

DUKE POWER COMPANY  
Catawba Nuclear Station  
Units 1 & 2

Report Number: IE-79/03-SDD-413/414

Report Date: September 7, 1979

Facility: Catawba Nuclear Station, Units 1 & 2

Descriptions of Deficiency:

The present design criterion is to provide air operators for modulating control valves in Engineered Safeguards Systems which are designed to fail the valves in the safe position upon loss of air.

Recent review of the modulating control valves indicates that the application of control grade positioners, solenoids, and instrumentation could result in failure of these valves to go to the safe position upon loss of air or to control properly if air is available following a seismic event.

The problems identified to date are categorized as follows:

Category 1: Potential Failure of Cooling Water Flow Control Valves for Engineered Safeguards Heat Exchangers and Motor Coolers.

Category 2: Potential Failure of Main Steam Power Operated Relief Valves.

Category 3: Potential Failure of Auxiliary Feedwater Flow Control Valves.

Analysis of Safety Implications:

Category 1:

- A. Loss or impairment of function of control grade instrumentation and controls following a seismic event may cause unacceptable reduction in cooling water flow to the Nuclear Service Water, Component Cooling, Safety Injection, Centrifugal Charging, and Auxiliary Feedwater pump motor coolers.
- B. Loss or impairment of function of control grade temperature instrumentation and controls following a seismic event may cause an unacceptable reduction in cooling water flow to the Component Cooling Heat Exchangers.
- C. Loss or impairment of function of control grade flow instrumentation and controls following a seismic event may cause unacceptable reduction in cooling flow to the Residual Heat Removal Heat Exchangers.

Category 2:

Loss of function of control grade instrumentation and controls for the main steam power operated relief valves following a seismic event which causes loss of normal

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feedwater could result in opening of the relief valves with subsequent failure of one or more of these valves to close after main steam pressure has dropped below the closure setpoint. This would result in an uncontrolled loss of steam or the equivalent of a main steam break caused by a seismic event.

Category 3:

Loss or impairment of function of control grade instrumentation and controls for auxiliary feedwater flow control valves, following a seismic event which causes loss of normal feedwater, may result in inadequate feedwater flow.

Corrective Action:

Class 1E solenoid valves will be added to the instrumentation air lines immediately upstream of the affected valve operators and downstream of all control grade components to vent the operator on the appropriate signal thus allowing it to fail the valve in the safe position.

Our review of this matter is not complete at this time. A followup report will be filed by October 7, 1979.

Consideration will be given to the potential impact of failure of control grade instrumentation and controls on the performance of Engineered Safeguards Systems for all future plant designs.

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