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New York Power Authority

September 29, 2000
JPN-00-038

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Subject: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Response to Questions regarding the Electric Lift
Modification to the James A. FitzPatrick Safety Relief Valves

Dear Sir:

By letter dated August 29, 2000, your staff requested additional information regarding details of the Electric Lift Modification to the James A FitzPatrick Safety Relief Valves. Attachment I provides the Authority's response to this request.

The Authority recognizes that the NRC staff is currently evaluating the BWROG's (Boiling Water Reactors Owners' Group) position on circuit analysis with respect to 10 CFR 50 Appendix R. The Appendix R compliance strategy set forth in Attachment I is consistent with the BWROG's proposed position.

Attachment II includes a commitment to revise procedure(s) to implement the Appendix R strategy as discussed in Attachment I.

If you have any questions please contact Charlene Faison at (914) 681-6306.

Very truly yours,

William A. Josiger
Vice President
Special Activities

STATE OF NEW YORK
COUNTY OF WESTCHESTER
Subscribed and sworn to before me
this 29th day of Sep 2000.

Eileen E. O'Connor

EILEEN E. O'CONNOR
Notary Public, State of New York
No. 4991062
Qualified in Westchester County
Commission Expires January 21, 2002

Cc: next page

A 001

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a) ***Page 56 of your nuclear safety evaluation of the 10 CFR 50.59 review for SRV ELECTRIC LIFT/ATWS SET POINT CHANGE PROJECT, stated that administrative controls will be established to prevent the operation of the new electric lift logic pending the completion of the Appendix R review. Provide the status of the Appendix R review and the proposed resolution of the Appendix R review and the proposed resolution of the Appendix R concerns.***

NYPA has completed the Appendix R review and has concluded the design as proposed is adequate to ensure the health and safety of the public and believes the proposed modification, with supporting procedure changes, will preclude the spurious operation of the SRVs.

The proposed design adds an electro-pneumatic assist feature to the SRVs. The system is designed to automatically open the SRVs under conditions of high reactor coolant pressure. To minimize the potential for the spurious failure (non-fire-related failure) of the system, coincident signals from two pressure transmitters in the same train are required. For redundancy of the actuation circuit, there are two sets of these circuits, each in a separate division. The circuits of the two transmitters of each division are routed in close proximity, and may be exposed to a common fire.

The pressure transmitters associated with this system generate a variable 4-20 ma signal. When the current increases above a preset value, the channel trips, causing the protective action (SRVs opening). The most likely failure of such a circuit due to fire is an off scale low signal (0 ma), which would result in the SRVs remaining closed. In order for the undesirable spurious operation to occur, a fire would have to induce a high current condition concurrently in two individual instrument loops in the same division, in the period prior to the plant operators taking corrective action to disable the circuits. The operators would receive early warning of a fire in an area which may threaten the control circuits from area smoke detectors. In addition, if a fire did cause the trip of one channel, the operators would receive indication of the false high pressure condition (identifiable as a half trip) in the Control Room. Procedure(s) will direct the operator to respond to the false high pressure indication. As a result, the operators would take prompt corrective measures to disable the system to prevent the spurious actuation. For the SRVs to actuate, the second signal would have to come in before the plant operators had time to disable the system.

The two forms of early warning (smoke detection and system internal indication), coupled with the low probability of a false high pressure signal in both loops, make the actual spurious operation of the system extremely unlikely.

NYPA believes the spurious failures under review are not credible and with the supporting procedure changes provides an enhanced design which exceeds what the BWROG considers necessary to prevent the undesired spurious failure. At the same time, NYPA recognizes that what constitutes a credible spurious operation is currently being discussed between the BWROG and the NRC Staff.

The SRV electric assist modification will improve SRV setpoint reliability. NYPA intends to apply the above Appendix R compliance strategy, install the modification, and place the system in service with supporting procedure changes implemented. In the event the results of discussions between the NRC and the BWROG identify that the proposed arrangement does not satisfy the NRC's final interpretation of Appendix R, NYPA would consider the proposed arrangement as an adequate "Compensatory Measure", until the action necessary to bring the plant into compliance could be completed. These steps may involve a 10CFR50.12 exemption and/or additional design changes.

b) The current design for SRV lifting logic is "two-out-of-two-taken once." This logic requires that either Channels A and C (Division 1) or Channels B and D (Division 2) must reach their given setpoints to activate the system and lift SRV's. Under this logic arrangement, a postulated fire induced fault in either Division 1 raceway or Division 2 raceway could spuriously actuate the system and that could affect more that a single SRV. Have you analyzed this scenario?

NYPA has considered the potential for the spurious operation of the electro-pneumatic assist feature and based on the BWROG's position believes that the spurious failures under review are not credible. In addition, NYPA will implement procedure changes for prompt operator action as an enhancement. NYPA recognizes that excluding this postulated scenario is a change in the NYPA Appendix R compliance strategy.

The JAF electrical design identifies 5 separate service levels of circuitry that are maintained in separate raceway systems. Instrumentation and control circuits are segregated in different raceway systems and are not run in the same raceway as power circuits. The circuitry is further segregated for each of the redundant safety related circuit systems to maintain divisional separation. Each of the circuits that occupy the panels / raceways is protected against overload and short circuit conditions.

The raceway in which the control circuit conductors are routed do not contain any high-energy power cables and all conductors in these raceways have appropriately coordinated overcurrent protection. A fire due to a sustained over current condition due to an electrical fault is therefore not considered to be credible.

c) Have you considered "one-out-of-two-taken-twice" logic for SRV lift logic?

Yes -The NYPA SRV project team considered a "one-out-of-two-taken-twice" early in the conceptual design phase of this project. However the "two-out -of-two-taken once" logic was ultimately chosen since it is the logic prescribed in NEDC-32121P, Pressure Switch/Transmitter for Two-Stage Target Rock Safety/Relief Valve. This GE Topical report, documents results of generic evaluations performed for the BWR Owners' Group to support modification to the Two-Stage Target Rock Safety/Relief Valves. This Topical Report, which was reviewed and accepted by the NRC, specifically prescribes the logic used in the design at the James A. FitzPatrick plant.

d) ***Page 21 of your design change summary stated that four pressure transmitters will provide the input to SRV electric lift logic. The signal will be transmitted to ATWS mitigation system to maintain the existing functionality. Describe the signal path of SRV lift actuation system and the signal path of ATWS mitigation system. Is there any single failure on these signal paths that could affect the safety function of the ATWS mitigation system? What is the consequence to the ATWS mitigation system when postulated a fault at one division raceway?***

The ATWS signal path is functionally unchanged by Modification M1-97-070. The Master Trip Units (MTUs) will be moved, and the associated cables rerouted (within the Relay Room only). The modification will move the master trip units, which previously were used exclusively to provide the ATWS high reactor pressure trip, from existing ATTS panels, 09-95 cabinet (Div I) and 09-96 cabinet (Div II), to the new Electric Lift initiation cabinets, 09-ECCS1-EP and 09-ECCS2-EP respectively. The analog transmitter signals (process pressure signal) that provide the input to the master trip units are terminated in the 09-95 and 09-96 panels and will be re-routed to the 09-ECCS1-EP and 09-ECCS2-EP panels respectively. The digital output signals from the master trip units will be then routed from the 09-ECCS1-EP and 09-ECCS2-EP to the 09-95 and 09-96 cabinets where the existing field cables to the ARI panels are presently located. Both the digital and analog signals between the existing ATTS panels and the new SRV Electric Lift panels will be routed in separate divisional conduits. -Note, the routing of the pressure transmitter signals from the Reactor Building to the Relay Room are unaffected by this modification.

The existing MTUs that provide the ATWS high pressure actuation will also retransmit the pressure signals from the respective Pressure Transmitters to sets of Slave Trip Units (STUs) that provide the Electric Lift logic functions. There is the potential for failure of an Electric Lift STU to affect the associated MTU. This interaction was considered in determining the level of quality of the components used in these applications. Single failure in the Electric Lift would affect at most one channel of ATWS instrumentation; this by itself would not prevent a valid ATWS actuation nor cause a spurious ATWS actuation.

Therefore, because the divisional separation of the entire ATWS signal path is maintained by this modification, a single failure does not affect the ATWS mitigation systems ability to perform its intended function. The consequence of a postulated fault to one divisional raceway is described below:

If both transmitter cables were damaged in such a manner that the pressure signals failed low, then ATWS would be disabled, since ATWS utilizes a "one-out-of-two-taken-twice" logic. If the transmitter cables were damaged in such manner that the pressure signals both failed high, then a half ATWS actuation would result. The ATWS response to a full divisional failure is not changed as a result of this modification.

e) ***With one pressure transmitter out-of-service, a procedure would bypass all SRV lift logic that would put the SRV electric lift system out–of-service. Would the ATWS mitigation system be out-of-service under this condition?***

The SRV Electric Lift Bypass Switches have no effect on the ATWS logic.

Attachment 2 to JPN-00-038

List of Commitments

Commitment ID	Description	Due Date
JPN-00-038-001	The appropriate procedure(s) will be revised to provide direction to operators to disable the SRV electric lift system in the event a false high pressure signal is present on one of the SRV electric lift trip channels.	Oct. 20, 2000