, after accumulating significant core exposure, a suitable demonstration can more adequately demonstrate the RHR heat exchangers ability to cooldown the reactor.

ACCEPTANCE CRITERIA

Level 1

Not applicable

Level 2

The RHR system shall be capable of operating in the suppression pool cooling and shutdown cooling mode (with either heat exchanger in operation) at the flow rates and heat transfer indicated on the process diagrams. The RHR system shall be capable of operating in the steam condensing mode. In the steam condensing mode, for small disturbances, each variable must have a decay ratio less than 0.25 throughout the expected operating range of each controller's expected operating range.

The RHR system performance in the shutdown cooling mode shall provide a controlled cooldown during shutdown.

The RHR System heat exchangers shall meet the heat transfer of the process diagram for the suppression pool cooling mode.

NOTE

The steam condensing mode of RHR is no longer used.

INITIAL CONDITIONS

1. All construction tests and preoperational tests are completed and approved.

2. All system instrumentation installed and calibrated.

3. All systems must be operational as required to perform the test.

TABLE 14.2-120 OF FSAR

FEEDWATER CONTROL SYSTEM STARTUP TEST

PURPOSE

The purposes of this test are:

1. To adjust the Feedwater Control System for acceptable reactor water level control.

2. To determine the maximum feedwater runout capability.

3. To demonstrate the capability of automatic recirculation flow runback feature to prevent low-water level scram following the trip of one of the two operating turbine driven feedwater pumps.

4. To demonstrate adequate response to feedwater temperature decrease.

5. To demonstrate the ability of the motor-driven feedwater pump to maintain level when the turbine driven system is lost.

DESCRIPTION

Reactor water level setpoint changes of approximately 3 to 6 inches (7.6 to 15.3 cm) and 10% pump flow step changes will be used to evaluate and adjust the feedwater control system settings. The level setpoint changes also demonstrate core stability to subcooling changes. One of the two operating feedwater pumps will be tripped and the automatic flow runback circuit will act to drop power to within the capacity of the remaining pump.

A trip of both pumps, or of a single pump when only one pump is in service, will be done for the purpose of determining the time involved in automatically bringing the motor-driven feedwater pump into operation. This part of the test will be performed at a power level well within the capability (35% flow) of the motor-driven pump in order to minimize the probability of adding an additional unnecessary low level scram to the startup test procedure. The automatic startup of the motor-driven pump is primarily for the purpose of maintaining level without the use of emergency systems if both turbine driven pumps trip at low power. The worst single failure case of feedwater heating loss will be performed and the resulting transients recorded between 80% and 90% power and near full core flow rate. The trip will involve the elimination of extraction steam to the high pressure feedwater heater.

Pump performance curves will be used to determine the turbine speed

corresponding to either the maximum allowed flow at rated vessel pressure or 135% of rated flow at 1075 psia. The mechanical speed limiters (Unit 2 has electrical speed limiters) will be set to the smaller of these values. Feedwater controller outputs will be adjusted to not exceed their rated output no matter what their input might be. Data collected during plant operation will be used to verify that the preceding adjustments are adequate.

ACCEPTANCE CRITERIA

Level 1

a. In the automatic mode, the response of any level system controlled variable to any test input change or disturbance must not diverge.

b. For the feedwater temperature loss test, the maximum feedwater temperature decrease due to a single failure case must be ≤ 100°F. The resultant MCPR determined from actual test results must be greater than the fuel thermal safety limit.

c. The increase in simulated heat flux cannot exceed the predicted Level 2 value by more than 2%. The predicted value will be based on the actual test values of feedwater temperature change and power level.

d. The feedwater flow runout capability must not exceed the assumed value in the FSAR.

Level 2

a. Level control system related variables may contain oscillatory modes of response. In these cases, the decay ratio for each controlled mode of response must be less than or equal to 0.25.

b. The dynamic flow response of each feedwater actuator (turbine or valve) to small (≤ 10%) step disturbances in the manual mode shall be:

   1. Maximum time to 10%* - ≤ 1.1 seconds.

   2. Maximum time from 10% to 90%* - ≤ 1.9 seconds.

   3. Setting time to within ± 5%* of the final value - ≤ 14.0 seconds.

4. Peak overshoot - ≤ 15%*.

5. Dead time - ≤ 1 second.

*Percent of step disturbance.

c. A scram must not occur from low water level following a trip of one of the operating feedwater pumps. There should be greater than 3 inch water level margin to scram for a feedwater pump trip initiated at 100% power conditions.

d. The increase in simulated heat flux cannot exceed the predicted value referenced to the actual feedwater temperature change and power level.

e. The average rate of response of the feedwater turbines to large (10% to 20%) step disturbances shall be between 10% and 25% of pump rated flow/second. This average response rate will be assessed by determining the time required to pass linearly through the 10% and 90% response points.

INITIAL CONDITIONS

1. All construction tests are completed and approved.

2. Electrical power and control air are available to various system components as necessary to conduct the test.

3. Instrumentation has been checked or calibrated as appropriate to conduct the test.