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ComEd

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JSP LTR. #95-0013

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Dresden Nuclear Power Station Units 2 and 3
Responses to Generic Letter 95-07 "Pressure Locking & Thermal Binding of Safety Related Power-Operated Gate Valves" Issued August 17, 1995
NRC Docket Numbers 50-237 and 50-249

Reference: (a) Letter from J. O'Neill to F. Spangenberg dated November 3, 1995 CHRON# 0312333 "Pressure Locking & Thermal Binding Screening Review Revision 0

Attached is ComEd's 180 day response to Generic Letter 95-07. ComEd has committed to: Evaluate the operational configuration of safety related, power-operated (including motor-, air, and hydraulically operated) gate valves in the plant to identify valves that are susceptible to pressure locking and/or thermal binding, and, perform further analyses as appropriate, and take any needed corrective actions (or justify longer schedules), to ensure that the susceptible valves identified are capable of performing the safety function(s) under all modes of plant operation, including test configuration.

Attachment 1 provides a list of safety-related gate valves with a safety related function to open that are susceptible to pressure locking and thermal binding and the actions taken or recommended to resolve these issues.

Attachment 2 provides a list of safety related gate valves that do not have a safety related function to open that are susceptible to pressure locking and thermal binding and the actions taken or recommended to resolve these issues.

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If your staff has any questions concerning this letter, please refer them to Frank Spangenberg, Dresden Station Regulatory Assurance Manager, at (815) 942-2920, extension 3800.

Sincerely,

J. Stephen Perry
Site Vice President
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TPJ/kls

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File: Numerical

ATTACHMENT 1

DRESDEN STATION 180 DAY RESPONSE TO GENERIC LETTER 95-07
Gate Valves With A Safety Related Function To Open that are Susceptible to Pressure Locking and Thermal Binding

The following safety related valves, that are required to open to perform a safety related function, have been determined to be susceptible to pressure locking and/or thermal binding.

I. PRESSURE LOCKING

1. 2(3)-1402-25A/B: Core Spray Inboard Injection Isolation Valves
2. 2(3)-1501-22A/B: LPCI Inboard Injection Isolation Valves

The scenario that produces pressure locking in the normally closed LPCI and Core Spray injection valves assumes that the downstream injection check valves are not leak tight. As a result, the disk on the reactor side of the ECCS injection isolation valves will be subjected to reactor pressure during power operations. Reactor pressure will deflect this disk allowing the valve bonnet and the area between the disks to pressurize.

If a large break LOCA rapidly depressurizes the reactor, high pressure could be trapped inside the valve exerting an outward force on both valve disks. This pressure locking scenario would increase the force required to open the valve.

ACTIONS TAKEN TO RESOLVE PRESSURE LOCKING

Complete.

In order to eliminate the potential for pressure locking, a 1/4 inch hole was drilled in the disk on the high pressure side of these flex-wedge gate valves (the reactor side). The purpose of this hole is to assure that the pressure in the bonnet and the area between the disks will remain equal to the pressure in the downstream piping. The low pressure side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements.

3. 2(3)-2301-8: HPCI Injection Isolation Valves

The scenario that produces thermally induced pressure locking in these normally closed HPCI injection isolation valves assumes that the valves reach room temperature during an outage. During the unit start-up the feedwater temperature increases. The feedwater piping conducts heat from the feedwater line, through the HPCI discharge check valve, to the HPCI Injection Isolation valve (2301-8). The increase in temperature of the water, assumed to be trapped in the bonnet, creates pressure locking.

RESOLUTION TO PRESSURE LOCKING ISSUE

The Dresden HPCI injection isolation valves have experience this operating scenario with every unit startup and it has never resulted in pressure locking of the 2301-8 valves. The HPCI injection isolation valves are equipped with 150 ft-lb motors that have considerable thrust capability. A pressure locking calculation was performed showing the actuator is capable of overcoming the additional pressure locking forces with a design margin of 33%.

RECOMMENDED CORRECTIVE ACTIONS

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In order to eliminate the potential for pressure locking, Dresden Station intends to drill a 1/4 inch hole in the disk on the feedwater side of these flex-wedge gate valves (feedwater side) the next time maintenance is performed on the internals of this valve.

The purpose of this hole is to assure that the pressure in the bonnet and the area between the disks will remain equal to the pressure in the downstream piping eliminating the potential for temperature induced pressure locking. The pressure locking calculations showing the capability of the actuators justifies this schedule.

II. THERMAL BINDING

1. 2(3)-1301-3: Isolation Condenser Condensate Return Outboard Isolation Valve

The scenario that produces thermal binding in these normally closed Isolation Condenser condensate return valves assumes that the configuration of the piping allows the temperature of the valve body to drop below 212 degrees F during normal power operations.

If the Isolation Condenser is initiated, the temperature of the valves will equalize with the condensed steam returning to the reactor. This condensate can be as high as 561 degrees F.

These valves are insulated. After the Isolation Condenser system is returned to the stand-by condition, the temperature of the 1301-3 valve will decrease slowly. A decrease in valve temperature greater than 200 degrees F is assumed to produce thermal binding which increases the force required to open the valve.

RESOLUTION TO THERMAL BINDING ISSUE

The Isolation Condenser is used during reactor isolation events. These events will produce a SCRAM resulting in a termination of power operations. Therefore, under design basis conditions, there would be no need to re-open the 1301-3 valve after the Isolation Condenser system operation. During a unit startup, the Isolation Condenser outboard condensate return valve (1301-3) is opened and the inboard valve is closed (1301-4), therefore, the current procedures assure the valve is not thermally bound prior to power operations.

The only time the reactor remains at power after the Isolation Condenser system operates is during the 5 year Isolation Condenser test. These valves have always cycled during the quarterly surveillance following this test. Therefore, the cool down rate has been shown to be too slow to induce thermal binding.

RECOMMENDED CORRECTIVE ACTIONS

None.

ATTACHMENT 2

DRESDEN STATION 180 DAY RESPONSE TO GENERIC LETTER 95-07
Gate Valves With No Safety Related Function To Open that are Susceptible to Pressure Locking and Thermal Binding

The following safety related valves, that are not required to open to perform a safety related function, have been determined to be susceptible to pressure locking and/or thermal binding.

I. PRESSURE LOCKING

1. 2(3)-0202-4A/B Reactor Recirculation Pump Suction Isolation Valves
2. 2(3)-0202-5A/B Reactor Recirculation Pump Discharge Isolation valves

The scenario that produces pressure locking in these normally open valves assumes that a recirculation pump develops a seal leak that requires these valves to be closed. The pump depressurizes resulting in a high differential pressure across one disk. If a LOCA were to occur during this event, both valves would pressure lock.

RECOMMENDED CORRECTIVE ACTIONS

None.

The recirculation pump discharge valve is required to close during a design basis LOCA. There is no safety related function to open either valve. In the event of a recirculation pump develops a leak that requires these valves to be closed, the unit would be required to shutdown. Under these conditions, there would be no attempt to open these valves during power operations.

In order for pressure locking to occur in gate valves, the valves must be leak tight. These 28" gate valves are not required to be leak tight. Pressure locking is not considered to be a concern for these valves.

ATTACHMENT 2 (continued)

3. 2(3)-205-24 Head Spray Containment Isolation Valves

The Head Spray System at Dresden is supplied by the non-safety related CRD pumps. The Head Spray containment isolation valves are closed during normal power operations and all design basis accidents.

The scenario that produces pressure locking in these normally closed valves assumes the Head Spray system is being used as an alternate water source during a reactor transient event. The reactor is rapidly depressurized concurrent with a loss of the CRD pumps. This scenario would be governed by the Emergency Operating Procedures (EOPs) and is beyond the design basis of the plant.

RECOMMENDED CORRECTIVE ACTIONS

Complete.

The Head Spray containment isolation valves were replaced during D3R13 and D2R14 with Anchor/Darling double disk gate valves. These valves were procured with a hole drilled in one of the two disks. The disks were installed with the hole toward the reactor side. The CRD side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements.

4. 3-220-1 & 2 Main Steam Line Drain Isolation Valves

The Main Steam line drains at Dresden are closed during power operations and all design basis accidents. The valves can be utilized to equalize the pressure between the MSIVs if an attempt is made to open the MSIVs after a Group I Isolation event.

The scenario that produces pressure locking in these normally closed valves assumes the vessel is rapidly depressurized and the main steam line drain valves are to be used to equalize the pressure between the MSIVs. This scenario would be governed by the Emergency Operating Procedures (EOPs) and is beyond the design basis of the plant.

RECOMMENDED CORRECTIVE ACTIONS

Complete.

The Unit 3 Main Steam Line Drain valves were replaced with an Anchor/Darling double disk gate valves during D3R13. These valves were procured with a hole drilled in one of the two disks. The disks were installed with the hole toward the reactor side. The low pressure side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements. The Unit 2 Main Steam Line Drain containment isolation valves are globe valves. Globe valves are not susceptible to pressure locking.

5. 2-1001-1A/B Shut-Down Cooling (SDC) Supply Inboard Isolation Valves
6. 3-1001-1A/B Shut-Down Cooling (SDC) Supply Inboard Isolation Valves

The SDC containment isolation valves are interlocked closed when the vessel temperature is above 350 degrees F and receive a signal to close when reactor water level is below eight inches (Group III). The SDC system is not used during any design basis accidents. Therefore, the valves are closed during normal power operations and all design basis accidents. The valves are open to initiate SDC during shutdown conditions.

The scenario that produces pressure locking in these normally closed valves assumes the vessel is rapidly depressurized and the SDC system is initiated immediately. This scenario would be governed by the Emergency Operating Procedures (EOPs) and is beyond the design basis of the plant.

RECOMMENDED CORRECTIVE ACTIONS FOR THE 2-1001A/B

Complete.

The 2-1001-1A/B containment isolation valves were replaced during D2R14 with Anchor/Darling double disk gate valves. These valves were procured with a hole drilled in one of the two disks. The disks were installed with the hole toward the reactor side. The low pressure side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements.

RECOMMENDED CORECTIVE ACTIONS FOR THE 3-1001-1A/B

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In the event that maintenance is performed on the internals of these valves, then a 1/4 inch hole shall be drilled in the disk that will be installed on the reactor side of the valve. The low pressure side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements.

7. 2-1201-1 Reactor Water Clean-Up (RWCU) Supply Isolation Valve
8. 3-1201-1 Reactor Water Clean-Up (RWCU) supply Isolation Valve

The RWCU containment isolation valves are normally open during power operations. They are required to close during a Group III Isolation which occurs when the reactor water level drops below plus eight inches (+8"). There is no safety related function to open these valves.

The scenario that produces pressure locking in these valves assumes the 1201-1 valve closes on a low water level event, the vessel rapidly depressurizes, then an attempt is made to re-open the valves. This scenario would be governed by the Emergency Operating Procedures (EOPs) and is beyond the design basis of the plant.

The scenario that produces thermally induced pressure locking assumes the 1201-1 valve is at room temperature following an outage. The RWCU inboard containment isolation bypass line is opened, causing the heat up the 1201-1 valve. The increase in temperature of the water, assumed to be trapped in the bonnet, creates pressure locking.

There is no safety related function to open this valve.

RECOMMENDED CORRECTIVE ACTIONS FOR THE 2-1201-1

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In the event that maintenance is performed on the internals of these valves, then a 1/4 inch hole shall be drilled in the disk that will be installed on the reactor side of the valve. The low pressure side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements.

RECOMMENDED CORRECTIVE ACTIONS FOR THE 3-1201-1

Complete.

The 3-1201-1 containment isolation valves were replaced during D3R13 with Anchor/Darling double disk gate valves. These valves were procured with a hole drilled in one of the two disks. The disk were installed with the hole toward the reactor side. The low pressure side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements.

9. 2(3)-1402-24A/B Core Spray Inboard Injection Isolation

In the normal Core Spray system alignment, the outboard containment isolation valves are closed and the inboard containment isolation valves are open. The pressure locking evaluation has concluded that the normally closed outboard isolation valve is susceptible to pressure locking (see Attachment 1) while the normally open inboard containment isolation valve is not susceptible to pressure locking.

If the Core Spray system was in an abnormal alignment where the outboard containment isolation valve was open and the inboard containment isolation valve was closed, the inboard isolation valve would then be susceptible to pressure locking.

The Dresden Operating Procedures (DOP) precludes operating in this abnormal alignment.

RECOMMENDED CORRECTIVE ACTIONS

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In the event that maintenance is performed on the internals of these valves, then a 1/4 inch hole shall be drilled in the disk that will be installed on the reactor side of the valve. The low pressure side disk will continue to provide containment isolation in accordance with 10 CFR 50 Appendix J requirements.

II. THERMAL BINDING

1. 2(3)-0202-4A/B Reactor Recirculation Pump Suction Isolation Valves
2. 2(3)-0202-5A/B Reactor Recirculation Pump Discharge Isolation Valves

The scenario that produces thermal binding in these normally open valves assumes a pump seal leak that requires these valves to be closed. The unit is shutdown and the valves are allowed to cool.

RECOMMENDED CORRECTIVE ACTIONS

None.

The recirculation pump discharge valve is required to close during a design basis LOCA. There is no safety related function to open either valve.

In the event of a pump seal leak that was large enough to warrant the closure of these valves, the unit would be required to shutdown. Cycling the valves during this scenario may complicate the pump seal failure problem.

3. 2-1201-1 & 2 Reactor Water Clean-Up (RWCU) Supply Isolation

The RWCU containment isolation valves are normally open during power operations. They are required to close during a Group III Isolation which occurs when the reactor water level drops below plus eight inches (+8"). There is no safety related function to open these valves.

The scenario that produces thermal binding in these valves assumes the valves close on a low water level event, then the reactor is quickly brought to a cold shutdown condition.

RECOMMENDED CORRECTIVE ACTIONS

None.

Re-establishing RWCU flow is a non-safety related function.

4. 2(3)-1301-1&2 Isolation Condenser Steam supply Isolation Valves
5. 2(3)-1301-4 Isolation Condenser Condensate Return Isolation Valves
6. 2(3)-2301-4&5 Isolation Condenser Steam Supply Isolation Valves

The normally open HPCI steam supply and Isolation Condenser containment isolation valves may be closed to perform maintenance on the Isolation Condenser system during power operations. If the duration of the maintenance activity is long enough (greater than 8 hours), the valves may cool enough to create a thermal binding condition. The system would be considered inoperable until these valves have been re-opened.

RECOMMENDED CORRECTIVE ACTION

None.

The valves would be out-of-service closed and the system would be declared inoperable. The valves have to be open prior to declaring the system operable.

7. 2(3)-3206A/B Feedwater Isolation Valve

The Feedwater isolation valves are normally open during power operations. These have no safety related function to open or close. These valves are closed as the feedwater regulation valves are closed to assure there is no flow in the line.

The scenario that produces thermal binding assumes the valves are closed during a normal unit shutdown when the valves are at the temperature of the "C" feedwater heaters. The valves are allowed to cool and required to open during a unit start-up.

RECOMMENDED CORRECTIVE ACTIONS

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Cycle the feedwater isolation valves prior to starting the feedwater pumps during a unit start-up.