ENCLOSURE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SUPPLEMENTAL SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

STATION BLACKOUT RULE (10 CFR 50.63)

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

1.0 INTRODUCTION

The NRC staff's safety evaluation (SE) pertaining to the Power Authority of the State of New York (the licensee) response to the station blackout (SBO) rule, 10 CFR 50.63, was transmitted to the licensee by letter dated November 13, 1991. The staff's SE found the licensee's proposed method of coping with an SBO to be acceptable contingent upon the satisfactory resolution of seven recommendations listed in the SE. The licensee responded to the staff's SE by letters from R. E. Beedle, dated December 18, 1991, and April 1, 1992. The licensee also provided information pertaining to the SBO rule by letter dated September 13, 1991. Although this information preceded the NRC staff's November 13, 1991, SE, it was not received in time to be evaluated in that SE. Thus, this previous information, as well as the April 1, 1992, submittal, has been considered in this supplemental safety evaluation (SSE).

2.0 EVALUATION

The licensee's responses to the staff's concerns are evaluated below.

2.1 Condensate Inventory for Decay Heat Removal (SE Section 2.2.1)

SE Recommendation: In the SE, the staff recommended that the licensee should provide a procedure to ensure that the minimum Condensate Storage Tank level of 200,000 gallons will be available during normal power operation. In addition, since no depressurization is considered, the licensee should verify that the torus temperature would not exceed its heat capacity temperature limit (HCTL).

Licensee Response: In the submittal dated December 18, 1991, the licensee indicated that the physical arrangement of the suction connections to the condensate storage tanks (CSTs) and the existing recirculation provisions of the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) test procedures preclude the possibility that the CST level could drop below the 200,000 gallon reserve level during normal operation. Therefore, no additional procedures are required to provide assurance of the CST reserve

level. The licensee further indicated that if no depressurization of the reactor primary system were considered, it is possible that the HCTL of the suppression pool would be exceeded during a 4-hour SBO event. However, operation of the HPCI, RCIC, or Safety Relief Valves (SRVs) systems would result in reduction of reactor vessel pressure which would raise the HCTL so that the actual torus temperature would remain within the limit. In addition, the temperature of the suppression pool had been verified to remain within the HCTL during operation of RCIC (the preferred core heat removal system during SBO).

Staff Evaluation: Based on its review of the licensee's rationale and the review of other similar design BWRs, the staff finds the licensee's response acceptable and, therefore, considers this SE issue related to condensate inventory for decay heat removal during an SBO event resolved.

2.2 Class 1E Battery Capacity (SE Section 2.2.2)

SE Recommendation: In the SE, the staff stated that the licensee should verify and confirm that with the load shedding proposed for SBO conditions, the batteries have sufficient capacity, plus aging and load growth margins, to cope with and recover from an SBO of 4 hours. The verification of battery adequacy should consider loads such as those that are needed for EDG start attempts and switching requirements (breaker controls) at the beginning and end of the SBO event.

Licensee Response: The licensee referenced its September 13, 1991, response, and stated that the SBO battery calculation (JAF-89-013, Revision 2) considered EDG field flashing for EDG start attempts and circuit breaker control loads for breaker reclosure, during the load shedding, and reconnection sequences for restoration of ac power, as loads at the onset of the event. Although these loads were not considered as loads during the last minute of the 4-hour coping period, the calculation indicated that for the limiting interval at the end of the duty cycle, the 16 positive plates in each battery exceeded the minimum number of required plates (12 for 72SB-2 and 13 for 72SB-1) by a significant margin. This calculated margin was considered to be adequate to include field flashing and breaker reclosure loads during the last minute of the 4-hour coping period.

The licensee's September 13, 1991, response stated that the JAF-89-013, Revision 2, calculation used the methodology of IEEE-485 and applied penalties for initial low electrolyte temperature (10%) and battery end-of-life condition (25%). This calculation showed that either the A or B station battery is capable of powering the SBO loads for more than 6 hours.

The licensee also stated that a new formal engineering review is being conducted encompassing the updating, revision, and unification of several of the existing battery calculations including the SBO battery capacity calculation. The revised calculations are expected to be completed by December 21, 1992.

Staff Evaluation: Based on the above, the staff finds that the issue pertaining to the adequacy of the station batteries has been satisfactorily addressed.

2.3 Effects of loss of Ventilation (SE Section 2.2.4)

SE Recommendation: In the SE, the staff recommended that the licensee should reevaluate the heat-up calculation for the drywell and determine the effects of loss of ventilation during a 4-hour SBO event for the main steam tunnel, suppression pool and relay room using conservative initial temperatures. Equipment operability in these areas should be assessed and confirmed for the calculated heat-up conditions. In addition, the licensee should establish a procedure in accordance with the guidance described in NUMARC 87-00 for opening the control room cabinet doors within 30 minutes following an SBO event.

2.3.1 Drywell

Licensee Response: In the submittal dated December 19, 1991, the licensee indicated that no equipment in the drywell is required to function to mitigate the effects of an SBO event and that three plant-specific calculations were performed for the FitzPatrick IPE (Individual Plant Evaluation). All three calculations predicted a maximum SBO drywell temperature of approximately 200 °F after 4 hours. This is considerably less than the peak post-LOCA temperature inside the drywell of approximately 300 °F and the drywell design temperature of 309 °F.

2.3.2 Main Steam Tunnel and Suppression Pool

Licensee Response: The licensee indicated that no equipment in the main steam tunnel is required to mitigate the effects of an SBO. Accordingly, the main steam tunnel is not a DAC.

The licensee also indicated that calculations performed using NUMARC 87-00 methodology predict that during a 4-hour SBO, ambient temperatures near the drywell entrance and suppression pool room areas could reach 184 °F and exceed HPIC and RCIC high ambient temperature isolation setpoints. To prevent HPCI or RCIC from inadvertently isolating in the event of an SBO, procedure F-AOP-49 directs the operator to place the main steam line break detection circuits in the test mode. This effectively prevents HPCI or RCIC isolation due to elevated temperature in the drywell entrance area. Temperatures inside the suppression pool room were not calculated because temperatures near the drywell entrance are known to be higher.

2.3.3 Relay Room

The maximum relay room air temperature of 106 °F during a 4-hour SBO was originally calculated using the methodology outlined in NUMARC 87-00 and an initial room temperature of 75 °F.

Licensee Response: In the response dated December 18, 1991, the licensee indicated that preliminary calculations indicate that the use of a more conservative 90 °F initial temperature would result in an increased peak room temperature from 106 °F to 113 °F which would still be less than 120 °F.

2.3.4 Control Room Cabinet Doors

Licensee Response: In the response dated December 18, 1991, the licensee indicated that Step C.6a of the FitzPatrick SBO procedure F-AOP-49 directs operators to open all panel doors in the Control and Relay Rooms.

Staff Evaluation: Based on its review, the staff finds the licensee's responses acceptable and, therefore, considers this SE issue related to the effects of loss of ventilation during an SBO event at the FitzPatrick plant resolved.

2.4 Containment Isolation (SE Section 2.2.5)

In the SE, the staff reported that for the evaluation of containment isolation during an SBO event, the licensee used one additional criterion that was not in conformance with the guidelines described in RG 1.155 and NUMARC 87-00. This criterion excluded a valve which was interlocked with another valve in the same penetration. The licensee had not provided the justification for this deviation. In addition, the licensee had not identified which CIVs/penetrations were excluded using this criterion.

Also, the staff's consultant found that the drywell pressure sensing and torus pressure sensing penetration valves were normally open and fail closed. The fail-closure of these pressure valves might cause the loss of pressure indications in the control room for these areas.

SE Recommendation: The staff recommended that the licensee should provide the justification for the above cited deviation, add the valves that were excluded by the additional criteria (a valve interlocked with another valve) in an appropriate procedure and identify actions which are needed to confirm these valves are closed. The valve closure needs to be confirmed by position indication (local, remote, mechanical, process information, etc.) independent of the preferred (offsite) or onsite power. In addition, the licensee should verify that the fail closure of the drywell and torus pressure sensing penetration valves would not cause the loss of pressure indications in the control room for these areas.

Licensee Response: The licensee indicated that in addition to the exclusion criteria described in NUMARC 87-00 and RG 1.155, the licensee established two other criteria to evaluate the CIVs/penetrations. These two criteria are:

(1) Water Seals: Suction inlets and discharge points are always submerged below the water level in the suppression pool. The systems to which the lines from the suppression pool connect are closed systems.

(2) Valves (Electrically Interlocked With Other Valves) That Must Be Closed For Reactor Operation: The RHR shutdown cooling suction valves and the RHR head spray valves are interlocked closed by reactor high pressure signal. The RHR spray valves ar_ 'nterlocked closed on reactor level and drywell pressure signals. These valves must be closed for proper reactor operation.

The licensee also indicated that eight valves isolating penetrations were excluded using the series mounted electrically interlocked valve criteria. Eighteen valves isolating seven penetrations were excluded using water seal isolation criteria.

The licensee further indicated that the pressure sensing lines of the staff's concern are used only for the integrated leak rate testing (ILRT) instrumentation. They do not provide information to the operator during normal operation nor during an SBO. Therefore, isolation of these lines during an SBO event is acceptable. Control room primary containment pressure instrumentation is served by penetration number 50c, "Instrumentation Sensing DW Pressure."

Staff Evaluation: Based on its review, the staff finds the licensee's response acceptable and concludes that the CIV design and operation at the FitzPatrick plant have met the intent of the guidance described in RG 1.155. Therefore, the staff considers this SE issue resolved.

2.5 Procedures and Training (SE Section 2.4)

SE Statement: In the SE, the staff stated that it expects the licensee to implement the appropriate training to assure an effective response to an SBO.

Licensee Response: The licensee responded that changes to the procedures to meet the guidance of NUMARC 87-00, Section 4.2.1, will be implemented by December 31, 1992. The licensee stated that simulator training has been conducted, including a walk through of a station blackout sequence. The station blackout scenario will be reviewed in requalification training once every 2 to 4 years. A classroom lesson plan is scheduled for development during 1992 and will become part of the licensed operator replacement training program.

Staff Evaluation: The staff finds the licensee's response to be acceptable.

2.6 Proposed Modifications (SE Section 2.5)

SE Recommendation: In the SE, the staff recommend d that the licensee include a full description, including the nature and objectives of the modifications required in the documentation that is to be maintained by the licensee in support of the SBO submittals.

Licensee Response: The licensee stated that there are two modifications. One modification will provide an alternate power source to the RCIC enclosure

ventilation fans which will eliminate the potential for RCIC system isolation on high ambient temperature during an SBO. The other modification will provide alternate power to selected instrumentation, under SBO conditions, to provide operators with information that would otherwise be lost upon shedding of the UPS MG set after 1 hour into the SBO.

The licensee described the "RCIC Enclosure Ventilation Fan Power Supply" and the "Monitoring and Analysis Panel 27 (27MAP) Power Supply" in its submittal, and stated that the modifications are scheduled for the Reload 11/Cycle 12 refueling outage, currently scheduled to start in October, 1993.

Staff Evaluation: The staff has reviewed the descriptions of the proposed modifications and find them to be conceptually acceptable. The actual modifications may be subject to future audit/inspection by the NRC after they have been installed.

2.7 Quality Assurance and Technical Specifications (SE Section 2.5)

SE Recommendation: In the SE, the staff recommended that the licensee should verify that the SBO equipment is covered by an appropriate QA program consistent with the guidance of RG 1.155. This evaluation should be documented as part of the documentation supporting the SBO rule response. Although, no specific recommendation was included in the staff's SE for plant procedures, the SE did state that the staff expects that the plant procedures will reflect the appropriate testing and surveillance requirements to ensure the operability of the necessary SBO equipment.

Licensee Response: The licensee stated that the plant equipment and systems necessary to meet the requirements of 10 CFR 50.63 (Station Blackout), are currently classified as quality assurance (QA) Category I, safety related. The QA program encompasses the guidance of Appendix A to RG 1.155. Therefore, station blackout equipment is covered under an appropriate QA program consistent with the guidance of RG 1.155. The licensee states further that although compliance with the SBO Rule can be achieved using equipment which is classified as QA Category I, the preferred method of coping with an SBO is to run the QA Category M Reactor Core Isolation Cooling (RCIC) system instead of the QA Category I High Pressure Coolant Injection (HPCI) system during station blackout. The use of RCIC minimizes the potential for unnecessary cycling of the dc motor operator valves and, therefore, extends battery power availability.

With respect to surveillance testing, the licensee states that the equipment and systems classified as QA Category I are subject to the inspection and testing requirements of the QA program.

Staff Evaluation: The staff finds the licensee's response to be acceptable. With respect to Technical Specifications (TS), the TS for the SBO equipment is currently being considered generically by the NRC in the context of the Technical Specification Improvement Program. If the staff later determines

that TS regarding the SBO equipment is warranted, the licensee will be notified of the implementation requirements.

2.8 Emergency Diesel Generator Reliability Program (SE Section 2.6)

SE Recommendation: In the SE, the staff recommended that an EDG reliability program should be developed in accordance with the guidance of RG 1.155, Section 1.2. If an EDG reliability program currently exists, the program should be evaluated and adjusted in accordance with RG 1.155. Confirmation that such a program is in place or will be implemented should be included in the documentation that is to be maintained by the licensee in support of the SBO submittals.

Licensee Response: The licensee stated that it (the Authority) will implement a program incorporating the guidance contained in RG 1.155 by December 21, 1992. The Authority may revise this program when the NRC's unresolved safety issue B-56, "Emergency Diesel Generator Reliability," is resolved.

Staff Evaluation: The staff finds the licensee's response to be acceptable.

3.0 SUMMARY AND CONCLUSION

The staff has reviewed the licensee's response to the staff's November 13, 1991, safety evaluation (SE) pertaining to the Station Blackout Rule (10 CFR 50.63) and finds the licensee's responses to be acceptable. The licensee should maintain all documentation in support of its SBO submittals in its files for possible future NRC audit.

Principal Contributor:
A. Toalston

Date: June 9, 1992

implementation of the SBO rule in accordance with 10 CFR 50.63(c)(4) to begin upon your receipt of the enclosed SSE.

You are requested to notify the NRC when you have completed the modifications and program upgrades as detailed in your previous responses to the SBO rule. This completes our activities on TAC No. M68546.

Sincerely,

ORIGINAL SIGNED BY.

Richard A. Plasse, Acting Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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