3.2 CHEMICAL AND VOLUME CONTROL SYSTEM

Applicability

Applies to the operational status of the Chemical and Volume Control System.

Objective

To define those conditions of the Chemical and Volume Control System necessary to ensure safe reactor operation.

Specification

A. When fuel is in a reactor, there shall be at least one flow path to the core for boric acid injection. The minimum capability for boric acid injection shall be equivalent to that supplied from the refueling water storage tank.

B. For one-unit operation, the reactor shall not be critical unless the following Chemical and Volume Control System conditions are met:

1. Two charging pumps shall be operable and one charging pump from the opposite unit shall be available*.

2. Two boric acid transfer pumps shall be operable.

3. The boric acid tanks (tank associated with the unit plus the common tank) together shall contain a minimum of 6000 gallons of at least 7.0% (but not >8.5%) by weight boric acid solution at a temperature of at least 112°F.

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*Available means (1) operable except for automatic initiation instrumentation, (2) offsite or emergency power source may be inoperable in cold shutdown, and (3) it is capable of being used for alternate shutdown with the opening of the charging pump cross-connect.

4. System piping and valves shall be operable to the extent of establishing two flow paths to the core; one flow path from the boric acid tanks to the charging pumps and a flow path from the refueling water storage tank to the charging pumps.

5. Two channels of heat tracing shall be operable for the flow paths requiring heat tracing.

6. System piping, valves and control board indication required for the operation of the two charging pumps in Specification 3.2.B.1 shall be operable, and system piping, valves and control board indication required for the operation of the opposite unit charging pump in Specification 3.2.B.1 shall be available*.

C. For two-unit operation, the reactor shall not be critical unless the following Chemical and Volume Control System conditions are met:

1. Two charging pumps shall be operable per unit.

2. Three boric acid transfer pumps shall be operable.

3. When the common tank is in service, it shall be assigned to only one unit at a time. For that unit which has usage of the common tank, the boric acid tanks (unit's tank plus common tank) together shall contain a minimum of 6000 gallons of at least 7.0% (but not >8.5%) by weight boric acid solution at a temperature of at least 112°F.

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*Available means (1) operable except for automatic initiation instrumentation, (2) offsite or emergency power source may be inoperable in cold shutdown, and (3) it is capable of being used for alternate shutdown with the opening of the charging pump cross-connect.

For that unit which does not have usage of the common tank, the unit's own tank shall contain a minimum of 6000 gallons of at least 7.0% (but not >8.5%) by weight boric acid solution at a temperature of at least 112°F.

When the common tank is assigned to one unit, valves shall be positioned to establish a flow path to that unit and prevent flow to the other unit.

4. System piping and valves shall be operable to the extent of establishing two flow paths to the core; one flow path from the boric acid tanks to the charging pumps and a flow path from the refueling water storage tank to the charging pumps.

5. Two channels of heat tracing shall be operable for the flow paths requiring heat tracing.

D. The requirements of Specifications 3.2.B and 3.2.C above may be modified to allow one of the following components to be inoperable at any one time. If the system is not restored within the time period specified, the reactor shall be placed in hot shutdown conditions. If the requirements of Specifications 3.2.B and 3.2.C are not satisfied within an additional 48 hours, the reactor shall be placed in the cold shutdown condition.

1. One of the stipulated boric acid transfer pumps may be inoperable for a period not to exceed 24 hours provided immediate attention is directed to making repairs.

2. Two charging pumps may be inoperable subject to the provisions of Specification 3.3.B.

3. One heat tracing circuit my be inoperable for a period not to exceed 24 hours provided immediate attention is directed to making repairs.

E. The requirements of Specifications 3.2.B.1 and 3.2.B.6, concerning the opposite unit's charging pumps and associated piping, valves and control board indications, may be modified to allow the following components to be unavailable.

1. The opposite unit's charging pumps may be unavailable for a period not to exceed 7 days provided immediate attention is directed to making repairs. If not available within 7 days, be in at least hot shutdown within the next 6 hours and in cold shutdown within the next 30 hours.

2. The cross tie piping, associated valves and control board instrumentation and controls may be unavailable for a period not to exceed 7 days provided immediate attention is directed to making repairs. If not available within 7 days, be in at least hot shutdown within the next 6 hours and in cold shutdown within the next 30 hours.

Basis

The Chemical and Volume Control System provides control of the Reactor Coolant System Boron inventory. This is normally accomplished by using boric acid transfer pumps which discharge to the suction of each unit's charging pumps. The Chemical and Volume Control System contains four boric acid transfer pumps. Two of these pumps are normally assigned to each unit but, valving and piping arrangements allow pumps to be shared such that three out of four pumps can service either unit. An alternate (not normally used) method of boration is to use the charging pumps taking suction directly from the refueling water storage tank. There are two sources of borated water available to the suction of the charging pumps through two different paths; one from the refueling water storage tank and one from the discharge of the boric acid transfer pumps.

A. The boric acid transfer pumps can deliver the boric acid tank contents (7.0% solution of boric acid) to the charging pumps.

B. The charging pumps can take suction from the volume control tank, the boric acid transfer pumps and the refueling water storage tank. Reference is made to Technical Specification 3.3.

The quantity of boric acid in storage from either the boric acid tanks or the refueling water storage tank is sufficient to borate the reactor coolant in order to reach cold shutdown at any time during core life.

Approximately 6000 gallons of the 7.0% solution of boric acid are required to meet cold shutdown conditions. Thus, a minimum of 6000 gallons in the boric acid tank is specified. An upper concentration limit of 8.5% boric acid in the tank is specified to maintain solution solubility at the specified low temperature limit of 112°F. For redundancy, two channels of heat tracing are installed on lines normally containing concentrated boric acid solution.

The Boric Acid Tank(s), which are located above the Boron Injection Tank(s), are supplied with level alarms which would annunciate if a leak in the system occurred.

For one-unit operation, it is required to maintain available one charging pump with a source of borated water on the opposite unit, the associated piping and valving, and the associated instrumentation and controls in order to maintain the capability to cross-connect the two unit's charging pump discharge headers. In the event the operating unit's charging pumps become inoperable, this permits the opposite unit's charging pump to be used to bring the disabled unit to cold shutdown conditions. Initially, the need for the charging pump cross-connect was identified during fire protection reviews.

REFERENCES

FSAR Sections 9.1 Chemical and Volume Control System

ATTACHMENT 2

DISCUSSION OF PROPOSED TECHNICAL SPECIFICATION CHANGE

This proposed change supplements a previous change to Specification 3.2. A charging pump cross-connect modification was implemented in response to commitments made to the staff concerning Appendix A to Branch Technical Position 9.5-1 and the Fire Protection Safety Evaluation Report for Surry Power Station dated September, 1979. The purpose of the charging pump cross-connect modification is to provide alternate shutdown capability. Specification 3.2 is revised to address the availability of charging pump capability from the non-operating unit during one unit operation. In the event the operating unit's charging pumps become inoperable, the opposite unit's charging pump may be used to bring the disabled unit to cold shutdown conditions. This proposed change allows the status of opposite unit charging pump to be "available". Available is defined as (1) operable except for automatic initiation instrumentation, (2) offsite or emergency power source may be inoperable in cold shutdown, and (3) it is capable of being used for alternate shutdown with the opening of charging pump cross-connect. This proposed change defines the condition where the opposite unit charging pump is available and capable of performing its intended function but may not meet the strict requirements of operable as defined in the Technical Specifications.

This proposed change also provides specific action to be in hot shutdown within the next 6 hours and in cold shutdown within the next 30 hours in the event that the opposite unit's charging pumps, cross-tie piping, associated valves and control board instrumentation and controls are unavailable for a period of more than 7 days.

This proposed change does not involve a significant hazards consideration. This change is best encompassed by Example (vi) of the examples provided for guidance by the NRC in the April 6, 1983 FR[14870]; a change which either may result in some probability or consequences of a previously analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within the acceptance criteria for the system or component. This proposed change does not degrade the use of the system. Any change to the margin of safety is insignificant because essentially the status of the opposite unit charging pump is unchanged. The component is still required to be able to perform its intended function. This change is to avoid the possibility of violating a definition of the Technical Specification when the opposite unit is in cold shutdown.

In addition, the editorial changes in this proposed change are encompassed by Example (i), of the examples provided for guidance by the NRC to determine that a significant hazards consideration is not involved. Example (i) states, A purely administrative change to technical specifications, for correction of errors, in this instance, typographical and minor editorial errors.

These changes are suggested by the NRC to clarify our previous submittal.