

U. S. NUCLEAR REGULATORY COMMISSION  
REGION III

Report Nos. 50-237/87011(DRP); 50-249/87010(DRP)

Docket Nos. 50-237; 50-249

License Nos. DPR-19; DPR-25

Licensee: Commonwealth Edison Company  
P. O. Box 767  
Chicago, IL 60690

Facility Name: Dresden Nuclear Power Station, Units 2 and 3

Inspection At: Dresden Site, Morris, IL

Inspection Conducted: February 28 through March 4, 1987

Inspectors: L. G. McGregor  
S. G. DuPont  
R. D. Lanksbury  
E. A. Hare

Approved By: *Mark A. Ring*  
M. A. Ring, Chief  
Reactor Projects Section 1C

*3/17/87*  
Date

Inspection Summary

Inspection during the period of February 28 through March 4, 1987

(Report Nos. 50-237/87011(DRP); 50-249/87010(DRP))

Areas Inspected: This special report is a summary of the events surrounding the apparent violation of a Technical Specification Limiting Condition for Operation at Dresden Unit 3 on February 27, 1987.

Results: One violation of Technical Specifications was identified when Dresden Unit 3 was in a condition where primary containment was not maintained and reactor water temperature was above 212°F with fuel in the reactor vessel.

*87-2326-247*

## DETAILS

### 1. Persons Contacted

#### Commonwealth Edison Company

- + E. Eenigenburg, Station Manager
- \*J. Wujciga, Production Superintendent
- W. Pietryga, Unit 3 Operating Engineer
- \*R. Flessner, Services Superintendent
- +\*M. Jeisy, Station Q.A. Superintendent
- B. Scott, Senior Reactor Operator Advisor
- D. Kim, Shift Control Room Engineer
- R. Sitts, Shift Engineer
- R. Reisner, Nuclear Station Operator - Unit 3
- M. Parcell, Shift Foreman
- M. McDonald, Nuclear Station Operator - Center Desk
- P. Dohm, Nuclear Station Operator - Unit 2
- \*J. Marshall, Director of QA Operations
- + D. Galle, Assistant Vice President and General Manager
- + C. Reed, Vice President - Nuclear Operations
- + D. Farrar, Nuclear Licensing
- + L. Gerner, Regulatory Assurance Superintendent
- + S. Trubatch, Staff Attorney
- + I. Johnson, Nuclear Licensing
- + J. Brunner, Assistant Superintendent
- + B. Stephenson, Manager - Department of Nuclear Safety
- + B. Zank, Training Supervisor - Dresden
- + S. Stiles, Training Staff - Dresden
- + R. Klemm, Program Development Administrator, PTC
- + R. Holyoak, Manager, Production Training
- + R. Mirochna, Station Nuclear Engineer
- + S. Javidan, Station Nuclear Engineer
- + J. Kotowski, Assistant Superintendent - Operations
- + P. Bhatt, Supervisory Design Engineer, Sargent & Lundy
- + A. Walser, Senior Structural Project Engineer, Sargent & Lundy
- + D. Gullaksten, Assistant Division Head, Structural Division, Sargent & Lundy

#### United States Nuclear Regulatory Commission (USNRC)

- +A. B. Davis, Acting Regional Administrator
- +E. G. Greenman, Deputy Director, Division of Reactor Projects
- +C. W. Hehl, Chief, Operations Branch
- +R. F. Warnick, Chief, Reactor Projects Branch 1
- +J. J. Harrison, Chief, Engineering Branch
- +M. A. Ring, Chief, Reactor Projects Section 1C
- +M. P. Phillips, Chief, Operational Programs Section
- \*+L. G. McGregor, Senior Resident Inspector, Dresden
- \*+S. G. DuPont, Reactor Inspector
- \*+E. A. Hare, Operator Licensing Examiner

\*+R. D. Lanksbury, Operator Licensing Examiner  
+D. E. Hills, Operator Licensing Examiner  
+T. Reidinger, Operator Licensing Examiner  
+N. V. Gilles, Reactor Inspector

The inspectors also talked with and interviewed several other licensee employees, including members of the technical and engineering staffs, reactor and auxiliary operators, shift engineers and foremen.

\* Denotes those attending one or more exit interviews conducted on March 4, 1987, and informally at various times throughout the inspection period.

+ Denotes those attending the Enforcement Conference conducted on March 4, 1987.

## 2. Event Description

On February 25, 1987, at approximately 1630 hours, Unit 3 began a scheduled four day outage to repair minor leaks, accomplish selected maintenance items within the drywell, and complete a capacity test of the Unit 2 125 Volt D.C. battery. The unit commenced shutdown during the evening of February 25, 1987, and was in cold shutdown (defined as: mode switch in Shutdown and reactor coolant temperature less than 212°F) by 0842 hours on February 26, 1987. The reactor coolant system was not vented and forced circulation of the reactor coolant was in progress utilizing the recirculating pumps and the 3A shutdown cooling pump and associated heat exchanger. At 2020 hours on February 26, 1987, the 3B recirculating pump was shut down and taken out of service for maintenance, leaving the 3A recirculating pump and the 3A shutdown cooling pump in operation to maintain cooldown of the reactor coolant system. The control room operator (Nuclear Station Operator (NSO)) and the Station Control Room Engineer (SCRE) who is a Senior Reactor Operator (SRO) were aware of the Dresden Operating Procedure - DOP 1000-3, "Shutdown Cooling Mode of Operation", and were implementing this procedure and monitoring the reactor coolant temperature. The operators were observing the output of the thermocouple located in the discharge leg of the recirculating pump, which was displayed on one of the cathode-ray tubes (CRT) in the control room, in order to monitor reactor coolant temperature.

On February 27, 1987, the oncoming Unit 3 NSO relieved the day shift NSO with vessel water temperature at 170°F, within the 170 to 180°F band established by the Night Orders. Soon after assuming the NSO duties, the Shift Foreman (SF) gave the NSO three outages (Maintenance requests and equipment tagouts) to take the operating recirculating pump out of service. The Shift Foreman also reminded the NSO of the appropriate procedure, DOP 1000-3, "Shutdown Cooling Mode of Operation," to be used in establishing operation with two shutdown cooling pumps. At approximately 1543 hours, a second shutdown cooling water pump was placed in service. In following the operating procedure, the NSO secured the 3A recirculating pump and closed its discharge valve. The selected temperature point (discharge of the reactor recirculation pump discharge

leg) which was being monitored by the computer system was now on a stagnant coolant line because of the closed discharge valve downstream of the recirculating pump. This thermocouple readout remained constant for some time, as it should have, and then started to decrease from approximately 170°F to 166°F. This reduction in temperature gave the operator an impression that the two shutdown cooling water pumps were more than sufficient to maintain the cooldown requirement. In response to this apparent cooling down, the NSO isolated Reactor Building Closed Cooling Water (RBCCW) to the shutdown cooling heat exchangers.

DOP 1000-3 requires that the vessel metal temperatures are to be monitored hourly. The recorder for the vessel metal temperatures is located on the 903-21 panel, a back panel not within the sight of the NSO while in the operator controlled area. The NSO would have to be relieved by the Center Desk NSO or one of the SROs on shift to monitor the procedure required parameters. Throughout the first four hours of the shift, the NSO did not monitor the vessel metal temperatures on the back panel as required by the procedure or other water temperatures indicated on the front panels within the operator control area. The NSO relied only on the computer display until approximately 7:00 p.m. (1900 hours).

At about 1630 hours an SRO who was acting in the capacity of a Shift Advisor arrived in the control room. This was a new position on the shift which was a condition of the Confirmatory Action Letter issued by the NRC as a result of a 50% failure rate on NRC operator requalification exams at Dresden. Prior to assuming the duties of Shift Advisor, all of the personnel scheduled to act in this capacity were given a briefing on their responsibilities lasting approximately 15 minutes. After arriving in the control room, the Shift Advisor received a turnover of plant status from the SCRE, which lasted until about 1800 hours. This turnover distracted the SCRE from his normal shift duties.

At approximately 1700 hours, the shift briefing was held by the Shift Engineer in the control room. At this briefing, the duties of the Shift Advisor were first described to the shift. Throughout the briefing, the Unit 3 NSO continued to monitor the incorrect water temperature. The monitored indication was still at 170°F, however; the actual vessel water temperature was beginning to increase above 180°F. Other indications available to the NSO, such as the shutdown cooling recorder 3-1040-2 and the recirculation loop suction recorder 2-360-11 located on the front of the 903-4 panel were indicating 180°F at 1700 hours.

Also available to the NSO after the briefing were four SRO's for relief to monitor the vessel metal temperature recorder on the back panel, which was also indicating an increase in temperatures. None of these actions were taken by the NSO.

Between 1600 and 1750 hours, the NSO completed six outages or tagouts. Also at 1750 hours the 903-5 panel received numerous alarms because of one of the outages. The cause of the alarms was an electrician who accidentally caused a fuse to blow while installing a jumper. The NSO continued to be involved with maintenance outage (three additional at 1800 hours) until 1815 hours. In addition to the outages, the NSO was also involved with three surveillances.

Between 1915 and 1930 hours, the NSO brought to the attention of the Shift Foreman that water temperature was decreasing (this was the third tour into the control room by the Shift Foreman since shutdown cooling had been placed in service). The NSO discussed with the Shift Foreman other possible actions that could be taken to heat up the vessel water temperature (the monitored temperature had continued to decrease to 163°F). The NSO and SF concluded that the Reactor Water Cleanup (RWCU) flow should be throttled. Throughout this discussion and subsequent actions to throttle RWCU flow, neither the NSO nor Shift Foreman noticed the water temperature recorders on the 903-4 panel directly in front of them. Both the recirculation suction loop water temperature and shutdown cooling water temperature recorders indicated 212°F at 1915 hours.

At 1945 hours, approximately four hours after the second shutdown cooling pump was put in service, the NSO and Shift Foreman first discovered that reactor water temperature had exceeded 212°F. Closer examination of the shutdown cooling temperature recorder indicated that the reactor water temperature had approached 223°F. The NSO also verified that the vessel metal temperatures were above 212°F (this is the first time the NSO complied with DOP 1000-3 since 1544 hours).

A review of the strip chart recorder traces and interviews with licensee personnel indicate that the heatup and pressurization began at about the same time the second reactor recirculating pump was secured. The reactor coolant experienced a steady temperature increase with reactor pressure coming on scale at approximately 4 psig.

The shift took immediate corrective action at 1945 hours by reducing the reactor coolant temperature, correcting the flow through shutdown coolers and re-establishing containment. At 2005 hours primary containment was established and at 2007 hours the reactor coolant temperature was below 212°F.

### 3. Results of Special Inspection

Region III began a special inspection of this event at approximately 1100 hours, on February 28, 1987, which continued through March 4, 1987.

It was determined that a number of contributing factors were evident in this event. The first and most serious is the lack of attention to at least three temperature indications (two are chart recordings which indicate increasing trends) by two NSOs and two SROs leading to violation of Technical Specification 3.7.A.2, which requires primary containment integrity to be maintained at all times when the reactor water temperature is greater than 212°F and fuel is in the reactor vessel.

The training of a second SRO by the assigned shift SRO severely detracted from his normal functions for the greater portion of two hours. A third contributing factor was the inadequate cooldown procedure which requires the NSO to hourly monitor reactor vessel metal temperatures but does not clearly indicate how to establish and maintain a cooldown rate or how to monitor this cooldown rate. The procedure is also weak in identifying the difference between Unit 2 and Unit 3 reactor recirculating loops and the mode by which the operator should maintain a cooldown rate. Futher,

The procedure did not reference Technical Specification 3.7.A.2, contained contradictory statements about controlling shutdown cooling flow, did not encourage use of the multiple temperature indications available, and did not require logging or plotting of the temperatures.

Additional contributing factors to the event were the multiple activities occurring in the control room that distracted the operators and the overall shift concentration on other duties instead of the primary duty of carefully monitoring plant parameters. These duties included control room personnel performing as the back-shift site telephone operator for all outside calls, NSO involvement in three surveillances and seven outages, numerous calls for entry into High Radiation areas and the involvement of shift personnel in meetings or other activities away from the control room such that they were not available to help detect or prevent the event.

In conclusion, the inspectors determined that allowing the reactor water temperature to exceed 212°F with fuel in the reactor and without primary containment integrity established constituted a violation of the Limiting Condition for Operation of Technical Specification 3.7.A.2 (249/87011-01(DRP)). This violation is being considered for escalated enforcement, therefore, the Notice of Violation is not included in this report but will be transmitted under separate correspondence.

#### 4. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) informally throughout the inspection period and at the conclusion of the inspection on March 4, 1987, and summarized the scope and findings of the inspection activities.

The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary. The licensee acknowledged the findings of the inspection.

In addition, a management meeting was held in Region III offices on March 4, 1987, regarding this event as well as other issues at Dresden. Subsequent to the meeting, the meeting was declared to represent an Enforcement Conference regarding this LCO violation event. This change in designation was discussed with the licensee (D. Farrar) who acknowledged the change and concurred that an additional meeting was not necessary.