

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-457/88012(DRP)

Docket No. 50-457

License No. NPF-75

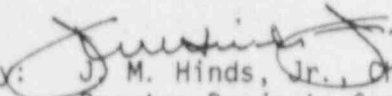
Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Braidwood Station, Unit 2

Inspection At: Braidwood Site, Braidwood, Illinois

Inspection Conducted: March 14 through March 25, 1988

Inspectors: T. M. Tongue
T. E. Taylor

Approved By:  J. M. Hinds, Jr., Chief
Reactor Projects Section 1A

4.12.88
Date

Inspection Summary

Inspection from March 14 through March 25, 1988 (Report No. 50-457/88012(DRP))

Areas Inspected: Special safety inspection conducted by the resident inspectors concerning an event in which the 2B Safety Injection pump was found incapable of performing its intended function when its manual discharge valve (2SI8921B) was found locked shut.

Results: One violation (failure to meet a Technical Specification requirement) was identified.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*R. E. Querio, Station Manager
K. Kofron, Production Superintendent
D. E. O'Brien, Administrative Superintendent
*G. Masters, Operations Assistant Superintendent
*P. Barnes, Regulatory Assurance Supervisor
*T. Simpkin, Regulatory Assurance
*P. Holland, Regulatory Assurance
J. Kuchenbecker, Shift Control Room Engineer
M. Hess, Nuclear Station Operator
L. Ganci, Equipment Attendant
B. Kempen, Equipment Attendant

*Denotes those attending the exit interview conducted on March 25, 1988.

2. Purpose

This inspection was conducted to review the circumstances related to the event in which the Unit 2 "B" Safety Injection (SI) pump manual discharge valve (2SI8921B) was found locked shut, thus rendering the 2B SI pump inoperable from 7:47 p.m. on March 5 to 5:00 p.m. on March 13, 1988.

3. Event Description and Chronology

On March 13, 1988, at 4:50 p.m., the licensee identified that the 2B Safety Injection (SI) pump manual discharge valve (2SI8921B) was locked shut, thus rendering the 2B SI pump incapable of performing its intended function. The valve was promptly unlocked, opened, and relocked as required. The counterpart valve on the 2A SI pump was verified to be in its proper locked open position.

The mispositioned valve was identified by a "B" equipment attendant (EA) who was in the 2B SI pump room for routine rounds. There is no position indication for that valve on the main control board in the main control room; however, there is a position microswitch that provides a signal to the main computer. An immediate review of the Sequence of Events Recorder log showed that the valve was shut prior to 7:30 a.m. on March 9, 1988. In addition, an initial review of records showed that the 2B SI pump had been run for five minutes on February 8, 1988, starting at 10:27 a.m.

Further investigation by the licensee revealed that the key for the lock on that valve had been checked out on March 5, 1988.

Follow-up interviews with the nuclear station operators (NSOs) and EAs involved found that the valve was unlocked and left open for maintenance

personnel on March 5, 1988. The maintenance personnel were attempting to tighten a leaky pipe flange very close to the valve, and the locking chain interfered with access to the flange studs and nuts.

The center desk NSO stated that he requested the "B" EA to make an entry in the Locked Equipment Log; however, this log had been deleted several months previous to the event. In addition, there was no entry made in the Abnormal Position Log by control room personnel.

Upon completion of the repair on March 5, 1988, maintenance personnel were contacted by the Shift Control Room Engineer (SCRE) to verify that the work was complete. The SCRE then directed the center desk NSO to have the valve relocked. A different "B" EA (who had about two months of experience on the job) was assigned to relock the valve by the center desk NSO. The "B" EA interpreted his instructions to mean that he should shut and relock the valve, and he did so. In addition, he did not question the order that was having him make an ECCS component inoperable by shutting the valve.

Later interviews showed that the "B" EA was instructed to "lock the valve tight," or "lock it snug," which he interpreted to mean "shut the valve tight and lock it." The "B" EA told the Senior Resident Inspector (SRI) that he wasn't sure if he confused the order or whether the NSO gave him erroneous directions.

The shut valve isolated the discharge flow path for the 2B SI pump for a period of over seven days.

4. Evaluation of the Event

The result of this event was having the 2B SI pump inoperable or incapable of performing its intended safety function (mitigating the consequences of an intermediate size loss of coolant accident) for a period of about eight days. The 2B SI pump is part of the "B" Emergency Core Cooling System (ECCS) train (subsystem). The other components (Charging pump, Residual Heat Removal pump, Residual Heat Removal heat exchanger, and the flow path) of the "B" ECCS train and the entire "A" ECCS train were available (operable).

While the pump was inoperable, the Unit 2 reactor was at normal pressure (2235 psig) and temperature ($T_{avg}=557^{\circ}\text{F}$) and in either Mode 2 or Mode 3. The unit had attained initial criticality on March 8, 1988, and was involved in low power physics testing (nominally several orders of magnitude less than 1% power); therefore, the source term was extremely low as compared to that of the design basis accident analysis.

This event is considered a violation of Technical Specification 3.5.2, "ECCS SUBSYSTEMS - $T_{avg} > 350^{\circ}\text{F}$," which requires that two independent ECCS subsystems (including the SI pump) be operable in Modes 1, 2, and 3, with an action statement requiring restoration within seven days or proceeding to hot standby (Mode 3) within six hours and hot shutdown (Mode 4) within the following six hours. (50-457/88012-01(DRP))

This appears to be the first event of this type at Braidwood and is not an example of a multiple occurrence.

5. Licensee Corrective Actions

The licensee's immediate action was to unlock, open, and relock the valve and to verify that the opposite train did not have a similar problem. This action was appropriate.

The licensee immediately commenced an investigation to determine the cause and took steps for long term corrective action to prevent recurrence. These actions included reaffirming and improving the communication skills of all operations personnel.

Additional actions taken or planned are to re-emphasize the use of the Abnormal Position Log with shift personnel and to make use of the INPO "Human Performance Evaluation System" for additional improvement.

Each of these completed and planned actions were reviewed and confirmed to be appropriate by the inspector.

6. Conclusion

In summary, this is a violation of Technical Specification 3.5.2 for failure to have the required ECCS equipment (2B SI pump) operable for over seven days. Other ECCS equipment, including the opposite train, was available during that time. The reactor power history was significantly low such that decay heat for accident considerations was negligible, and this appears to be the first event of this type at Braidwood.

The cause is attributed to the lack of formality and quality of communications, and a contributing cause was the improper use of logs (Abnormal Position Log). Training for prevention of recurrence and implementation of corrections is a concern.

7. Exit Interview (30703)

The inspector met with the licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on March 25, 1988. The inspector summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.