

ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
BORG-WARNER 3" MOTOR OPERATED GATE VALVES
NCR 0020
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

During a recent test program conducted by Duke Power Company at Marshalltown Steam Station, Borg-Warner's standard 3", 1500-pound motor operating gate valve failed to fully close when actuated under operating conditions. The operating conditions were 2485 lb/in² at 650° F with a flow rate of 220,000 pounds per hour of steam, which is equivalent to a velocity of approximately 40 feet per second. Under this severe service the valve closed to within 10 percent of full closure.

After the initial test was conducted, through a number of subsequent tests, the problem was resolved to be lack of proper guiding, combined with very high bearing stresses between the gates and the seats which caused binding just before full closure.

Safety Implications

The valves are used at Bellefonte as isolation/control valves in the Component Cooling Water System on either side of the reactor coolant pump seal coolers. Although the valves at Bellefonte would not be expected to see the conditions that resulted in failure of the valves, it cannot be easily shown that such a failure would not occur. Failure of these valves would result in loss of the Component Cooling Water System.

Corrective Action

The condition has been resolved by Borg-Warner redesigning the standard gate valve to include a more complete guiding of the gate in the body and seats and increasing the radii on the seat and the gate allowing the gate to go to a complete closure without binding. This has been confirmed by retesting the modified valves through 31 full cycles successfully. This modification will be complete at Bellefonte by September 1, 1980.