

Enclosure

Summary of Report

The system described by the applicant is designed to ensure that the turbine will not exceed its design overspeed following a loss of electrical load. The proposed system functions to dump to the condenser the steam entrapped in the steam lines and moisture separator reheater between the high pressure and low pressure turbines whenever the turbine trips on loss of electrical load. The releasing of this steam through the low pressure turbine would result in exceeding design overspeed.

Because of the possible consequences of a turbine overspeed and resultant turbine missile, the proposed system is stated to be designed to certain "nuclear protection system criteria of redundancy, separation and reliability". In addition, it is stated that system performance is assured in the event of a single failure.

Redundancy is provided for the dump system in the detection schemes, logic, actuation devices and physical piping arrangements. One detection and logic scheme energizes the "A" solenoid associated with each dump valve on unit trip and loss of electrical load. Another scheme energizes the "B" solenoid valve. Either solenoid will cause the associated dump valve to open. There are six dump valves and six associated steam lines leading independently to the condenser. Five of the six paths are required for trip from full power. Isolation can be effected on any of the lines by closing a separate motor operated isolation valve in series with the dump valve. Indication of the isolation valve position is located in the control room and according to plant Technical Specifications, only limited power operation is allowed when isolation valves are closed for any reason.

At power testing capabilities are provided for the trip schemes. The dump valves are tested (operated) separately.

Summary of Regulatory Evaluation

1. Testing

In order to meet the test requirements of protection systems, a complete test of the system is necessary. The proposed testing of the "signal reception" and "logic circuit portions" does not indicate the type of separate testing of the final actuation device (dump valve) and the degree of overlap with the other tests.

2. Removal from Operation

The description of the proposed limitations on plant power when less than six dump valves and lines are available does not provide sufficient information.

3. Identification

There is no information available to demonstrate that sufficiently distinct identification is provided for the redundant portions of the low pressure steam bypass system.

4. Failure Mode and Effects Analysis

The information provided does not allow us to analyze the system for possible unsafe failure modes. Particular consideration must be given to the loss of air supply to the valves.

Regulatory Position

1. Testing

Additional information describing the testability of the system is required. A test that includes sufficient overlap is acceptable.

2. Removal from Operation

The inoperability of any of the six bypass paths must be (at a minimum) initially alarmed and continuously indicated in the Control Room.

3. Identification

A method of identification is required to show that the system is a protection grade system.

4. Failure Mode and Effects Analysis

Information on the failure modes of the proposed system and the resultant effects on the overall plant safety must be provided. The results of the loss of air supply should be included.

Conclusion

The proposed system criteria are acceptable upon the resolution of the areas of concern defined in the Regulatory Positions.