

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No: 50-456/96019; 50-457/96019

Licensee: Commonwealth Edison (ComEd)

Facility: Braidwood Nuclear Plant, Units 1 and 2

Location: RR #1, Box 84  
Braceville, IL 60407

Dates: October 19 - November 29, 1996

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## EXECUTIVE SUMMARY

### Braidwood Nuclear Plant, Units 1 & 2 NRC Inspection Report 50-456/96019; 50-457/96019

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection.

#### Operations

The inspectors concluded, from discussions that occurred during the PORC meeting, that the importance of the pressurizer manway and the reactor head vent pathways were understood by management and the reduced inventory evolutions were well planned. However, in the case of the first draining evolution the blockage of the pressurizer manway vent path, the creation of a loop seal on the reactor head vent pathway, and miscommunication that resulted in the exclusion of an additional drainage verification method from the procedure indicated that this evolution was not well executed. (Section O1.1)

The inspectors concluded that during the performance of a turbine valve exercise that the nuclear station operator (NSO) demonstrated poor control of reactivity, failed to perform steps of the annunciator alarm procedure for the Average Temperature (Tave)/Reference Temperature (Tref) deviation alarm, and failed to comply with the "Operating Logs and Records" procedure. The inspectors also concluded that the unit supervisor failed to provide the proper oversight during the event. This licensee identified and corrected event is being treated as a Non-Cited Violation. (Section O4.1)

#### Maintenance

The inspectors observed the performance of low voltage closure testing and lubrication of a 480 volt DS series breaker. The inspectors concluded that the maintenance was performed in accordance with the procedure and was closely supervised. (Section M1.1)

The inspectors concluded that the surveillance activities observed during this inspection period were performed in a competent and well controlled manner. (Section M1.2)

The inspectors concluded that BwAP 100-21 was inadequate in that it did not require a review of the surrounding area for the potential to introduce foreign material into a safety-related system resulting in a piece of scaffolding being dropped into the suction bay for the essential service water system. The inspectors concluded that this procedural deficiency was a violation. (Section M1.3)

The inspectors observed the installation of Unit 1C Steam Generator manways and diaphragm plates and reviewed the associated procedure. The inspectors concluded that the licensee failed to complete all steps of the installation procedure. The

inspectors also concluded that specific management actions to ensure procedure compliance were ineffective in that an individual assigned to follow the work procedure took no action when the procedure was not complied with. This event is considered a violation of technical specifications. (Section M4.1)

The inspectors reviewed the licensee's response to an observed abnormal voltage control indication on the 1B Diesel Generator. The licensee determined that 125 volts direct current (VDC) leads were reversed on the instantaneous prepositioning (IPP) board. The inspectors concluded that the maintenance was performed without the necessary documentation. This licensee identified event is being treated as a Non-Cited Violation. (Section M4.2)

#### Engineering

The inspectors concluded that not documenting a 10 CFR 50.59 safety evaluation for returning the unit to service with the Unit 1 cold leg reactor coolant stop valve degraded, demonstrated a lack of complete understanding of the 10 CFR 50.59 requirements. (Section E2.1)

The licensee observed cooler than normal temperatures in the Unit 1 essential switchgear room. An investigation determined that control relay contacts were configured incorrectly. The inspectors concluded that field documentation was confusing and post modification testing was inadequate. This event is considered an Unresolved Item until the inspectors can assess the licensee's corrective actions for previous instances of inadequate post maintenance testing. (Section E2.2)

While a system engineer's identification during a review of disconnected power leads for two control room dampers of an inconsistency between the control and instrumentation drawing and external wiring diagram was good and demonstrated a questioning attitude, the failure to update the appropriate drawings at the time the power was removed was a violation of 10 CFR Part 50, Appendix B, Criterion VI. This licensee identified event is being treated as a Non-Cited Violation. (Section E2.3)

The inspector concluded that the system engineer's detection of electronic noise effecting vibration readings on a diesel oil transfer pump was an excellent observation since the vibration measurements initially obtained met the acceptance criteria. The system engineer demonstrated an excellent knowledge of expected system performance and a questioning attitude. (Section E4.1)

#### Plant Support

The inspectors performed a visual inspection of the high level spent resin tank room. The inspectors found the room and the equipment in the room to be in good condition. (Section R2.1)

The inspectors observed part of an emergency planning drill and concluded that it provided valuable and challenging training. (Section P5.1)

The inspectors reviewed physical security measures and procedures and conducted interviews with security personnel on duty. The inspectors found security facilities in good condition and personnel knowledgeable and professional. (Section S1.1)

## Report Details

### Summary of Plant Status

Unit 1 entered the period in cold shutdown for a scheduled mid-cycle outage. The unit was shut down on October 12, 1996, to perform inspections and maintenance. Contractors performed eddy current inspections and the necessary sleeving and plugging of degraded or defective steam generator tubes in all steam generators. The steam generator maintenance required the plant operators to perform two reduced inventory evolutions for the installation and subsequent removal of nozzle dams in the 1C Steam Generator. This was due to the inability to shut the C Loop Cold Leg Reactor Coolant Stop Valve. Unit 1 ended the period shutdown with plant operators making preparations for the unit's restart.

Unit 2 operated at or about 100% for the entire period.

### I. Operations

#### **O1    Conduct of Operations**

##### **O1.1   Reduced Inventory Activities**

###### **a.    Inspection Scope**

The licensee lowered the Unit 1 reactor vessel water level to mid-loop to install steam generator nozzle dams in the "C" steam generator because of the inability to shut the "C" reactor coolant loop cold leg isolation valve. The inspectors attended a preevolution plant operations review committee meeting and reviewed procedures BwOP RC-4, "Reactor Coolant System Drain," Revisions 7 and 8, and 1BwOA PRI-10, "Loss of RH Cooling Unit 1," Revision 56. These reviews were performed using NRC Temporary Instruction 2515/113, "Reliable Decay Heat Removal During Shutdown," Generic Letter 88-17, "Loss of Decay Heat Removal," technical specifications, and the Updated Final Safety Analysis Report (UFSAR). The inspectors also reviewed problem identification form (PIF) 456-201-96-2375 which described problems with the reactor head vent path during the drain down to the reactor flange.

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

The inspectors observed the licensee drain the Unit 1 reactor water level to the vessel flange level on October 19 and to the mid-loop region on October 21. The inspectors verified that both shutdown cooling trains were verified to be operable with only one train operating as required, redundant flow paths were available for emergency inventory addition, and redundant vessel water level instruments and core temperature monitoring instruments were operable and in service. The inspectors also verified that there were no other outage activities ongoing that could have affected shutdown cooling.

The inspectors attended the plant operations review committee's (PORC) meeting to evaluate the drain down procedure. Committee members recommended that holdup tank level be monitored during the draining process. Since the water would be drained into the holdup tank, monitoring this tank's level would provide an additional check on total volume drained from the reactor coolant system. However, due to miscommunication, this recommendation was not incorporated into the procedure. The inspectors discussed this issue with plant management and administrative controls were subsequently implemented to monitor holdup tank level prior to start of draining to a reduced inventory condition.

Prior to starting the drain down, a licensee inspector noticed that the pressurizer manway, which had been opened to provide a vent path, was inadvertently partially capped with a foreign material exclusion cover. This information was promptly conveyed to the control room and the draining procedure was halted. The licensee removed the cover and initiated an investigation of this event prior to recommencing the draining procedure.

During the drain down to the reactor flange level licensee personnel noticed that reactor vessel indicated water level reached 400 feet before the anticipated time to drain the volume of water. However, the reactor vessel level instrumentation system was still reading 100% in the upper head region on both level trains when it should have been reading 100% in the vessel region. The licensee determined that the hose connecting the reactor head vent to a collection bottle had slumped and filled with water resulting in a loop seal. When the loop seal condition was cleared reactor water level indication rose about 4 feet. The licensee determined that non-licensed operators had moved the hose and collection bottle prior to drain down but had not secured the hose to prevent it from dropping below the vent valve level.

c. Conclusions

The inspectors concluded, from discussions that occurred during the PORC meeting, that the importance of the pressurizer manway and the reactor head vent pathways were understood by management and the evolution was well planned. However, the blockage of the pressurizer manway by maintenance personnel, the creation of the loop seal in the reactor head vent pathway, and miscommunications that resulted in a desired verification of reactor water level draindown not being incorporated into the procedure indicated that this evolution was not well executed.

**O4 Operator Knowledge and Performance**

**O4.1 Poor Reactivity Control and Failure to Follow Procedures**

a. Inspection Scope (71707)

The inspectors reviewed a licensee finding of high average coolant temperature (Tave) deviation. Tave deviation is the difference between the highest Tave channel reading and what Tave should be for the existing power level, referred to as the reference temperature (Tref). The Tave deviation annunciator alarm setpoint was



3 degrees F. The inspectors interviewed 2 nuclear station operators (NSO), the unit supervisor (US) and the Shift Operation Supervisor and reviewed procedures 2BwOS 3.4.2.a-1, "Turbine Overspeed Protection Systems Monthly Valve Stem Freedom Checks," Revision 8E1; BwAP 350-1 "Operating Logs and Records," Revision 8; BwAP 300-1, "Conduct Of Operations," Revision 19; BWAR 2-14-D1 "Tave Control Deviation High," Revision 7; licensee problem identification report 457-200-96-038; NSO operating logs (Unit 2, Oct 1 - Nov 12, 1996); and the annunciator alarm summary print out (Unit 2, Oct 26, 1996).

b. Observations and Findings

The inspectors reviewed unit operating logs that stated that on October 27, 1996, Unit 2 power was reduced from 100% to approximately 75% as a prerequisite to 2BwOS 3.4.2.a-1. Inspector interviews with the operators indicated that the NSO and US became concerned that axial flux distribution (Delta I) was too high when rods began automatically stepping out to compensate for xenon buildup. In response the operators placed rod control in manual. The inspectors learned through a review of plant data that the NSO made a series of dilutions to the reactor coolant system in order to compensate for the continuing xenon buildup. However, the inspectors determined through the data review and interviews with other operators that the NSO did not accurately predict the necessary dilution volume and did not allow time between successive dilutions for the plant to stabilize. This resulted in an over dilution which caused Tave to rise above Tref and the Tave deviation annunciator to then alarm. Tave deviation reached a maximum of about 6 degrees F and remained above the alarm setpoint for 1 hour and 43 minutes. The annunciator alarm procedure, BWAR 2-14-D1 required the operator to place rod control in manual and match Tave with Tref. However, the alarm procedure was not referenced or followed. The operators were concerned about Tave but took no action to restore it to the normal range. The alarm condition did not clear until the surveillance was completed and the ramp-up to full power was commenced.

Operator experience was a contributing factor to the occurrence. The inspectors learned that the Unit NSO had about 10 months operating experience but had not previously performed a significant load change and the US had previously supervised two similar load ramps. There were two experienced NSOs assisting in the control room but their experience was not utilized.

The inspectors verified NSO logs recorded the power ramp-down and ramp-up and performance of 2BwOs 3.4.2.a-1 but did not record any reactivity changes as required by BwAP 350-1. The NSO logs did not document any difficulty in controlling reactivity and did not document reactor operation with Tave higher than normal.

The inspectors conducted a follow up review of the Unit 2 NSO logs. The inspectors selected four evolutions that had been performed between October 1 and November 12, 1996, that required NSO log entries per BwAP 350-1, and verified the required log entries were made.

The licensee performed the following corrective actions to prevent recurrence of the event:

- Changed BwAP 350-1 to require shift engineer and unit supervisor's signatures indicating concurrence that log entries are appropriate for the shift;
- the NSO received additional training on performing reactor power changes;
- the unit supervisor was counseled regarding management expectations for maintaining operating parameters, utilizing the experience of the team, informing the shift engineer of unusual conditions, and logkeeping;
- management will identify licensed operators needing additional training on performing reactor power changes and make arrangements for training;
- review the event with all licensed operators to increase operator sensitivity to reactivity control, to identify other evolutions that require additional training or operator guidance, and to reinforce management expectations for operator logs.

c. Conclusions

The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), Technical Specifications, and the maximum Tave reached during the event and concluded that the plant was not operated outside its design basis.

The event indicated a weakness in operator training in reactivity management and performance of required actions for an alarming annunciator. The inspectors concluded that both the operator and the supervisor were overly focused on a single plant parameter, Delta I, during the evolution and unnecessarily operated with Tave different than Tref. The knowledge of experienced NSOs on shift was not utilized and the shift engineer was not informed of the event which indicated a lack of teamwork. The inspectors considered the lack of meaningful log entries describing an unusual situation to be poor watchstanding practice.

Technical Specification (TS) 6.8.1.a requires that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1.a applies to BwAR 2-14-D1 and BwAP 350-1 and therefore, the failure to follow BwAR 2-14-D1 and BwAP 350-1 was a violation of TS 6.8.1.a. The inspectors concluded that the training and counseling sessions and procedural change commitments made by the licensee were adequate corrective actions. This licensee-identified and corrected violation is being treated as a Non-Cited Violation consistent with Section VII.B1 of the NRC Enforcement Policy (50-457/96019-01 (DRP)).



## II. Maintenance

### **M1 Conduct of Maintenance**

#### **M1.1 Inspection and Lubrication of A Westinghouse DS Series 480 volt Breaker**

##### **a. Inspection Scope (62703)**

The inspectors observed the performance of low voltage closure testing and lubrication of the 2B auxiliary feedwater pump cubicle cooler fan breaker (Work Request 960106199-01). The inspectors also reviewed the work request package and discussed the work in progress with the electrician performing the task and a system engineer supervising the task.

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

The inspectors observed the following:

- the operator assigned to remove the breaker from the cubicle checked the work package to ensure the correct cubicle location, called the control room prior to removing the breaker, and wore appropriate safety equipment to perform the task;
- the work package appeared to be adequate for the work performed;
- the electrician had appropriately calibrated test equipment;
- the voltage used for the closing test was in accordance with procedural requirements;
- the lubricants used were in accordance with the procedural requirements;
- the electrician followed the procedure closely and documented each step as performed;
- the electrician was given clear guidance on how to apply the lubricant to the breaker internals by the component engineer.

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

The inspectors concluded that the maintenance was performed in accordance with the procedure and was closely supervised.

## M1.2 Surveillance Observations

### a. Inspection Scope (61726)

The inspectors observed all or portions of the following surveillance activities:

- |                       |   |
|-----------------------|---|
| · BwVS 0.5-2.RH.2-2   | Residual Heat Removal System Check Valve Stroke Test  |
| · 2BwOS 7.1.2.1.a.1-1 | Motor Driven Auxiliary Feedwater Pump Monthly Surveillance  |
| · 2BwVS 0.5-3.AF.1-1  | Motor Driven Auxiliary Feedwater Pump ASME Quarterly Surveillance                                   |
| · 2BwOS 3.2.1-940     | ESFAS Instrumentation Slave Relay Surveillance  |
| · 2BwOS 8.1.1.2.a-1   | 2A Diesel Generator Operability Monthly and Semi Annual   |
| · 1BwVS 6.2.1.b-1     | ASME Surveillance Requirements for 1A Containment Spray Pump and Check Valves 1CS003A and 1CS011A." |
| · 2BwVS 0.5-3.DO.1    | Unit 2 ASME Requirements for Testing the Diesel Oil Transfer System.                                |

### b. Observations and Findings

The inspectors noted that all surveillances observed were performed in accordance with the procedure. Technicians were experienced and knowledgeable of their assigned tasks. The inspectors observed equipment operation and verified performance parameters were within allowable limits. The inspectors reviewed the technical specifications and the Updated Final Safety Analysis Report for several of these surveillances and found no discrepancies.

### c. Conclusions

The inspectors concluded that the surveillances listed above were performed in accordance with the procedures and all acceptance criteria were met. The inspectors found all instruments in calibration. Operations provided good support and no communication problems were observed. The inspector also concluded that the procedures were well written and provided clear guidance.

## M1.3 Foreign Material Exclusion (FME)

### a. Inspection Scope (71707)

The inspectors reviewed a licensee identified event of a scaffold pole dropped in the essential service water bay at the lake screen house. The inspectors reviewed BwAP 100-21, "Foreign Material Exclusion (FME)," Revision 0.1.

b. Observations and Findings

On November 7, workers were erecting scaffolding in front of the traveling screens in the lake screen house. The structure surrounding each traveling screen incorporates a slot about 8 feet long by about 6 inches wide inside the screens apron to the essential service water bay below. The workers dropped an 8 foot scaffold pole through the opening into the bay. The inspectors verified that there were no strainers or screens to prevent the introduction of FME into the essential service water system pump suction.

As an initial corrective action, the licensee installed temporary FME covers on the traveling screens near the scaffolding. On November 7 the inspectors verified that FME covers were installed on the traveling screen openings. The inspectors noted that BwAP 100-21 did not specifically require FME protection during the erection of scaffolding.

The inspectors reviewed the design of the essential service water bay and associated piping and found that due to physical constraints, an 8 foot pole would not be able to damage essential service water components or restrict flow.

c. Conclusions

The inspectors concluded that the opening in the traveling screen housing could allow the admission of foreign material into the suction of the essential service water system. 10 CFR Part 50, Appendix B, Criterion V, requires that activities affecting quality shall be prescribed by documented procedures of a type appropriate to the circumstances. The inspectors concluded that BwAP 100-21, "Foreign Material Exclusion," was inadequate in that it did not require a review of the surrounding area for the potential to introduce foreign material into a safety system during performed work. (50-456/96019-02(DRP)).

**M4 Maintenance Staff Knowledge and Performance**

**M4.1 Installation of Steam Generator (SG) Manways**

a. Inspection Scope (62703)

On November 18, 1996, The inspectors observed installation of Unit 1 Steam Generator (SG) primary manway covers and diaphragm plates for the "C" SG and reviewed BwMP 3300-038, "Removal and Installation of the Primary Manway Cover on the Steam Generators," Revision 7.

b. Observations and Findings

Due to radiation protection considerations, the inspectors observed the maintenance work on a remote video display. A maintenance worker also observed the work on video display and followed the work progress with a field copy of BwMP 3300-038. The maintenance worker was dedicated to ensuring that the procedure steps were

followed. The inspector was informed by the maintenance worker that quality control (QC) coverage was continuous and that the QC inspector was at the work site. The manways, hardware, and special tools were in good condition and installation went smoothly. The procedure required installation of 2 guide pins followed by the manway and bolts. The inspectors observed that the craftsmen failed to perform Step F.7.d.4(f) of BwMP 3300-038, which required lubrication of the female threads after removal of the 2 guide pins and prior to installation of the last 2 manway bolts. Neither the maintenance worker dedicated to ensuring procedural compliance nor the QC inspector noted that this procedural step was missed.

After the inspector informed the licensee of the missed step, a PIF was written. The licensee consulted Westinghouse and it was concluded that since, per the original procedure: (1) the bolts were lubricated prior to installation, and (2) after torquing to final torque, the bolts were removed one-by-one, lubricated and reinstalled. The procedure was changed to reflect that the female threads did not need to be additionally lubricated.

c. Conclusions

The inspectors concluded that specific management actions to ensure procedural compliance were ineffective in that an individual assigned to follow procedure steps in the work package took no action when the procedure was not complied with. TS 6.8.1.a required that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1.a applies to BwMP 3300-038 and therefore, the failure to follow BwMP 3300-038 was a violation of TS 6.8.1.a (50-456/96019-03(DRP)). The inspectors concluded that the licensee's immediate corrective action to remove the procedure step was adequate.

M4.2 1B Diesel Generator Voltage Regulator Terminal Board Lead Reversal

a. Inspection Scope (92902)

On October 14, 1996, a licensee's investigation found two leads reversed on the 1B diesel generator instantaneous prepositioning board (IPP). In response to the event, the inspector reviewed the 1B diesel generator operability determination, the licensee's event investigation (NTS Item #456-201-96-2254), corrective actions, work packages 960095577 01 and 960057260 01, and pages 16 through 18 of the Alternate Replacement Evaluation (ME-P7), Number M-94-0597-01.

b. Observations and Findings

The inspectors concurred with the licensee's determination of operability of the 1B diesel generator. Reversing the polarity of the 125 VDC to the IPP board continuously input the 4160 VAC reference signal into the voltage regulator. Normally, the 4160 VAC reference signal was applied only during isochronous mode

operation. Since the diesel generators operated in the isochronous mode during emergency operation, the voltage regulator circuitry would have responded exactly as designed in the event of an emergency actuation.

The inspectors also concurred with the licensee's event investigation report that identified two direct causes for the error. First, insufficient information was provided in the work package. The inspectors found that the work package made reference to evaluation M-94-0597-01 but the evaluation was not contained in the work package. This document contained important information required to perform the terminations. The inspectors also verified that the work package included design drawings that referenced terminations for the original IPP board and not the new IPP board. The work analyst issued the work package without complete instructions.

Second, the electrician that performed the work in the field lacked a questioning attitude. The configuration was different between the new and old boards with respect to the termination points and required the electrician to make interpretations as to the correct point of termination. The electrician failed to question the need for a field interpretations and relied on hand written notes found on one of the drawings. The inspectors verified that these notes were incorrect.

The inspectors noted that the following corrective actions have been taken or identified:

- correction of the wiring error on the 1B diesel generator
- check IPP board installation on 2A diesel generator
- review outstanding work request for the IPP board replacement on the 1A and 2B diesel generators
- discuss the event with electrical maintenance personnel
- discuss the event with electrical maintenance work analysts
- revise drawing 20E-1-4021A
- revise drawing 20E-1-4092AL

c. Conclusions

The inspectors agreed with the licensee's conclusions that the 1B diesel generator was operable with the incorrect termination of leads on the IPP board of the voltage regulator circuit and would have been capable of performing its design function. The inspectors also agreed with the licensee's conclusion that neither the work analyst nor the electrician used a questioning attitude in the completion of the work package. The inspectors concluded that the licensee performed a good root cause analysis of the event.

The inspectors concluded that adequate documented instructions and drawings were not available to accomplish the installation of the IPP board for the 1B DG. This is a violation of 10 CFR Part 50, Appendix B, Criterion V requirements. The training and counseling sessions and the document revision commitments made by the licensee were adequate corrective action. This licensee-identified and corrected



violation is being treated as a Non-Cited Violation consistent with Section VII.B1 of the NRC Enforcement Policy (50-456/96019-04(DRP)).

### III. Engineering

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

##### **E2.1 10 CFR 50.59 Evaluation For Unit 1 Cold Leg Reactor Coolant Stop Valve**

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

Repeated alarms occurred from the Unit 1 loose parts monitoring system on August 27, 1996. The unit shut down to hot zero power on September 6, 1996, to repair two steam leaks in the containment and to try to identify the source of the loose parts monitor alarms. The licensee identified at that time the source of the noise was most likely the Unit 1 cold leg reactor coolant stop valve (1RC8002C). Unit 1 was restarted on September 9, 1996. Unit 1 was again shutdown on October 12, 1996, for a mid-cycle outage to inspect steam generator tubes. During this outage the licensee radiographed 1RC8002C and determined that one of the valve disc guides had come loose and moved within the valve body. The inspectors reviewed Safety Evaluation Check Lists (SECL) 96-165 and SECL 96-165, Revision 1, regarding the potential for a loose part in the Unit 1 reactor coolant system.

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

The inspectors observed that SECL 96-165 discussed the possibility of a broken valve disc guide and stated that an inadvertent valve closure was not expected because it would require the failure and dislodging of both valve disc guides. SECL 96-165, Revision 1, was written after the radiograph had shown that only one guide had come loose and moved into the valve body. SECL 96-165, Revision 1, stated that the failure of both disc guides was not a consideration because the radiograph showed only one guide to be failed. However, the inspectors verified that the licensee did not know what the failure mechanism of the valve disc guide was or why a modification that had been installed to prevent the guide from moving into the valve had also failed.

The inspectors were concerned that since the failure mechanisms of the valve disc guide were not known how the licensee could be assured that the valve disc guides would not fail in a way that could result in the valve disc falling into the flow path and result in a loss of coolant flow in the loop. SECL 96-165, Revisions 0 and 1 had not answered the questions required by 10 CFR 50.59 from the point of view of returning the unit to service with 1RC8002C degraded.

Based on the inspectors concerns the licensee generated a 10 CFR 50.59 safety evaluation based on returning Unit 1 to service with 1RC8002C degraded. The 10 CFR 50.59 review specifically stated that in order to break the disc guide the valve would have to be shut. The broken valve guide was applying a force to the disc to hold the other valve guide in place should it become loose. As long as the valve



guide remained in place the valve disc would not fall into the flow path. The inspectors reviewed the safety evaluation and had no further concerns.

c. Conclusions

The inspectors concluded that not documenting a 10 CFR 50.59 safety evaluation for returning the unit to service with 1RC8002C degraded demonstrated a lack of understanding of the 10 CFR 50.59 requirements. This was not a violation because the 10 CFR 50.59 safety evaluation was completed prior to returning the valve to service.

E2.2 Emergency Safety Feature (ESF) Switchgear Room Ventilation Fan MCC Relay Configuration Error

a. Inspection Scope (92903)

On October 3, 1996, operating department personnel observed cooler than normal temperatures in the Unit 1 ESF Switchgear Room. The licensee determined contacts on control relay CR1 had been installed incorrectly during a modification to the ESF switchgear room ventilation system. This resulted in the ventilation dampers not positioning properly as the room temperature decreased. The inspectors reviewed the licensee's Problem Investigation Report #456-201-96-2207, drawings 1-4683D and 1-4659M, Field Change Request (FCR) #960052, NEP-04-05, Revision 0, "Design Change Acceptance Testing Criteria," and BwAP 1610-5, Revision 3, "Development of Modification Test." The inspectors conducted interviews with the Electrical Maintenance Master Electrician, Electrical Maintenance Staff Supervisor, root cause team personnel, and with site engineering personnel.

b. Observations and Findings

The inspectors agreed with the licensee that the exact conditions that resulted in contact reversal could not be determined. The inspectors also agreed with the licensee's conclusion that inadequate post modification testing failed to identify the incorrectly installed contact. The inspectors noted that this was the eighth identified example of inadequate post modification testing in the last 2 years.

The inspectors reviewed the licensee's planned corrective actions of tailgating the maintenance workers, work analysts, site construction workers, and site and system engineers about this event.

c. Conclusions

The licensee identified the inadequate post-modification testing. However, the inspectors were unable to come to a conclusion concerning the appropriateness of the licensee's corrective actions considering the number of related events in the last 2 years. The inspectors planned to review previous events and modifications

recently completed or in progress to continue assessment of modification process for programmatic problems. The adequacy of the licensee's corrective actions was an unresolved item (50-456/96019-05(DRP)).

### E2.3 Control Room Ventilation Damper Hydromotor Had Disconnected Power Leads

#### a. Inspection Scope (37551)

On November 11, licensee personnel observed that OVC075 and OVC073, the hydromotors for control room ventilation dampers OVC140Y and OVC104Y respectively, had the power leads disconnected. The inspectors reviewed PIF #456-201-96-2620 and interviewed site and system engineering personnel.

#### b. Observations and Findings

During discussions with the inspectors, the system engineer stated that he had noticed that Control and Instrumentation Drawing M-2096 showed that power was removed from OVC075 and OVC073 and that the schematic and external wiring diagrams still showed power supplied to the two hydromotors. The system engineer also stated that a Byron Field Change Request (FCR-F-34067), generated in 1984 during Byron station construction, removed the power to the damper hydromotor and changed M-2096. M-2096 was a Byron/Braidwood common drawing. The dampers controlled by the hydromotors control air flow to the main control room.

Licensee personnel stated that no documentation could be found that approved the same change to the construction of Braidwood Station. Licensee personnel generated engineering request 9602195 to evaluate the lack of power to the hydromotor. The licensee's evaluation was that power to OVC075 and OVC073 was unnecessary and Engineering Change Notices 000950E and 000951E were issued to document the changes to the power supplies to the hydromotors and update the appropriate drawings.

The inspectors reviewed UFSAR Sections 9.4.1, 6.5.1, and 6.4.4 and concluded that the system design as described in the UFSAR was unaffected. Section 9.4.1 stated that all automatic isolation and control dampers were driven by spring loaded electric powered operators which fail safe on the loss of electric power. The inspectors determined that the dampers were left in a fail safe condition.

#### c. Conclusions

The inspectors concluded that by identifying the problem the performance of the system engineer was good. The inspectors determined that the licensee's corrective actions were good. The inspectors also concluded that the failure to update all the appropriate drawings at the time the change was made was a violation of 10 CFR Part 50, Appendix B, Criterion VI. This licensee-identified and corrected violation is being treated as a Non-Cited Violation consistent with Section VII.BI of the NRC Enforcement Policy (50-456/96019-06(DRP)).

#### **E4 Engineering Staff Knowledge and Performance**

##### **E4.1 Diesel Oil Transfer Pump Vibration Measurements**

###### **a. Inspection Scope (61726)**

The inspectors reviewed the procedure and observed the performance of 2BwVS 0.5-3.DO.1, "Unit 2 ASME Requirements For Testing The Diesel Oil Transfer System," Revision 1. The purpose of this procedure was to verify that the diesel oil transfer pumps and discharge check valves meet ASME Section XI operational readiness pursuant to TS 4.0.5 (see Paragraph M1.2).

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

On November 14, 1996, the inspector observed the performance of 2BwVS 0.5-3.DO.1, "ASME Requirements For Testing The Diesel Oil Transfer System," Revision 1. During the pump vibration measurements on the 2DO01PB pump, the system engineer informed the inspector that the vibration measurements were within acceptance criteria but were greater than expected. The inspector observed all of the vibration measurements and noted that all the values obtained were within the acceptable range. The system engineer informed the inspector that he suspected the introduction of electronic noise and conducted an inspection of the TEC-Smart Meter, cable, and vibration transducer. The system engineer noticed a small break in the vibration transducer cable insulation near the amphenol connector. The cable was replaced and the vibration measurements repeated. The repeated vibration measurements exhibited the expected levels and were within the acceptable range.

###### **c. Conclusion**

The inspector concluded that the system engineer's detection of the introduced noise was an excellent observation since the vibration measurements initially obtained met the acceptance criteria. The system engineer demonstrated an excellent knowledge of expected system performance and a questioning attitude.

#### **IV. PLANT SUPPORT**

##### **R2 Status of RP&C Facilities and Equipment**

##### **R2.1 Inspection of the High Level Spent Resin Tank Room**

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

The inspectors observed the licensee perform a visual material condition inspection of the high level spent resin tank room. Licensee personnel had not entered or inspected the room in about 5 years.

b. Observations and Findings

The inspectors observed the licensee perform the inspection using a video camera inserted into the high level spent resin tank room through a floor plug in the Unit 2 lower cable spreading room. The camera provided a view of all areas of the room except for a small area behind the tank. Licensee personnel stated the unobserved area contained no equipment. The room was adequately illuminated and a high quality picture of the room was obtained. The inspectors noted that this was the first inspection of this room in the 5 years and questioned the elapsed time between inspections. The licensee stated that there was no door to the room and that a shield wall must be disassembled to gain access. However, the licensee indicated that they would perform an annual video camera inspection of the room and would enter the inspection into their surveillance data base for scheduling.

c. Conclusions

The inspectors found the room and the equipment contained within to be in good condition. The inspectors observed no indications of component or tank leakage.

**P5 Staff Training and Qualification in Emergency Preparedness (EP)**

P5.1 Emergency Preparedness Drill

a. Inspection Scope (71750)

The inspectors observed an EP drill from the simulator and the Technical Support Center (TSC).

b. Observations and Findings

On November 20, inspectors observed the station response to an emergency preparedness drill from the simulator and TSC and noted that it challenged the participants. Response in the simulator was deliberate with teamwork characterized by mutual backup, clear communications, and thorough use of procedures. Actual problems, such as the failure of telephone equipment and real time sampling from the high radiation sampling system added realism to the drill. Training value in the simulator was also enhanced by simulated equipment malfunctions and out-of-services, which greatly complicated operator action, but also by the delay of exercise termination until the plant was in the final stage of cooldown.

c. Conclusions

The inspectors concluded that the drill's scenario was well developed and challenged participants. The simulator operating crew's in-depth self-critique added greatly to the training value of the exercise.

## **S1 Conduct of Security and Safeguards Activities**

### **S1.1 General Comments**

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

The inspectors reviewed physical security measures and the "Security Control Center Procedure," BSP-12, Revision 4 and observed security operations in progress. The inspectors interviewed the security administrator, assistant security administrator, and three security personnel on duty.

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

The inspectors observed operations and alarm response from the Main and Secondary Security Control Centers (SCC). The monitoring, alarm, and communications equipment was in satisfactory condition and security personnel were proficient in the operation of the SCC. Administrative requirements (BSP-12) such as shift briefing sheets and communications checks were adhered to. Response to an interior door alarm was satisfactory. Security personnel were familiar with procedures for abnormal situations postulated by the inspectors.

The inspectors observed the expeditious removal of construction equipment from the lake screen house protected area and the prompt restoration of the security barriers following equipment removal. The inspector observed that the security staffing for the evolution was sufficient to maintain access control to the lake screen house.

#### **c. Conclusions**

Security facilities were in good condition and personnel interviewed were knowledgeable and professional. Routine operations observed went smoothly.

## **V. Management Meetings**

### **X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on November 29, 1996. 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

- \* H. G. Stanley, Site Vice President
- \* T. Tulon, Station Manager
- \* H. Pontious, Nuclear Licensing Administrator
- W. McCue, Support Services Director
- R. Flessner, Site Quality Verification Director
- R. Byers, Maintenance Superintendent
- D. Miller, Work Control Superintendent
- \* T. Simpkin, Regulatory Assurance Supervisor
- H. Cybul, System Engineering Supervisor
- \* J. Meister, Engineering Manager
- \* D. Cooper, Operations Manager
- M. Turbak, Independent Safety Engineering Group Supervisor
- \* M. Cassidy, Regulatory Assurance - NRC Coordinator

### NRC

- R. Lanksbury, Chief, Reactor Projects Branch 3
- \* C. Phillips, Senior Resident Inspector
- \* J. Adams, Resident Inspector
- \* D. Rich, Resident Inspector

### IDNS

- \* T. Esper

\* Indicates those attending the management meeting on November 29, 1996.



## INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering  
IP 61726: Surveillance Observations  
IP 62703: Maintenance Observation  
IP 71707: Plant Operations  
IP 71750: Plant Support Activities  
IP 92902: Followup - Maintenance  
IP 92903: Followup - Engineering  
IP 92904: Followup - Plant Support

## ITEMS OPENED AND CLOSED

### Opened

50-457/96019-01	NCV	failure to follow procedures
50-456/96019-02	VIO	inadequate procedure
50-456/96019-03	VIO	failure to follow procedures
50-456/96019-04	NCV	failure to provide adequate instructions
50-456/96019-05	URI	inadequate modification testing assessment
50-456/96019-06	NCV	failure to update appropriate drawings

### Closed

50-457/96019-01	NCV	failure to follow procedures
50-456/96019-04	NCV	failure to provide adequate instructions
50-456/96019-06	NCV	failure to update appropriate drawing

## LIST OF ACRONYMS USED

AR	Action Request
CFR	Code of Federal Regulations
ESF	Engineered Safety Features
ESFAS	Engineered Safety Features Actuation System
FCR	Field Change Request
FME	Foreign Material Exclusion
IDNS	Illinois Department of Nuclear Safety
IPP	Instantaneous Prepositioning
MCC	Motor Control Center
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSO	Nuclear Station Operator
PDR	Public Document Room
PIF	Problem Identification Form
QC	Quality Control
SCC	Security Control Center
SECL	Safety Evaluation Check List
SG	Steam Generator
Tave	Average Temperature
Tref	Reference Temperature
TS	Technical Specification
TSC	Technical Support Center
TSI	Thermal Sciences Incorporated
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
US	Unit Supervisor
VAC	Volts Alternating Current
VDC	Volts Direct Current
VIO	Violation