DUKE POWER COMPANY
OCONEE NUCLEAR STATION

ATTACHMENT 2

PROPOSED TECHNICAL SPECIFICATION REVISION

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3.4 SECONDARY SYSTEM DECAY HEAT REMOVAL

Applicability

Applies to the secondary system requirements for removal of reactor decay heat.

Objective

To specify minimum conditions necessary to assure the capability to remove decay heat from the reactor core.

Specification

3.4.1 Emergency Feedwater System

The reactor shall not be heated above 250°F unless the following conditions are met:

a. Three emergency feedwater pumps (one steam driven pump capable of being powered from an operable steam supply system and two motor driven pumps) and associated initiation circuitry shall be operable.

b. Two 100% emergency feedwater flow paths shall be operable. Each flow path shall have at least one flow indicator operable.

3.4.2 During operation greater than 250°F, the provisions of 3.4.1 may be modified to permit the following conditions:

a. One emergency feedwater pump may be inoperable for a period of up to seven days. If the inoperable pump is not restored to operable status within 7 days, the unit shall be brought to hot shut down within an additional 12 hours and below 250° in another 12 hours.

b. Two emergency feedwater pumps or one emergency feedwater flow path may be inoperable for a period of up to 60 hours. If the inoperable pump is not restored to operable status within 60 hours the unit will be at hot shutdown within an additional 12 hours and below 250°F in another 12 hours.

c. With three emergency feedwater pumps and/or both emergency feedwater flow paths inoperable, immediately initiate corrective action to restore at least one emergency feedwater pump and associated emergency feedwater flowpath to operable status. The unit shall be at hot shutdown within 12 hours and below 250°F in another 12 hours.

3.4.3 The 16 main steam safety relief valves shall be operable.

3.4.4 A minimum of 72,000 gallons of water per operating unit shall be available in the upper surge tank, condensate storage tank, and hotwell. A minimum of 5 ft. (=30,000 Gal.) shall be available in the upper surge tank.

3.4.5 The emergency condenser circulating water system shall be operable.

3.4.6 The controls of the emergency feedwater system shall be independent of the Integrated Control System.

Bases

The Main Feedwater System and the Turbine Bypass System are normally used for decay heat removal and cooldown above 250°F. Feedwater makeup is supplied by operation of a hotwell pump, condensate booster pump, and a main feedwater pump.

Operability of the Emergency Feedwater System (EFW) assures the capability to remove decay heat and cool down the Reactor Coolant System to the operating conditions for switch over to decay heat removal by the Decay Heat Removal System, in the event that the Main Feedwater System is inoperable. The EFW system consists of a turbine driven pump (880 gpm), two motor driven pumps (450 gpm each), and associated flow paths to the steam generators.

The decay heat and the reactor coolant pump heat following a reactor trip from 102% power, and the EFW flow rate (90°F feedwater) required to remove this heat demand are as follows:

Time	Heat Demand (% of 2568 MWT)	EFW Flowrate (gpm)
1 min	4.65	721
2 min	4.17	647
5 min	3.64	564
10 min	3.28	509
30 min	2.70	419
1 hour	2.35	365
2 hours	2.07	322

The limiting transient requiring maximum EFW flow is the loss of main feedwater with offsite power available. For this transient, a minimum EFW flow rate equivalent to 405 gpm at 1065 psia is adequate. Each of the three EFW pumps is capable of delivering this flow.

A 100% flowpath is defined as: The flowpath to either steam generator including associated valves and piping capable of being supplied by either the turbine driven pump or the associated motor driven pump.

One flow indicator or steam generator level indicator per steam generator is sufficient to provide indication of emergency feedwater flow to the steam generators and to confirm emergency feedwater system operation. In the event that at least one indicator per steam generator is not available, then the flowpath to this steam generator is considered to be inoperable.

The EFW System is designed to start automatically in the event of loss of both main feedwater pumps or low main feedwater header pressure. All automatic initiation logic and control functions are independent from the Integrated Control System (ICS).

Normally, decay heat is removed by steam relief through the turbine bypass system to the condenser. Condenser cooling water flow is provided by a siphon effect from Lake Keowee through the condenser for final heat rejection to the Keowee Hydro Plant tailrace. Decay heat removal via recirculation

flowpath may be maintained for up to 11 hours per unit, assuming the minimum amount of water in the upper surge tanks, condensate storage tank, and hotwell is available. This is based on the conservative estimate of normal makeup being 0.5% of throttle flow. Throttle flow at full load, 11,200,000 lbs/hr., was used to calculate the operation time. For decay heat removal the operation time with the volume of water specified would be considerably increased due to the reduced throttle flow.

Decay heat can also be removed from the steam generators by steam relief through the main steam safety relief valves. The total relief capacity of the 16 main steam safety relief valves is 13,105,000 lbs/hr. In this case the minimum amount of water in the upper surge tank, condensate storage tank, and hotwell is sufficient to remove decay heat and reactor coolant pump heat for 3 hours per unit at hot shutdown conditions.

REFERENCE

FSAR, Section 10.