U-600703
L08-86(09-10)-L
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ILLINOIS POWER COMPANY

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

September 10, 1986

Docket No. 50-461

Mr. James G. Keppler
Regional Administrator
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: IE Bulletin No. 85-03:
Motor-Operated Valve Common Mode Failures
During Plant Transients Due to Improper Switch Settings

Dear Mr. Keppler:

Illinois Power's (IP) letter dated May 15, 1986 (U-600529) provided a response to IE Bulletin No. 85-03. Additional information was requested by the Nuclear Regulatory Commission (NRC) in a letter to W. C. Gerstner (IP) dated August 1, 1986. The additional program information requested per Action Item e of the Bulletin is attached. This letter supersedes the information provided in IP's May 15, 1986, letter. As stated in IP's previous letter, all work required by Action Items b, c, and d will be completed prior to exceeding 5% power.

I hereby affirm that the information in this letter and the attachments is correct to the best of my knowledge.

Please contact me if you have any questions on this matter.

Sincerely yours,

F. A. Spangenberg

F. A. Spangenberg
Manager - Licensing and Safety

DWW/kaf

Attachments

cc: B. L. Siegel, NRC Clinton Licensing Project Manager
NRC Resident Office
Illinois Department of Nuclear Safety
NRC Document Control Desk

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Attachment A

Action Item a:

Review and document the design basis for the operation of each valve. This documentation should include the maximum differential pressure expected during both opening and closing the valve for both normal and abnormal events to the extent that these valve operations and events are included in the existing, approved design basis, (i.e., the design basis documented in pertinent licensee submittals such as FSAR analyses and fully-approved operating and emergency procedures, etc). When determining the maximum differential pressure, those single equipment failures and inadvertent equipment operations (such as inadvertent valve closures or openings) that are within the plant design basis should be assumed.

Response to Action Item a:

Please note that valve data is arranged in the recommended format of IE Bulletin 85-03 Table 2. The design basis differential pressure data are from the designer's (General Electric) design specifications. The design differential pressure value data represents the worst case listed for both opening and closing the valve for both normal and abnormal events within the scope of the approved design basis. The design basis includes single failure criteria.

Valve Component ID, Manufacturer, Type, Model, Size, Rating	Valve Operator Manufacturer, Model, Motor RPM	Valve Function (e.g. AFW pump discharge isolation valve)	Design Basis ΔP (psi) Open & Close
(High Pressure Core Spray System)			
1E22-F001, Anchor Darling, Gate, 522201124, 16", 150 lb.	Limitorque, SMB-00, 1700	HP Suction Valve	90
1E22-F004, Anchor Darling. Gate, 52220212, 10", 655 lb.	Limitorque, SB-3, 3380	Injection Valve	1575
1E22-F010, Anchor Darling, Globe, 52220511, 10", 900 lb.	Limitorque, SMB-4, 1720	HP Test Return Valve	1575

Valve Component ID, Manufacturer, Type, Model, Size, Rating	Valve Operator Manufacturer, Model, Motor RPM	Valve Function (e.g. AFW pump discharge isolation valve)	Design Basis ΔP (psi) Open & Close
(High Pressure Core Spray System)			
1E22-F011, Anchor Darling, Globe, 52220612, 10", 900 lb.	Limitorque, SMB-4, 1720	HP Test Return Valve	1575
1E22-F012, Anchor Darling, Gate, 52220314, 4", 900 lb.	Limitorque, SB-0, 3400	Low Flow Bypass Valve	1575
1E22-F015, Anchor Darling, Gate, 52220412, 20", 150 lb.	Limitorque, SB-1, 3450	Suppression Pool Suction Valve	90
1E22-F023, Anchor Darling, Globe, 52220711, 10", 900 lb.	Limitorque, SMB-3, 1725	Suppression Pool Test Valve	1575
(Reactor Core Isolation Cooling System)			
1E51-F010, Anchor Darling, Gate, E6214291, 6", 150 lb.	Limitorque, SMB-000, 1900	Cond. Storage Tank Iso. Valve	75
1E51-F013 Anchor Darling, Gate, E62141691, 6", 900 lb.	Limitorque, SMB-0, 1900	Pump Discharge Valve	1400

Valve Component ID, Manufacturer, Type, Model, Size, Rating	Valve Operator Manufacturer, Model, Motor RPM	Valve Function (e.g. AFW pump discharge isolation valve)	Design Basis ΔP (psi) Open & Close
(Reactor Core Isolation Cooling System)			
1E51-F019, Yarway, Globe, E62142767, 2", 900 lb.	Limitorque, SMB-000 1900	Pump Min-Flow Bypass Valve	*
1E51-F022, Anchor Darling, Globe, E6214871, 4", 900 lb.	Limitorque, SMB-00, 1900	Pump Test Return Valve	1400
1E51-F031, Anchor Darling, Gate, E6214311, 6", 150 lb.	Limitorque, SMB-000, 1900	Suppression Pool Pump Suction Valve	75
1E51-F045, Anchor Darling, Globe, E6214881, 4", 900 lb.	Limitorque, SMB-0, 1900	Steam Supply Valve	1177
1E51-F046, Anchor Darling, Globe, E62142768, 3", 900 lb.	Limitorque, SMB-000, 1900	Cooling Loop Shut-Off Valve	1400
1E51-F059, Anchor Darling, Gate, E6214721, 4", 900 lb.	Limitorque, SMB-00, 1900	Pump Test Return Valve	1400
1E51-F063, Anchor Darling, Gate, E621451, 8", 600 lb.	Limitorque, SMB-0, 1700	RCIC Steam Flow Iso. Valve	1177
1E51-F064, Anchor Darling, Gate, E62141431, 8", 600 lb.	Limitorque, SMB-0, 1700	RCIC Steam Flow Iso. Valve	1177

Valve Component ID, Manufacturer, Type, Model, Size, Rating	Valve Operator Manufacturer, Model, Motor RPM	Valve Function (e.g. AFW pump discharge isolation valve)	Design Basis ΔP (psi) Open & Close
(Reactor Core Isolation Cooling System)			
1E51-F068, Anchor Darling, Gate, E6214341, 12", 150 lb.	Limitorque, SMB-000, 1700	Turbine Exhaust Iso. Valve	30
1E51-F076, Rockwell, Globe, BL021, 1", 1500 lb.	Limitorque, SMB-00, 1700	Steam Warm-up Iso. Valve	1177
1E51-F077, Yarway, Globe, 5515B, 1.5", 600 lb.	Limitorque, SMB-000, 1700	Vacuum Breaker Iso. Valve	30
1E51-F078, Anchor Darling, Gate, E62141401, 3", 150 lb.	Limitorque, SMB-000, 1700	Vacuum Breaker Iso. Valve	30
1E51-F095, Anchor Darling, Globe, E62143911, 1", 600 lb.	Limitorque, SMB-000, 1900	F045-Bypass Valve	1177
1E51-C002E, Gimpel, Globe, 7412218 4", 900 lb.	Limitorque, SMB-000, 1900	RCIC Turbine Trip and Throttle Valve	1177

* Shut off head of RCIC pump (1370 psi)

Action Item b:

Using the results from item a above, establish the correct switch settings. This shall include a program to review and revise, as necessary, the methods for selecting and setting all switches (i.e., torque, torque bypass, position limit, overload) for each valve operation (opening and closing).

If the licensee determines that a valve is inoperable, the licensee shall also make an appropriate justification for continued operation in accordance with the applicable technical specification.

Response to Action Item b:

A list of the nominal and maximum torque switch settings was compiled from each valve's torque switch calibration plate which is located in the limit switch compartment. The seating and unseating thrust required to operate the valve under design conditions was obtained from the valve manufacturers.

The limit, torque, and torque by-pass switches have been set in accordance with CPS Procedure 8451.02, "MOVATS Testing of Motor Operated Valves" (Attachment B). The torque switches have been set to obtain 110% of the design thrust listed in the controlled torque switch setting list.

The torque switch bypass in the open direction is set to open at no less than 20% of the valve stroke, to ensure the valve will unseat and overcome any initial differential pressure loads.

All valves that have a safety related function in the open and/or close direction (as defined in Technical Specification Section 3.8.4.2) contain an additional torque switch and overload heater bypass circuit in the safety related direction (see Attachment C). This additional bypass circuit exists for 100% of the open stroke, because the valves open on limit switch. In the closing direction the limit switch is set to open less than one (1) second from the fully closed position (defined as torque switch trip). However, valves with stroke times of less than 20 seconds have their limit switches set to drop out approximately 5% from the end of stroke. The bypass limit switch is controlled by gear ratio and is strictly a mechanical function. Therefore, it is independent of differential pressure. Therefore, the valves will have torque switch and overload heater bypass protection for 100% of their open travel and a minimum of 95% of their closed travel. In most cases, the disc has already contacted its seat when the torque switch bypass drops out at 95% of closing travel.

Action Item c:

Individual valve settings shall be changed, as appropriate, to those established in item b, above. Whether the valve setting is changed or not, the valve will be demonstrated to be operable by testing the valve at the maximum differential pressure determined in item 1 above with the exception that testing motor-operated valves under conditions simulating a break in the line containing the valve is not required. Otherwise, justification should be provided for any cases where testing with the maximum differential pressure cannot practicably be performed. This justification should include the alternative to maximum differential pressure testing which will be used to verify the correct settings.

Note: This bulletin is not intended to establish a requirement for valve testing for the condition simulating a break in the line containing the valve. However, to the extent that such valve operation is relied upon in the design basis, a break in the line containing the valve should be considered in the analyses prescribed in items a and b

above. The resulting switch settings for pipe break conditions should be verified, to the extent practical, by the same methods that would be used to verify other settings (if any) that are not tested at the maximum differential pressure.

Each valve shall be stroke tested, to the extent practical, to verify that the settings defined in item b above have been properly implemented even if testing with differential pressure cannot be performed.

Response to Action Item c:

As discussed in the response to Action Item b, valves with safety related functions contain a bypass circuit. This bypass circuit ensures the maximum valve operator output is available to stroke the valve during normal operation conditions. This design eliminates the need to verify proper torque switch settings using maximum differential pressure testing. The Clinton design bypassed the overload and torque switch protection during normal operation of the valves. This design criterion dictated that the benefit of 100% bypass during normal operations exceeded the risk of damaging the motor. Also, a breaker trip from overload conditions is detected in the Main Control Room since the position indicating light will go out.

Action Item d:

Prepare or revise procedures to ensure that correct switch settings are determined and maintained throughout the life of the plant. Ensure that applicable industry recommendations are considered in the preparation of these procedures.

Response to Action Item d:

Testing and preventative maintenance procedures are being prepared which will include testing from the Motor Control Center (MCC), monitoring valve motor load and control switch signature traces during the opening specified in the preventative maintenance procedures and closing cycle. The testing frequencies will be specified in the preventative maintenance procedures. Analysis of this test data will determine if any valve parameters have changed significantly from previous test data. The extent of signature analysis will be dictated by the indications found or the maintenance performed. If degradations are clearly imminent, the valve will be considered inoperable, and MOVATS testing and/or corrective maintenance will be performed, as plant conditions permit.

Instruction ME-6 (Attachment D) "Control of Valve Torque Switch Setting List" will ensure proper control when updating the torque switch setting list. This list contains the range of torque and thrust values.

A program is in place and functioning which provides industry information to the appropriate organizations for review and appropriate action.