U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-455/87004(DRP)

Docket No. 50-455 License No. NPF-60

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Byron Station, Unit 2

Inspection At: Byron Station, Byron, IL

Inspection Conducted: January 5 - 23, 1987

Inspectors: P. G. Brochman
J. M. Hinds, Jr.

Approved By: William L. Forney
W. L. Forney, Chief
Reactor Projects Section 1A

2/03/87
Date

Inspection Summary

Inspection on January 5 - 23, 1987 (Report No. 50-455/87004(DRP))
Areas Inspected: Special, unannounced safety inspection by the resident inspectors to review the circumstances surrounding the inoperability of both subsystems of the Byron Unit 2 Emergency Core Cooling System (ECCS) while in Mode 3 and the entry into Mode 3 with one ECCS subsystem inoperable.
Results: One apparent violation of NRC requirements was identified (failure to ensure that both ECCS subsystems were operable upon entry into Mode 3). This violation is of more than minor safety significance; however, there was no immediate threat to public health or safety because the reactor had not been critical and there was no inventory of fission products in the reactor.

DETAILS

1. Persons Contacted

Commonwealth Edison Company

R. Querio, Station Manager
*R. Pleniewicz, Production Superintendent
*R. Ward, Services Superintendent
*W. Burkamper, Quality Assurance Superintendent
*L. Sues, Assistant Superintendent, Operating
*T. Joyce, Assistant Superintendent, Technical Services
*J. Schrock, Operating Engineer, Unit 1
D. Brindle, Operating Engineer, Unit 2
M. Snow, Regulatory Assurance Supervisor
*W. Pirnat, Regulatory Assurance Staff
*J. Langan, Regulatory Assurance Staff
*D. Berg, Nuclear Safety Group

The inspector also contacted and interviewed other licensee and contractor personnel during the course of this inspection.

* Denotes those present during the exit interview on January 23, 1987.

2. Purpose (92700 & 93702)

(Closed) LER (455/86003-LL): This inspection was conducted to review the circumstances surrounding the inoperability of both subsystems of the Byron Unit 2 Emergency Core Cooling System (ECCS), the entry into Mode 3 with one ECCS subsystem inoperable, and the licensee's investigation and corrective actions for this event. The inspector reviewed the records for this event, including the LER (Licensee Event Report), interviewed personnel, and verified that stated corrective actions had been accomplished.

3. Description of the Event

On December 13, 1986, while in Mode 4, the manual discharge valve for the 2B Safety Injection (SI) pump, 2SI8921B, was shut and tagged out-of-service (OOS) to allow the pump to be run for a post-maintenance test. The test was completed; however, the tag was not cleared and the valve was not reopened. At 2145 on December 15, 1986, the Mode change checklist BGP 100-1T3 was signed off indicating that a review of the OOSs affecting the change to Mode 3 had been completed. At 2155 on December 16, 1986, Mode 3 was entered with valve 2SI8921B shut; therefore, the 2B SI pump and consequently the 2B ECCS subsystem was inoperable in violation of Technical Specification 3.0.4. At 0335 on December 17, 1986, the discharge valve for SI pump 2A, 2SI8821A, was shut in accordance with operating procedure BOP SI-5 to fill the SI accumulators. This made the 2A and 2B pumps and consequently the 2A and 2B ECCS subsystems inoperable. At 0425 the valve 2SI8821A was reopened after the accumulators had been filled. Both ECCS subsystems were inoperable for 50 minutes. At 1056 on December 18, 1986, Mode 4 was entered for

unrelated reasons. At approximately 2200 on December 18, 1986, when the licensee discovered that valve 2SI8921B was tagged shut, OOS #7767 was cleared and valve 2SI8921B was reopened.

4. Chronology of Events

October 27, 1986	Prior to initial entry into Mode 6, the 2A and 2B SI pumps were tagged out-of-service (OOS #7401) per Technical Specification 4.5.3.2, to prevent inadvertent discharge into the reactor coolant system (RCS) when the average temperature of the RCS was less than 330 °F.
December 13, 1986	OOS #7401 was "temporarily lifted" in order to run the 2B SI Pump after maintenance had been performed. To meet the requirements of Technical Specification 4.5.3.2, the manual discharge valve for the 2B SI pump, 2SI8921B, was shut and tagged with OOS, #7767. OOS #7767 was not cleared after the maintenance run was completed. The Master OOS card for OOS #7767 was hung in its proper place on the Master Out-Of-Service Board in the control room. Valve 2SI8921B is not indicated on the main control board and therefore does not have a separate main control board OOS card.
December 15, 1986	The Mode change checklist, Byron General Operating Procedure BGP 100-1T3, "Mode 4 to 3 Checklist," item 6.b, was signed off in error by the Shift Control Room Engineer (SCRE), [SRO licensed control room supervisor], indicating that a review of the OOSs that would affect the change to Mode 3 had been completed. The SCRE intended to sign off that the Caution Card Log, item 6.c, had been reviewed, not the Out-of-Service Log. The signature block for review of the Caution Card Log is immediately below the signature block for review of the Out-Of-Service Log on BGP 100-1T3. When BGP 100-1T3 was completed on the next shift, the Caution Card Log was again reviewed and item 6.c was signed off on BGP 100-1T3.
December 16, 1986	OOS #7401 was cleared in preparation for entry into Mode 3. At 2155 Mode 3 was entered with valve 2SI8921B still tagged shut. Therefore, the 2B SI pump and consequently the 2B ECCS subsystem was inoperable upon entry into Mode 3.
December 17, 1986	At 0335 valve 2SI8821A was shut in accordance with Byron Operating Procedure BOP SI-5 to raise the level in the SI accumulators. With valve 2SI8821A shut the 2A SI pump and consequently the 2A ECCS subsystem was inoperable. At 0425 valve 2SI8821A was reopened. Consequently, both ECCS subsystems were inoperable for 50 minutes.

December 18, 1986 At 1056 unit 2 was placed in Mode 4 due to an unrelated problem (a crack in the 2D SI accumulator fill line). At approximately 2200, a Shift Foreman (SF) [Licensed SRO] was performing a review of the Master Out-Of-Service board and discovered that OOS #7767 was still hanging. OOS #7767 was then cleared.

5. Evaluation of the Event

The root cause of this event was a personnel error by a SCRE in signing off the wrong step of BGP 100-1T3, indicating that the Out-Of-Service Log had been reviewed, when in fact it had not been reviewed.

Contributing errors were the failure to clear OOS #7767 after it was no longer needed (maintenance run completed) and the timing of the performance of BGP 100-1T3. By completing the checklist too early, and poor communications during the shift turnover (in regard to what had been accomplished on the checklist) the possibility of a single personnel error going unnoticed was greatly increased.

Technical Specification 3.5.2 requires that two independent ECCS subsystems shall be operable in Modes 1, 2, and 3. Each subsystem shall be comprised of, in part, an operable SI pump. Valve 2SI8921B must be open for the 2B SI pump to be operable. With the 2B SI pump inoperable the 2B ECCS subsystem was also inoperable.

Technical Specification 3.0.4 requires that entry into an Operational Mode shall not be made unless the conditions for the Limiting Condition for Operation are met without reliance on provisions contained in the Action Requirements. Since the 2B ECCS subsystem was inoperable on December 16, 1986, Action Statement a. of Technical Specification 3.5.2. was relied upon to enter Mode 3. The failure to ensure that both ECCS subsystems were operable upon entry into Mode 3 is a violation of Technical Specification 3.0.4 (455/87004-01(DRP)).

With valve 2SI8821A shut on December 17, 1986, the 2A SI pump was inoperable, and therefore the 2A ECCS subsystem was also inoperable. Consequently, both the 2A and 2B ECCS subsystems were inoperable for 50 minutes. However, since both ECCS subsystems were inoperable for less than the one hour specified for action by Technical Specification 3.0.3, no violation of Technical Specification 3.5.2 occurred.

6. Corrective Actions Initiated by the Licensee

As corrective action to prevent recurrence the licensee is permanently modifying all of the Mode change checklists for both units to require:

a. A dual verification be performed for all signoffs in the Mode Change checklists.

b. Both the Master Out-Of-Service Board and the Out-Of-Service Log will be reviewed for the Mode Change Checklists.

c. The Master Out-Of-Service Board and the Temporary Lift files will be reviewed within one hour prior to a Mode change.

d. Any OOSs for equipment that is required for a Mode change will be annotated on the Mode change checklist as to why this OOS does not affect system operability.

The permanent procedure changes are being tracked by Action Item Record AIR-6-86-310 and is scheduled for completion by April 1, 1987. In the interim the licensee has issued a Special Operating Order SOST-0025 to accomplish these actions. The inspector reviewed this special order and interviewed operating department personnel to verify their understanding of these requirements.

The SCRE and other operating department personnel were counseled, by station management, as to the importance of attention to detail and of the seriousness of this event.

7. Previous Similar Events

On January 11, 1985, both Unit 1 SI pumps were isolated from the reactor coolant system for approximately 15 minutes while filling the SI accumulators (Inspection Report 454/85002(DRP)). In that event the operator shut an additional valve, in the opposite train, that was not specified in the operating procedure. As corrective action for that event the licensee issued a memo to shift personnel to reinforce the necessity for strict procedural compliance and revised the operating procedure for filling SI accumulators to remind operators that only one SI train can be used at a time to fill accumulators and that the other train must be operable. The inspectors' review of both the current event and the previous event determined that though these events were similar, in involving the operability of both SI pumps, they were caused by different errors. Therefore, the corrective actions for the prior event could not have been reasonably expected to prevent the current event.

8. Conclusion

Operating the unit with both ECCS subsystems inoperable is, in and of itself, a significant safety concern. The safety significance of this event is mitigated by the fact that Unit 2 had never been critical, at the time of this event, and consequently had no fission product inventory in the core and that it was discovered by the licensee as part of a planned review of the master OOS board. However, this violation is indicative of the need for licensee personnel to pay increased attention to detail, to increase the use of dual verifications in important procedures and checklists, and to improve management controls over the equipment out-of-service program.

9. Exit Interview (30703)

The inspectors met with licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on January 23, 1987. The inspectors summarized the purpose and scope of the inspection and the findings. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/processes as proprietary.