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Licensee: Commonwealth Edison

Facility: Dresden Nuclear Station, Units 2 and 3

Location: 6500 North Dresden Road  
Morris, IL 60450

Dates: April 8 through May 21, 1999

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## EXECUTIVE SUMMARY

Dresden Nuclear Station Units 2 and 3  
NRC Inspection Report 50-237/99008(DRP); 50-249/99008(DRP)

This inspection included routine resident inspection from April 8 through May 21, 1999.

### Operations

- The Technical Specifications required a shutdown of Unit 3 due to failure of the combination safety/relief valve. The licensee took actions to comply with the Technical Specifications, but also presented information that showed that the combination safety/relief valve was not credited in the plant's accident analyses. The Nuclear Regulatory Commission applied enforcement discretion which permitted Unit 3 to continue operating at power.
- The performance in operations was generally acceptable. The licensee identified some instances where operators, both licensed and non-licensed, failed to follow all the administrative procedures or failed to communicate properly.

### Maintenance

- The licensee had performed the maintenance required by the Technical Specifications on the combination safety/relief valve.
- The material condition of the reactor recirculation systems on both units impacted smooth full-power operations.
- The material condition of the reactor water cleanup systems impacted operations on both units. In one instance, one non-regenerative heat exchanger failed and leaked into the reactor building closed cooling system. In the other instance, a resin intrusion occurred as the licensee attempted to place the 3C demineralizer into service. The licensee restored the systems to service before exceeding any Technical Specification limitations.
- The licensee completed planned maintenance on the control room heating, ventilation, and air conditioning system within the Technical Specification time limitations. However, the inspectors noted poor performance by the licensee in the areas of work package preparation and procedural adequacy. These performance issues caused the refrigeration control unit to be inoperable for approximately 10 days without the operators being aware of it. Inadequacies in the licensee's corrective action program were also revealed during this maintenance.
- The licensee replaced a scram discharge volume instrument after the licensee identified that the instrument had failed. The licensee's critique of the work noted that parts unavailabilities and miscommunications delayed the replacement of the failed instrument while a one-half scram signal was inserted.

### Engineering

- The licensee performed a good, detailed investigation to find the source of increased pressurization of the low pressure coolant injection (LPCI) system.
- However, the inspectors concluded that the licensee's investigation into the LPCI pressurization issue was not timely.

### Plant Support

- Normally the licensee followed radiation protection procedures.
- However, the inspectors identified that a station laborer failed to frisk while exiting the radiation protection area. The licensee responded appropriately to this issue.
- The licensee identified and reported to the NRC a failure to compensate for an inactive security area. The inspectors' review of the licensee's report determined that multiple communication failures by several individuals led to the error.

## Report Details

### Summary of Plant Status

Unit 2 entered the inspection period at or near full power (2527 MWth).

- On May 7, 1999, power decreased to 2456 MWth due to the 2A recirculation pump running back due to an erratic speed controller.
- On May 9, 1999, power was reduced to 2150 MWth to support routine monthly surveillance tests.

Unit 3 entered the inspection period at or near full power (2527 MWth).

- On May 4, 1999, power was reduced to 2277 MWth as part of a shutdown required by the Technical Specifications due to a failure of the combination safety/relief valve; the reduction was stopped and full power restored after the NRC provided a Notice of Enforcement Discretion that removed the requirement to shut down.
- On May 16, 1999, load was reduced to 2167 MWth to support swapping of feedwater pumps.
- On May 20, 1999, the 3A recirculation pump motor-generator set temperatures increased due to failure of a ventilation damper. Operators reduced power to 2251 MWth to protect recirculation pump motor-generator components.

## I. Operations

### **O1 Conduct of Operations**

#### **O1.1 General Comments (71707)**

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. Overall conduct was acceptable, and a safety-conscious culture was present. Specific events and noteworthy observations are detailed in the sections below.

### **O2 Operational Status of Facilities and Equipment**

#### **O2.1 Status of Combined Safety/Relief Valve (Unit 3)**

##### **a. Inspection Scope (71707)**

The inspectors assessed the licensee's response to a failure of the Unit 3 combination safety/relief valve.

##### **b. Observations and Findings**

On May 3, 1999, the control room indication for a failure of the combination safety/relief valve alarmed. The annunciator indicated that the safety function of the combination safety/relief valve was inoperable due to a high pressure on the low-pressure side of the valve's pilot valve. After receipt of the annunciator, the licensee declared the valve inoperable and made the required notifications to the Nuclear Regulatory Commission using the Emergency Notification System.

Technical Specification 3.6.E, "Safety Valves," stated, "The safety valve function of the 9 reactor coolant system safety valves shall be OPERABLE in accordance with the specified code safety valve function lift settings . . . ." Action 1 of Technical Specification 3.6.E, stated that, "with the safety valve function . . . inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours."

The licensee commenced preparations for an orderly shutdown, and commenced de-inerting the Unit 3 drywell to allow maintenance staff to enter the drywell and inspect the combination safety/relief valve. The licensee also began reviewing the requirements for requesting enforcement discretion from the NRC to prevent the shutdown of the reactor.

During the 12-hour time until shutdown was required, the licensee presented to the NRC information from the Updated Safety Analysis Report and the Core Operating Limits Report that showed that the combination safety/relief valve's safety function was not needed or credited for accident analyses. The NRC reviewed the licensee's presentation, and concluded that a Notice of Enforcement Discretion was warranted. The licensee was therefore given permission to continue operating Unit 3 with a failed combination safety/relief valve.

The inspectors reviewed the licensee's parallel actions to comply with Action 1 of Technical Specification 3.6.E. The licensee had commenced the shutdown, and would have been in compliance with the Technical Specifications even if the Nuclear Regulatory Commission had not granted enforcement discretion.

The details of the Notice of Enforcement Discretion are discussed in separate correspondence, (NRC letter dated May 6, 1999, from C. Thomas, Director, Project Directorate III, NRR, to O. Kingsley, President, Nuclear Generation Group) and, therefore, are not included in this report.

c. Conclusions

The Technical Specifications required a shutdown of Unit 3 due to failure of the combination safety/relief valve. The licensee took actions to comply with the Technical Specifications, but also presented information that showed that the safety function of the combination safety/relief valve was not credited in the plant's accident analyses. The Nuclear Regulatory Commission issued a Notice of Enforcement Discretion and permitted Unit 3 to continue operation.

**O4 Operator Knowledge and Performance**

O4.1 Routine Performance

a. Inspection Scope (71707)

The inspectors performed routine control room monitoring to assess the operators' performance. The audits included items such as turnover, the operators' roles in equipment testing, and problem identification. The inspectors also assessed the licensee's responses to human performance issues in the operations department.

b. Observations and Findings

**Control Room Performance**

In the control room, the day-to-day operations remained acceptable. The operators were knowledgeable of the plant status, ongoing maintenance, and current issues. The operators were attentive to their panels, and identified discrepant conditions. The operators' logs appeared complete. The inspectors identified that a control room annunciator that frequently was left "lit" by the operators was not listed in the "control room lit annunciator log," but the inspectors concluded that the issue was minor because the alarm was occurring due to a known instrument spiking problem, and the licensee already had a work request written to address the spiking.

The licensee identified one failure to enter the correct administrative limiting conditions for operation. On April 23, 1999, one shift identified that the previous shift failed to record all the required Dresden Administrative Technical Requirements limiting conditions for operations for an inoperable fire detection device. Specifically, the previous shift failed to realize that a fire watch would be needed after 14 days. Fortunately, since the next shift identified the error, the licensee remained in compliance with the Dresden Administrative Technical Requirements. The problem was caused because the unit supervisor had relied on a reactor operator to review the requirements and the reactor operator failed to read the second line of the requirement and, as a result, did not realize a fire watch was needed after 14 days. The unit supervisor, who was the individual responsible for complying with the requirement, then failed to perform a complete independent review of the requirements. The licensee entered this into its corrective action process via Problem Identification Form (PIF) D1999-01846.

**Field Performance**

The licensee identified some issues in the field that concerned the inspectors. The issues reflected poor communication and adherence to operating standards.

On April 19, 1999, operations personnel, assigned to perform a radwaste transfer, stopped work when the radwaste supervisor realized that his intended orders were not being carried out. Initially, the supervisor had directed the transfer of the 2/3 B MaxRecycle Concentrator to its associated transfer tank. Subsequently, the supervisor decided to transfer the liquid from the transfer tank (which was getting full) to the neutralizer tank. However, the supervisor noted that the neutralizer tank never starting filling, then contacted the radwaste equipment attendant and discovered that the attendant thought the transfer was to the concentrated waste tank instead of the neutralizer tank. The licensee performed a prompt investigation and identified errors in how the pre-job brief was conducted and in not re-briefing when conditions had changed. The licensee documented the issue in PIF D1999-01775.

On May 12, 1999, the licensee identified that a non-licensed operator was not adhering to procedures while operating an emergency diesel air compressor. The operator was executing Dresden Operations Surveillance 6600-01, "Diesel Generator Surveillance Tests." The purpose of the steps being executed was to determine the air receiver pressure at which the compressor started. This was done by opening the drain line and blowing down the receiver tank until the compressor started. The inboard and outboard drain line valves are located by the air receiver tanks on an elevated platform and at the

base of a ladder, respectively. The operator had closed the inboard drain valve, with the intention of then opening the outboard drain valve at the base of the ladder, then re-opening the inboard valve so he could see the receiver tank's pressure gauge during the blowdown. The pressure gauge was not visible from the area of the outboard drain valve. The intent of the procedure was to use only the outboard drain valve and to have a second non-licensed operator observe the pressure instrument. Prior to proceeding with the blowdown, but after closing the inboard drain valve, the non-licensed operator contacted the unit supervisor (a senior licensed operator) to get permission to continue with the deviation from the procedure. The unit supervisor denied the request and sent a second non-licensed operator to assist in completing the task. However, the unit supervisor was not told that valves had already been manipulated at this point. Subsequently, an INPO observer who was observing the non-licensed operator in the field brought the failure to follow procedures to the licensee's attention.

The licensee performed an investigation and concluded that the out-of-sequence manipulations did not result in any adverse consequences to the plant. The licensee performed interviews with other non-licensed and licensed operators and concluded that the failure to follow procedures was an isolated incident. The licensee entered the issue into its corrective action program via PIF D1999-020708. The inspectors reviewed the incident and concluded that the manipulation had no actual impact on the system.

Technical Specification 6.8.A required, in part, that written procedures shall be established and implemented, covering the activities recommended in Appendix A of Regulatory Guide 1.33; the covered activities included operating the emergency diesel generator and its air start system. The manipulation of the inboard drain valve outside of procedures was a violation of Technical Specification 6.8.A. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy (**NCV 50-237/99008-01(DRP)**). This violation was in the licensee's corrective action program as PIF D1999-02078.

Although there were no safety consequences to this event, the inspectors, and the plant managers, were concerned that the event may have indicated a slip in the culture with respect to procedure adherence. The licensee concluded that the event was isolated, and noted that the individual who made the mistake had only recently been assigned to operations.

On May 16, 1999, the licensee identified two valves in the radwaste system that were operated without the required documentation being filled out. Plant staff had attempted to identify an unknown input into the "A" floor drain distillate tank. As part of the troubleshooting, the staff closed some valves. The valve positions were recorded in the logs, and the manipulations were performed under procedure control. The operators did not fill out an additional form that was used to document valve repositioning. The licensee documented this in PIF D1999-02121. The inspectors considered the issue to be minor because the operators had recorded the valve manipulations in their logs, and the manipulations were performed within plant procedures, although not documented on an additional form.

c. Conclusions

The performance in operations was generally acceptable. The licensee identified some instances where operators, both licensed and non-licensed, failed to follow all the administrative procedures or failed to communicate properly.

II. Maintenance

**M2 Maintenance and Material Condition of Facilities and Equipment**

M2.1 Maintenance on Relief Valves (Unit 3)

a. Inspection Scope (61726)

The inspectors audited the licensee's compliance with the surveillance requirements for safety valves.

b. Observations and Findings

The combination safety/relief valve on Unit 3 failed on May 3, 1999, as discussed in Section O2.1 of this report. The failure was indicated by high pressure in the low pressure side of the valve's bellows. At the end of the inspection period, the licensee had not performed a drywell entry and valve examination, so the licensee could not confirm if the valve's bellows had actually failed or if the pressure switch for the bellows had failed. Additionally, the annunciator that provided initial indication of the potential bellows failure, cleared several days later.

The inspectors verified that the licensee had been performing maintenance on the valve. Technical Specification 4.6.E required that, "At least once per 18 months, 1/2 of the safety valves shall be removed, set pressure tested and reinstalled or replaced with spares that have been previously set pressure tested and stored in accordance with manufacturer's recommendations." Technical Specification 4.6.E also required that, "At least once per 40 months, the safety valves shall be rotated such that all nine safety valves are removed, set pressure tested and reinstalled or replaced with spares that have been previously set pressure tested and stored in accordance with manufacturer's recommendations."

The inspectors reviewed the maintenance and discussed the maintenance with cognizant licensee personnel. The licensee produced records that showed the maintenance on the safety/relief valve to be in compliance with Technical Specifications.

After inquiry by the inspectors, the licensee also compared the surveillance test on the combination safety/relief valve's pressure switch with the instructions in the vendor's manual. The licensee identified some differences between maintenance described in the vendor's manual and the maintenance performed on the pressure switch. The licensee contacted the vendor and the vendor concluded that the licensee's maintenance was acceptable. The licensee updated the vendor instructions accordingly.



The licensee identified no history of problems with the pressure switch or valve. There have been some Licensee Event Reports within the past few years regarding safety valves lifting outside of the ranges allowed by Technical Specifications, but the deviations have been minor (the NRC reviewed the Licensee Event Reports in previous reports).

c. Conclusions

The licensee had performed the maintenance required by Technical Specifications on the combination safety/relief valve. The licensee could not determine the cause of the valve's failure until the next outage.

M2.2 Material Condition Issues Related to the Recirculation Pump Systems.

a. Inspection Scope (62707)

The inspectors reviewed the licensee's response to several issues related to the recirculation pump systems.

b. Observations and Findings

2A Recirculation System Speed Controller

On May 7, 1999, power decreased from about 2527 MWth to 2456 MWth due to the 2A recirculation pump running back to a lower speed. The operators quickly diagnosed and responded to the failure by locking the recirculation pump's motor-generator set scoop tube. The licensee subsequently identified and replaced a failed speed controller.

3A Recirculation Pump Motor-Generator

On April 7, 1999, the licensee discovered that an oil deflector ring (essentially a dust cover) on the motor end of the fluid coupler shaft had come loose. The licensee identified that the loose ring may be a symptom of a worn thrust bearing that could eventually lead to a trip of the motor-generator. The licensee had been tracking the issue throughout the inspection period. The licensee planned to secure the 3A recirculation pump and conduct single-loop operations the weekend of May 23 to assess the cause of the loose deflector ring.

3A Recirculation Pump Motor-Generator High Temperatures

On May 16, 1999, the operations staff added the 3A recirculation motor-generator temperature to the Operation's Concern list. This was done because one temperature reading was occasionally high. Operations staff created a contingency plan that included objective temperature points for immediate actions, including reducing recirculation flow.

The operations staff continued to keep station management's attention on the issue. During the "Plan of the Day" meeting on May 20, 1999, the shift manager reminded the other station senior management about the potential impact of the temperatures. Personnel from engineering and maintenance were also preparing to perform troubleshooting on the system. Coincidentally, while the shift manager was discussing the

issue, the Unit 3 recirculation system motor-generator ventilation system failed to operate properly. As a result, the temperatures for the Unit 3A motor generator set increased. In compliance with the contingency plan, the operating crew rapidly reduced the recirculation pump speeds and generator output by about 100 MWe. The operations and maintenance staff who responded to the ventilation failure noted that the exhaust damper was failed shut. The licensee speculated that the failure occurred as the ventilation system automatically switched from recirculation mode to exhaust mode as the outside air temperature increased from night to day. The speculation was that the exhaust damper did not get opened sufficiently by the system prior to the ventilation being pressurized from the operating fans, and once the system was pressurized, the actuator did not have enough power to overcome the pressure and open the damper.

The inspectors noted that the ventilation system for the reactor recirculation system impacted operations by causing operators to perform the pre-planned contingency actions for rising temperatures on a recirculation motor-generator set.

c. Conclusions

The material condition of the reactor recirculation systems on both units impacted smooth full-power operations. The Unit 2 system ran back, reducing flow and reactor power due to a controller failure. The Unit 3 system had to be manually reduced in speed due to a ventilation failure. Unit 3 also required single loop operation to diagnose and correct the deflector ring issue.

M2.3 (Units 2, 3) Reactor Water Cleanup Systems

a. Inspection Scope (62707, 71707)

During this period, the reactor water cleanup systems on both Unit 2 and Unit 3 had failures that impacted smooth operation. The inspectors reviewed the circumstances of the failures and the licensee's responses.

b. Observations and Findings

Unit 2 Reactor Water Clean Up (RWCU) Non-Regenerative Heat Exchanger Failure

On April 18, 1999, operators observed that the Unit 2 reactor building closed cooling water system showed signs of in-leakage. Chemistry personnel determined that the in-leakage was primary reactor coolant.

The licensee activated its Outage Control Center to ensure adequate staff was available to address the issue. The licensee determined that the leakage was coming from one of two non-regenerative heat exchangers (NRHX) in the reactor water cleanup system.

Operations personnel performed some tests to determine which NRHX was leaking. However, disassembly of the first heat exchanger showed that the licensee had not chosen correctly, as the heat exchanger did not have gross leaks. The licensee then disassembled the second NRHX and identified and repaired the failure.

The inspectors monitored the job progress and the impact on the reactor coolant chemistry. The inspectors noted that the limits in the Technical Specifications were

never approached during the work. The licensee did, however, track the coolant chemistry as it passed through various "Action Levels."

The licensee held a critique of the overall evolution and identified areas for improvement. The critique, though brief, discussed efficiencies in turnovers and briefs and the need to have specialists available at all times. This was identified because some workers' times on site were limited due to radiation exposure or time at work. The flawed original determination of which heat exchanger was leaking was listed as an area for improvement.

Overall, the licensee responded appropriately to the Unit 2 RWCU system problem, with the noted error in determining which heat exchanger failed.

#### Unit 3 RWCU System Resin Intrusion

On April 24, 1999, an attempt was made to swap from the 3B to the 3C RWCU demineralizer. During the evolution, a resin intrusion occurred and the 3C demineralizer was again removed from service. High conductivity on Unit 3 occurred soon after the swap and revealed the presence of resin in the reactor coolant. The licensee returned the 3B demineralizer to service.

The exact source of the resin and the method of intrusion could not be determined until the reactor water cleanup system was secured. However, the licensee decided not to resecure the RWCU system again to allow the coolant chemistry to return to normal.

#### c. Conclusions

The material condition of the reactor water cleanup systems impacted the chemistry on both units. In one instance, one non-regenerative heat exchanger failed and leaked into the reactor building closed cooling system. In the other instance, a resin intrusion occurred as the licensee attempted to place the 3C demineralizer into service. The licensee restored the systems to service before exceeding any Technical Specification limitations.

### M2.4 Control Room Ventilation System

#### a. Inspection Scope

On May 10, 1999, the licensee took the safety-related portion of the control room heating, ventilation and air conditioning (HVAC) system out-of-service for planned maintenance. The scope of this planned maintenance included performing 6-year preventive maintenance on several 480-volt breakers and the completion of an annual control room HVAC smoke test. The inspectors assessed the licensee's performance during this planned maintenance evolution.

#### b. Observations and Findings

##### System Operability

At the start of this activity, the operators placed the safety-related train ("B") of control room HVAC out-of-service to allow maintenance personnel to start work. Also, the

licensee installed a temporary alteration into this system in support of this maintenance activity. This alteration allowed the operators to keep the dampers for "A" train (nonsafety-related) of control room HVAC opened while the main bus was de-energized. To complete this temporary alteration, the operator secured the "A" control room HVAC air handling unit. After securing the "A" air handling unit, the "B" air handling unit was started along with "B" train's refrigeration control unit. Following the start of the system in this alignment the "B" refrigeration control unit tripped immediately on high back pressure.

After this event, the operators performed a walkdown of the system. The licensee discovered that the temperature control valve for the air conditioner condenser's service water flow control system was in the manual mode of operation instead of automatic. This prevented the flow control system from providing adequate cooling water flow to the refrigeration control unit. The licensee suspected that operators placed the valve in that mode during the performance of the last monthly operability surveillance test. This surveillance test was completed satisfactorily on April 13, 1999. The licensee's subsequent investigation concluded that the surveillance test procedure was inadequate in that it did not direct restoration of the valve position.

An engineering evaluation (DOC ID No. 0005946332) performed by the licensee concluded that with circulating water inlet temperature below 78°F and the temperature control valve in the manual mode, the refrigeration control unit discharge header would be maintained within its operating band of 170 to 296 psig. Licensee plant data showed that service water temperature reached 78°F around May 1. The inspectors reviewed this evaluation; no concerns were noted.

Using the information from the engineering evaluation, the licensee declared that the refrigeration control unit had been inoperable since May 1, 1998. Action statement 1.b of Dresden Technical Specification 3.8.D, "Control Room Emergency Ventilation System," stated, "with the refrigeration control unit inoperable, restore the inoperable refrigeration control unit to operable status within 30 days or be in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours." With the control room HVAC refrigeration control unit declared inoperable as of May 1, 1998, the licensee was placed in Day 10 of a 30-day limiting condition of operation (LCO).

Following the discovery of the temperature control valve in manual mode of operation, the operators placed the temperature control valve in the automatic mode and restarted the "B" air handling unit and refrigeration control unit. The refrigeration control unit operated normally. However, due to ongoing maintenance on the control room HVAC system, the licensee was not able to declare the refrigeration control unit operable and exit the LCO.

Dresden Technical Specification 6.8.A stated, in part, "Written procedures shall be established, implemented, and maintained covering the activities referenced in the applicable procedures recommended in Appendix A, of Regulatory Guide 1.33, Rev. 2, February 1978.

Regulatory Guide 1.33 referenced procedures for surveillance tests, inspections and calibration tests of safety-related equipment, such as the control room emergency ventilation system.

Contrary to above, on April 13, 1999, Dresden Operations Surveillance 5705-04, "Control Room Train B HVAC and Air Filtration Unit Surveillance," Rev. 19, provided inadequate procedural guidance. The guidance caused the operators to leave the temperature control valve in the manual mode of operation. Unknown to the licensee, this caused the system to be inoperable from May 1 until May 10 when planned maintenance activities revealed the issue. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy (NCV 50-237/249/99008-02(DRP)). The violation is in the licensee's corrective action program as PIF D1999-02032. Additionally, on May 12, 1999, the licensee revised the surveillance procedure to instruct operators to verify that the temperature control valve was in the automatic position after the completion of the surveillance test.

#### Maintenance Issues

The licensee also encountered other issues during the performance of this control room HVAC outage. One of these issues included the discovery that one of the replacement breakers was not a like-for-like replacement. The control power fuse block for a replacement motor control center was procured as a stand-alone component, while the original design had the fuse block self-contained. The licensee decided that this issue presented seismic qualification concerns. After the licensee performed a technical evaluation to confirm that it would meet seismic qualifications, the licensee mounted the fuse block inside the motor control center.

An issue that effected the quality of the licensee performance during this maintenance activity was the licensee's identification that a 24-hour refrigeration control unit oil warmup sequence had been left off the original work schedule. This warmup period was essential to the proper operation of the refrigeration control unit. This was due to the chemical interaction between the Freon in the condenser and the compressor oil. The oil warmup sequence added an additional 24 hours to the work surveillance time and time that the safety-related equipment was out-of-service.

On May 14, 1999, the operators started the "B" control room HVAC post-maintenance surveillance test (also monthly surveillance test). The "A" booster fan for the air filtration unit tripped instantly. The operators then started the "B" booster fan. Twenty-four minutes later it tripped. The operators then restarted the "B" booster fan, but it again tripped after 20 minutes of operation. The operators halted the surveillance and started an investigation.

Through this investigation the licensee discovered a problem with the molded case circuitry for the "A" booster fan's breaker. The licensee decided to replace the breaker after not being able to specifically identify the failure mode. The licensee was in day 4 of a 7-day LCO for the control room emergency ventilation system air handling unit.

In regards to the "B" booster fan, the licensee identified that the work instructions that were used during preventive maintenance on the fan's breaker specified the incorrect method for testing the breaker's thermal overloads. The work instructions described the thermal overload testing methodology used for working on General Electric (GE) 480-volt breakers. However, Westinghouse 480-volt breakers were used in the licensee's control room HVAC system.

The Westinghouse breakers used a block-type thermal overload assembly where all three thermal overloads were encased in the same assembly. This arrangement caused a relatively high radiant heat load to each thermal overload. This contrasts with the GE breakers the licensee normally uses. In the GE breakers, the thermal overloads are enclosed in separate assemblies, so the heat load (caused by heat transfer from each overload) seen by each thermal overload was much less.

The testing method for the GE breakers has each overload tested as an independent circuit, while the appropriate method for the Westinghouse breakers instructs the licensee to align the three overloads in series. The entire circuit is then tested.

When the GE methodology was used on the Westinghouse breakers, the thermal overload heat load was not being taken in consideration. This caused the electrician to set the thermal overload to approximately 85 percent of the normal value.

The licensee stated that other Westinghouse breakers used throughout Dresden would be inspected. The licensee also stated that the control room emergency ventilation system was the only safety-related system that used the Westinghouse breakers.

After the licensee corrected the thermal overload setting, the operators successfully performed the operability surveillance using the "B" booster fan. The licensee then declared the control room HVAC system operable and all associated Technical Specification LCOs were exited.

On May 15, 1999, as part of the post-maintenance testing for the breaker replacement for the "A" booster fan, the licensee ran the control room HVAC system using the "A" booster fan. One of the acceptance criteria for this post-maintenance test was a 5-hour continuous run of control room HVAC. During this run the "B" refrigeration control unit tripped, which placed the licensee back in a 30-day LCO.

A follow-up investigation by the licensee found that again the thermal overloads for the Westinghouse breaker used to power the "B" refrigeration control unit were set too low. The root cause was the same testing methodology deficiency described for the earlier issue. The thermal overload settings were corrected and the post-maintenance and operability testing of the control room HVAC refrigeration control unit was completed satisfactorily and the LCO exited.

The inspectors were concerned with this series of events because the events demonstrated a lack of adequate corrective actions on the part of the licensee when the first thermal overload issue was addressed. As a result, a safety-related system was left in a degraded state after it had been declared operable. The licensee agreed that the corrective actions were insufficient. However, according to the licensee, the decision to not validate the thermal overload setting in this breaker following the earlier identification that an invalid testing procedure was used, was based on the fact that the refrigeration control unit had been running for approximately 11 hours without any issues. This Westinghouse breaker had been worked during the planned maintenance evolution. The licensee did not consider that use of the breaker in a different system line up (different load patterns) might affect the breaker performance.

Appendix B, Criterion XVI of 10 CFR Part 50 stated that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies,

deviations, defective material and equipment, and nonconformances are promptly identified and corrected. Contrary to the above, on May 14, 1999, the licensee discovered that incorrect testing techniques had been used for setting the thermal overloads on Westinghouse breakers in the safety-related control room HVAC system. After this discovery, the licensee did not ensure that all breakers affected by this incorrect testing methodology had the correct thermal overload settings. This resulted in the failure of the safety-related HVAC refrigeration control unit on May 15, 1999. The failure to ensure that these safety-related breakers were operable was considered a violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions."

This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy (NCV 50-237/249/99008-03(DRP)).

The inspectors verified that the licensee captured these issues in the licensee's corrective action and "lesson learned" program. The licensee also discussed this issue with all work planner and electrical maintenance personnel. The licensee has also scheduled additional training for the Dresden staff regarding this and other Westinghouse breaker issues.

c. Conclusions

The licensee completed planned maintenance of the control room HVAC within the Technical Specification time limitations. However, the inspectors noted poor performance by the licensee in the areas of work package preparation and procedural adequacy. These performance issues caused the refrigeration control unit to be inoperable for approximately 10 days without the operators being aware of it. Inadequacies in the licensee's corrective action program were also revealed during this maintenance on the control room HVAC system.

M2.5 Unit 2 Scram Discharge Volume Switches

a. Inspection Scope (62707)

The inspectors monitored the licensee's response to a failure of a scram discharge volume switch to calibrate.

b. Observations and Findings

On April 27, 1999, during a routine surveillance test, the licensee found that a level switch and transmitter for the Unit 2 scram discharge volume could not be calibrated properly. In response, the licensee "inserted a 1/2 scram" or placed the channel in the reactor protection logic in a tripped condition in accordance with the Technical Specifications.

Following troubleshooting, station personnel concluded that the instrument had to be replaced. Some communication problems became apparent as the station changed from a goal of repairing the existing transmitter to replacing the transmitter. Operations staff and the work package writers intended that the maintenance workers perform a briefing prior to replacing the level transmitter. However, the workers thought they had already performed the appropriate briefings. Operators subsequently called the workers back from the plant and had the workers conduct the briefing.

One issue discussed in the brief was the need to keep on the right channel of equipment. This was especially important since one-half of the logic needed to scram the reactor was already present. The maintenance staff discussed that an abandoned-in-place air compressor was present between the two divisions of scram logic, so the workers would not be near the other untripped channel. However, in the field, the inspectors noted that maintenance staff members climbed over abandoned equipment and started work while using the untripped channel's piping for support. The inspectors brought this to the attention of maintenance supervision. Senior station management noted a repeat occurrence of this, and directed that a senior reactor operator oversee the work to prevent a third instance.

The licensee performed a critique of the work. The documentation of the critique was robust and systematically documented areas for improvement. It noted that 3 to 5 hours of time could have been saved if the work was coordinated better. The time savings was important because it would have reduced the time that a single trip in the other division of reactor protection logic would have caused the plant to scram. The critique also assigned specific tasks with due dates.

Related to this work, the licensee identified that parts availability for scram discharge volume transmitters was a concern. Since May 7, 1999, the licensee had been tracking the parts availability on its "Operations Concerns" list. At end of the inspection period the licensee was performing action to ensure that spare parts would be available onsite.

c. Conclusions

The licensee replaced a scram discharge volume instrument after the licensee identified that the instrument had failed. The licensee's critique of the work noted that parts unavailabilities and miscommunications delayed the replacement of the failed instrument while a one-half scram signal was inserted.

**M4 Maintenance Staff Knowledge and Performance**

M4.1 General Performance

The inspectors monitored the licensee's work through direct observation, review of logs, review of PIF records, and through monitoring of equipment performance. In general, the maintenance staff performed well. The maintenance activities were usually completed within the planned time. The licensee continued to track the start and completion times of maintenance to assure proper performance.

More detailed observations were discussed in Section M2.

M4.2 Fork Truck Incident

On April 8, 1999, a maintenance person drove a fork truck into an overhead walkway within the protected area. The fork truck was slightly too tall to fit, and the walkway was superficially damaged from the top of the forks. The issue concerned the inspectors and the plant management because within the past year several other problems with fork trucks and cranes have happened in or near the protected area. The licensee took the event seriously, and even reset its "Station Clock" to draw attention to the issue.



### III. Engineering

#### **E2 Engineering Support of Facilities and Equipment**

##### **E2.1 Low Pressure Coolant Injection (LPCI) System Pressurization Update (Unit 3)**

###### **a. Inspection Scope (37551)**

The inspectors assessed the licensee's investigation into LPCI system heat exchanger pressurization.

###### **b. Observations and Findings**

In Inspection Report 99006, the inspectors expressed concern regarding the unexplained pressurization of the LPCI System. Low pressure coolant injection pressurization started in late November 1998. This was not thoroughly addressed by the licensee until LPCI pressures increased to over alarm setpoints and inspectors questioned contingency planning.

After an exhaustive investigation, which included dead legging different sections of piping for the LPCI system, the licensee identified the source of the pressurization as leakage from the reactor recirculation loop via the high radiation sampling system (HRSS). In response to this discovery, the licensee confirmed that the HRSS lineup was not the problem. This confirmation was determined by walking down the system with the valve checklist. To stop the leakage into the LPCI system the HRSS was isolated.

Due to the fact that many systems are connected to this system, multiple valves would have had relatively high leakage in order for the LPCI system to see the rate and amount of pressurization seen in the LPCI system over the past months. Using this information, the licensee developed a comprehensive plan to identify which valves in the system were leaking by. This plan included using various system lineups to localize leakers. The plan also called for flushing various valves to determine if the valves were operating properly. This effort was still in progress at the end of the inspection period.

###### **c. Conclusions**

The inspectors concluded that although the licensee's action was not timely, the licensee performed a good, detailed investigation into finding the source of increased pressurization of the LPCI system heat exchanger.

##### **E8 Miscellaneous Engineering Items (92902)**

###### **E8.1 (Closed) TI 2515/141: Review of Year 2000 (Y2K) Readiness of Computer Systems at Nuclear Power Plants.**

The inspectors conducted an abbreviated review of Y2K activities and documentation using Temporary Instruction (TI) 2515/141, "Review of Year 2000 (Y2K) Readiness of Computer Systems at Nuclear Power Plants." The review addressed aspects of Y2K management planning, documentation, implementation planning, initial assessment, detailed assessment, remediation activities, Y2K testing and validation, notification

activities, and contingency planning. The inspectors used Nuclear Energy Institute/Nuclear Utilities Software Management Group documents 97-07, "Nuclear Utility Year 2000 Readiness," and 98-07, "Nuclear Utility Year 2000 Readiness Contingency Planning," as the primary references for this review.

Conclusions regarding the Y2K readiness of this facility are not included in this summary. The results of this review will be combined with reviews of Y2K programs at other plants in a summary report to be issued by July 31, 1999.

#### IV. Plant Support

### **R3 Radiological Protection and Chemistry Procedures and Documentation**

#### **R3.1 Update of Radiation Maps During Hydrogen Addition**

The inspectors noted that dose rates in the Unit 3 feedwater heater tube pull area were slightly higher than listed on the surveys. The inspectors verified that radiological postings and boundaries remained appropriate and discussed the issue with radiation protection management. The dose rates in the area had increased as the licensee implemented hydrogen addition on Unit 3. Although surveys of areas that could experience increased dose from hydrogen addition were planned, the area identified by the inspectors was not part of the original increased survey. Subsequently, the licensee added the area to its extra survey rounds.

### **R4 Staff Knowledge and Performance in Radiological Protection and Chemistry**

#### **R4.1 Violation of Radiation Protection Procedures**

##### **a. Inspection Scope (71750)**

The inspectors performed general plant walkdowns to assess radiation worker performance.

##### **b. Observations and Findings**

The inspectors noted that licensee radiation workers normally followed radiation procedures. However, on May 11, 1999, the inspectors witnessed a station laborer exit the radiologically protected area (RPA) without exiting through the personnel contamination monitors. The laborer exited the RPA through swing gates that were set up for entering the RPA. The inspectors stopped the laborer and instructed the laborer on the proper way of exiting the RPA. The laborer reentered the RPA and proceeded through the personnel contamination monitors.

In addition to exiting the RPA incorrectly, the inspectors discovered that the laborer did not inform radiation protection personnel that radiation protection procedures were violated while exiting the RPA. After being informed by the inspectors, radiation protection staff acted appropriately and performed surveys of the clean areas where the laborer stepped. No contamination was found.

Dresden Technical Specification 6.8.A.1, requires that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Appendix A, Revision 2 (February 1978). Regulatory Guide 1.33, Appendix A, recommends that procedures be implemented which address personnel access and monitoring and radioactive contamination control.

Dresden Administrative Procedure 12-27, "Radiation Protection Guidelines for RPA Access," Rev. 9, step F.3.a, stated, "each person entering the RPA shall adhere to the following rules . . . (15) Frisk yourself or be monitored for contamination as directed by station procedures."

Contrary to the above, on May 11, 1999, the inspectors identified that a laborer exited the RPA without using the personnel contamination monitors. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy (NCV 50-237/249/99008-04(DRP)). The violation is in the licensee's corrective action program as PIF D1999-02055. The licensee also discussed this incident with Dresden staff.

c. Conclusions

Normally the licensee followed radiation protection procedures. However, the inspectors identified that a station laborer failed to frisk while exiting the RPA. The licensee responded appropriately to this issue.

**P4 Staff Knowledge and Performance in Emergency Preparedness**

P4.1 Emergency Drill

The inspectors observed the licensee perform an emergency drill in advance of the planned emergency exercise. Overall, the Dresden staff effectively implemented the Emergency Plan and demonstrated a good level of preparedness for a real emergency.

**S4 Security and Safeguards Staff Knowledge and Performance**

S4.1 Failure to Establish Compensatory Measures

a. Inspection Scope (71750)

The inspectors performed a preliminary review of the licensee's investigation into a failure of security compensatory measures.

b. Observations and Findings

On April 27, 1999, the licensee's security staff identified that compensatory measures for an inactive perimeter zone had not been established. The licensee reestablished the measures within 10 minutes of discovery, and documented the event in PIF D1999-01885. The licensee also formally notified the NRC through a 1-hour Emergency Notification System call. Subsequently, the licensee retracted the call and concluded that the security event was a 24-hour loggable event, and not a 1-hour reportable event.

The licensee performed a prompt investigation. The inspectors reviewed the prompt investigation and noted that the investigation primarily concluded that a failure of one security officer to review the security status log caused the compensatory measures to fail.

In contrast, however, from the information in the prompt investigation report, the inspectors concluded that multiple breakdowns in communications among security staff lead to the failure. First, when the perimeter zone was inactivated, the Central Alarm Station operator failed to communicate that the area was to be prioritized (compensated). A security patrol, who knew from experience that prioritization was required, did not communicate this to the Central Alarm Station operator, even though the particular patrol began prioritizing the affected area. The patrol also did not add the prioritization information to the status logs.

During the pre-job briefing for the next shift of patrol, the fact that the inactive zone needed prioritization was discussed. When the oncoming patrol relieved the offgoing patrol (who had been performing prioritization), the offgoing failed to remind the oncoming about the need to prioritize the zone. The oncoming patrol failed to recall the information from the pre-job brief, so did not prioritize the area.

c. Conclusions

The licensee identified and reported to the NRC a failure to compensate for an inactive security area. The licensee's prompt investigation blamed one officer. However, the inspectors' review of the same report determined that multiple communication failures by several individuals led to the error.

## V. Management Meetings

### **X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of license management at the conclusion of the inspection on May 21, 1999. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

G. Abrell, Regulatory Assurance  
A. Best, Human Resources Supervisor  
P. Chabot, Site Engineering Manager  
J. Cox, Training Department  
L. Coyle, Shift Operations Supervisor  
R. Fisher, Operations Manager  
T. Fisk, Acting Chemistry Manager  
M. Heffley, Site Vice President  
K. Ihnen, Lead Assessor  
R. Kelly, Reg Assurance NRC Coordinator  
W. Lipscomb, Site Vice President Assessor  
J. Moser, Radiation Protection  
S. Stiles, Assessment Manager  
B. Stoffeis, Maintenance Manager  
J. Stone, Nuclear Oversight Manager

## INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering  
IP 61726: Surveillance Observations  
IP 62707: Maintenance Observations  
IP 71707: Plant Operations  
IP 71750: Plant Support Activities  
IP 92902: Miscellaneous Engineering  
TI 2512/141: Review of Year 2000 Readiness

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

50-249/99008-01	NCV	failure to follow operations procedures
50-237/99008-02	NCV	inadequate control room HVAC procedure
50-237/249/99008-03	NCV	failure to ensure that safety-related breakers were operable
50-237/249/99008-04	NCV	failure to follow radiation protection procedures

### Closed

50-237/99008-01	NCV	failure to follow operations procedures
50-237/249/99008-02	NCV	inadequate control room HVAC procedure
50-237/249/99008-03	NCV	failure to ensure that safety-related breakers were operable
50-237/249/99008-04	NCV	failure to follow radiation protection procedures

### Discussed

None