

May 16, 1978

Donald C. Cook Nuclear Plant Unit No. 2  
Docket No. 50-316  
License No. DPR-74

ENCLOSURE

This report provides a complete explanation of the circumstances surrounding this event.

a) Description Of The Event:

In Cold Shutdown (Mode 5) the normal position of Containment Spray System (CTS) Pump Switches is in the "Pull to Lockout" position. This is done to prevent inadvertent acutation of the CTS while in Mode 5 or 6.

While returning Unit 2 into operation after a planned outage , at 0431 hours on May 2, 1978, the Unit progressed from Mode 5 to Mode 4 (Hot Shutdown). When Mode 4 was entered the switches for the Containment Spray Pumps had not been moved from the "Pull to Lockout" position which prevents the pumps from starting, to the "Neutral" (Automatic Standby) position which permits the pumps to start automatically on demand. This action was in violation of Appendix "A" Technical Specification 3.6.2.1 which requires "Two independent containment spray systems shall be operable with each spray system capable of taking suction from the RWST and transferring suction to the containment sump." This specification is applicable to Modes 1, 2, 3, and 4.

b) Cause Of The Event:

The primary cause of this event was a procedural inadequacy with a secondary cause being personnel error.

Operating Procedure 2-OHP-4021.001.001 Revision 0 "Plant Heatup from Cold Shutdown to Hot Standby" was being used to control the heatup. The Operating Procedure was ambiguous and deficient. The procedure did not include a specific signoff that all the requirements for entering Mode 4 are completed. Procedure step 6.11.2 states "Verify completion of Checkoff Sheet 5.2." Checkoff Sheet 5.2 is a listing of all the required surveillance testing that must be current or completed prior to entering Mode 4. This listing did not require that the CTS pump switches be placed in the automatic standby position.

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b) Continued

Procedure step 6.17 states "Align the safeguards system for standby readiness by completing the valve lineup sheet for 2-OHP-4021.008.002 (ECCS) and 2-OHP-4021.009.001 (CTS)." Again, completing the valve lineup sheets would not have assured the pump switches were placed in the automatic standby condition. Combining the requirements for the entire Emergency Core Cooling (ECCS), which is not required until just prior to entering Mode 3, and the CTS, which is required prior to entering Mode 4, was confusing to the Operator.

The Unit Supervisor (US) in charge of Unit 2 Control Room and the Shift Operating Engineer (SOE) who is the shift supervisor did not comply with Technical Specification 3.6.2.1 prior to entering Mode 4. Both of them were aware of the Containment Spray System (CTS) pump switches being in the "Pull to Lockout" position. The US was aware that the required surveillance testing to assure Operable CTS pumps had been conducted and that if an accident should have occurred he could have placed the pumps switches in the required position and the pumps would have started as required. The US and the SOE mistakenly thought that the CTS pumps were not required until later in the heatup.

c) Corrective Action Taken At Time Event Was Discovered:

The event was discovered at 0800 by the next shift who had just assumed responsibility. The SOE was immediately informed and the heatup was stopped. RCS temperature was maintained between 310°F and 330°F. The ACTION statement of the Technical Specification 3.6.2.1 states: "With one containment spray system inoperable, restore the inoperable spray system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the inoperable spray system to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

With the Operators knowing they were in excess of specification 3.6.2.1 they then applied Technical Specification 3.0.3 which states: "In the event a Limiting Condition for Operation and/or associated ACTION requirements cannot be satisfied because of circumstances in excess of those addressed in the specification, the facility shall be placed in at least HOT STANDBY within 1 hour and in COLD SHUTDOWN within the following 30 hours unless corrective measures are completed that permit operation under the permissible ACTION statements for the specified time interval as measured from initial discovery. Exceptions to these requirements shall be stated in the individual specifications."

c) Continued

With the heatup stopped the operators were aware that they could cool down the Unit using the Residual Heat Removal System (RHR) to less than 200°F (Cold Shutdown) in less than 4 hours. Thus the decision was made not to cool down since the Unit was in Hot Shutdown (Mode 4), which is already lower than Hot Standby (Mode 3), and there were approximately 26 hours before a cool down had to be initiated. A confirmatory valve lineup for the CTS system was completed at 0920 on May 2, 1978. The valve checkoff sheets verified that the CTS system was in fact lined up correctly since no discrepancies were found. The CTS pump switches were then placed in "NEUTRAL" and the heatup continued.

A temporary change was written to the Operating Procedure to clarify that the CTS system must be OPERABLE prior to entering Mode 4.

d) Safety Evaluation of the Event

The containment spray system serves two principal safety functions. They are prevention of containment overpressurization and iodine removal following a loss of coolant accident.

Specific analyses have not been performed with respect to containment overpressurization for the postulated accident initiated at the maximum temperature and pressure as low as that occurring during the worst conditions of this event (330°F, 400 psig). However, a simple comparison of the total stored energy in the Reactor Coolant System at these conditions to the total energy absorption capability of the ice condenser indicates that more than sufficient heat absorption capability existed within the ice condenser to alleviate the requirement for initiation of sprays to keep the containment from overpressurizing.

With respect to iodine removal capability, it must be recognized that the plant was in its power ascension and had not yet operated at conditions exceeding 50% power. A conservative analysis, assuming zero ice condenser efficiency, has been performed on the same basis as reported in the final safety analysis of the Donald C. Cook Nuclear Plant. This analysis did not take credit for either the minimal fission products that had been generated in Unit 2 up to this time nor the minimal fuel damage that would have occurred for a loss of coolant accident initiated at 330°F. The results of this analyses showed that the operator would have had at least 25 minutes to restore the containment spray before doses would have exceeded those specified in 10 CFR Part 100.

As a result of the above analyses, it is concluded that the event cited herein would not have resulted in a situation which could have adversely affected the health and safety of the public.

e) Corrective Action Taken To Prevent Recurrence

- 1) Disciplinary action has been taken against the Unit Supervisor and Shift Operating Engineer who permitted the plant to enter Mode 4 in violation of the Technical Specification.
- 2) Operating Procedure 2-OHP-4021.001.001 is being revised to incorporate the required temporary change sheets to make it easier for the Operator to follow and further reduce the likelihood of recurrence.

In addition, for the charging, safety injection, RHR and containment spray systems, the procedure revision will include the requirement that immediately prior to entering an operational mode for which these systems must be operable, a check will be made of the Status Lights and Annunciator Panels in the Control Room to assure that the required valves and switches are indicated as being in the correct position.

- 3) Operating Procedures in the 2-OHP-4021.001.XXX series are overall plant coordinating procedures to control heatup, cool down and power operation. These procedures are used for sequencing when individual system procedures are to be completed. These procedures will be reviewed and revised as necessary to correct any deficiencies and to remove ambiguity.

f) Date of Full Compliance:

Operating Procedure 2-OHP-4021.001.001 will be revised prior to June 15, 1978.

The review and revision, if required, of the 2-OHP-4021.001.XXX series procedures will be completed by June 15, 1978.

- g) A completed copy of the Licensee Event Report is attached below.