



An increased incidence of personnel errors by operations personnel was noted during this inspection period (paragraphs 2 and 5).

No new strengths were identified.

Maintenance and Surveillance:

No new strengths or weaknesses were identified. Two personnel errors occurred during surveillance activities (paragraph 5).

Engineering/Technical Support:

No new strengths or weaknesses were identified.

Emergency Preparedness:

During an annual test of the emergency preparedness (EP) sirens the licensee observed an unusually high number of siren failures. This issue was reviewed during a routine EP inspection (paragraph 7).

No new strengths or weaknesses were identified.

Radiation Protection:

No new strengths or weaknesses were identified.

Security:

One weakness was identified with the licensee's control of safeguards information (paragraph 8).

Safety Assessment/Quality Verification:

Performance in this area was generally a strength. However a weakness was identified in review of changes made in the control of reactor coolant system draining while shut down (paragraph 2). Another weakness was identified in management oversight of plant activities (paragraph 2). These weaknesses contributed to the February 20, 1992, interruption of decay heat removal.

No new strengths were identified.

## DETAILS

### 1. Persons Contacted

E. Watzl, General Manager, Prairie Island  
M. Sellman, Plant Manager  
#K. Albrecht, General Superintendent, Engineering and Radiation Protection  
#M. Wadley, General Superintendent, Operations  
G. Lenertz, General Superintendent, Maintenance  
R. Lindsey, Assistant to the Plant Manager  
D. Schuelke, Superintendent, Radiation Protection  
G. Miller, Superintendent, Operations Engineering  
#M. Reodemann, General Superintendent, Electrical and Instrumentation Systems  
T. Breene, Superintendent, Nuclear Engineering  
#M. Klee, Superintendent, Quality Engineering  
R. Conklin, Supervisor, Security and Services  
E. Eckholt, Nuclear Support Services  
J. Le.eille, Nuclear Support Services  
#A. Hunstad, Staff Engineer  
J. Hill, Superintendent, Instrumentation and Controls Systems  
J. Maki, Superintendent, Electrical Systems  
#J. Sorensen, Plant Scheduling and Services  
#J. Anderson, Shift Manager  
#M. Dapas, Senior Resident Inspector, NRC  
#D. Kosloff, Resident Inspector, NRC

#Denotes those present at the management interview of April 16, 1992.

### 2. Operational Safety Verification (71707, 71710, 71711, 92701, 93702, 2513/13)

#### a. Operational Safety Verification (71707, 60705)

Unit 1 operated at full power throughout the inspection period except as noted below.

On February 18, 1992, at 5:44 p.m. power was reduced by 3 percent to ensure that the analysis limit on hot (peak) assembly average power was not exceeded. This derate ended at 5:20 a.m. on February 21 when the unit returned to full power operation.

Unit 2 was shut down for a refueling outage on February 18, 1992. The unit was restarted on March 14, 1992, returned to full power on March 21, 1992, and operated at full power the rest of the inspection period.

The inspectors observed control room operations, reviewed applicable logs, conducted discussions with control room operators, and observed shift turnovers. The inspectors verified

operability of selected emergency systems, reviewed equipment control records, verified the proper return to service of affected components, conducted tours of the auxiliary building, turbine building and external areas of the plant to observe plant equipment conditions, including potential fire hazards, and to verify that maintenance work requests had been initiated for the equipment in need of repairs.

b. Onsite Followup of Events (92701, 93702, 94703)

At 12:51 a.m. on February 19, 1992, No. 21 Auxiliary Feedwater Pump started automatically during surveillance test SP 2103. The inspectors observed the licensee's recovery from this event which is discussed further in paragraph 5.

On February 20, 1992, decay heat removal flow was interrupted for 21 minutes while draining the reactor coolant system (RCS) to mid-loop. This event was the subject of Augmented Inspection Team Inspection Report 50-306/92005 and special followup Inspection Report 50-306/92006. This event highlighted the reliance of operations personnel on engineering support to direct critical evolutions. In the past, there had been significant engineering involvement in reduced inventory evolutions. However, for the draining evolution on February 20, there was a reduction in engineering support, and shift management did not provide equivalent direct operations support. Weaknesses with the supervision of operational activities and the integration of engineering support in the conduct of critical operations, management oversight of plant activities, and the review of changes made in the control of RCS draining while shut down are addressed in Inspection Reports 50-306/92005 and 50-306/92006.

At 7:15 a.m. on March 19, 1992, an annunciator alarm was received in the control room indicating that a standby bus duct cooling fan had started for Unit 2. The bus duct cooling fans provide forced air cooling for the main electric generator power output busses. The bus duct cooling system is not a safety-related system. The operators responded to the alarm and verified that the bus duct cooling air temperature had risen enough to cause a valid start of the standby fan. The licensee notified the inspectors who observed operator action in the control room and in the turbine building. The licensee reduced unit power to 58%; at that level forced air flow is not needed to cool the bus duct. Operator and shift management response to this event was very good. Once unit power was stabilized, the inspectors observed troubleshooting activities. This is discussed in paragraph 4.

At 8:32 a.m. on March 26, 1992, No. 21 Auxiliary Feedwater Pump started automatically during surveillance test SP 2035A. The inspectors observed the licensee's recovery from this event which is discussed further in paragraph 5.



No violations, deviations, unresolved or open items were identified.

3. Licensee Action on Previous Inspection Findings (92701, 92702)

(Closed) Open Item (50-306/89002-01(DRP)): Momentary Loss of Cooling Water to the Unit 2 Turbine Building.

This item involved a brief, unplanned loss of cooling water to the Unit 2 turbine building due to unanticipated ramifications of running a post maintenance test on part of the containment and auxiliary building chilled water system while the Unit 2 turbine building was being supplied cooling water through an abnormal configuration. The item remained open pending completion of a study of lessons learned and recommendations to prevent recurrence by the licensee.

The licensee evaluated the event as Significant Operating Event Report Number P-SOE-2-89-2 dated February 20, 1989. That report contained several recommendations to incorporate lessons learned and several proposed improvements to the chilled water and cooling water systems. The event was reviewed by the Operations Committee on April 20, 1989 and actions were assigned to address remaining open items. At Operations Committee meetings on July 12, 1990 and March 1, 1991, the open action items were closed out. This item is closed.

(Closed) Violation (50-282/89008-01(DRP); 50-306/89008-01(DRP)):

Failure to have established surveillance or preventive maintenance procedures for the shield building airlock and auxiliary building.

The licensee responded to this violation with a letter dated June 1, 1989. This issue was similar to an open item (282/87005-01; 306/87005-01) which was closed in Inspection Report 50-282/89026; 50-306/89026 with the issuance of preventive maintenance procedures and a semi-annual surveillance.

In addition to the reviews in that inspection, the inspectors reviewed PM 3122-5, Category I Ventilation Zone Doors, Electrical Inspection. The inspectors determined that the licensee had established adequate procedures for the doors. This item is closed.

No violations, deviations, unresolved or open items were identified.

4. Maintenance Observation (71707, 37700, 62703)

Routine preventive and corrective maintenance activities were observed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes or standards, and in conformance with Technical Specifications. The following items were considered during this review: adherence to limiting conditions for operation while components or systems were removed from service, approvals were obtained prior to initiating the work, activities were accomplished using approved procedures and were inspected as applicable.

functional testing and/or calibrations were performed prior to returning components or systems to service, quality control records were maintained, activities were accomplished by qualified personnel, radiological controls were implemented, and fire prevention controls were implemented.

Portions of the following maintenance activities were observed during the inspection period:

- Component Cooling Water (CCW) Heat Exchanger Flush (SP1617). During the performance of this procedure, the breaker for CCW pump No. 22 did not close on demand. The licensee replaced the breaker. The failure of the breaker could not be reproduced. The inspectors will follow the licensee's continuing investigation.
- Preventive maintenance of No. 12 CCW Pump.
- Removal of Unit 2 Reactor Vessel Head.
- Removal of Unit 2 Containment Spray Pump Recirculation Piping.
- Threadchasing of Unit 2 Reactor Vessel Stud Hole and Replacement of Head Studs.
- Safety Injection Pump No. 22 Flow Test (WR SO 184-SI).
- Bus Duct Cooling System Solenoid Modification. During the Unit 2 refueling outage, licensee personnel (travelers) who do not normally work at Prairie Island, assisted with maintenance and modification work. Travelers were assigned to modify the main electric generator power output bus duct cooling system. This is not a safety-related system. Solenoid valves that had controlled cooling water flow were removed. The intent of the modification was to disconnect the wires that had supplied power to the solenoids. The travelers disconnected a neutral wire that was common to the solenoids and the electrically operated cooler fan dampers. Each fan damper normally opens when its associated fan starts. Since the fans were off when the work was done the fan dampers were closed. Normally one cooling fan operates with the second in standby, although no fans are actually needed until unit power exceeds 60%. When duct temperature increased, the standby fan started, but it had little effect because the damper associated with it did not open. The licensee identified the problem, restored power to the fan dampers, and resumed the unit power increase to full power. The licensee noted upon review of the work instructions, that had they been correctly followed, the fan dampers would not have been disconnected. The licensee also noted that several work instruction steps had been initiated by the work supervisor instead of by the travelers. Although this was not a safety-related activity, it did affect unit operation, and the inspectors are concerned about the apparent poor work

practices. The inspectors will review the licensee's evaluation of this problem when it is completed.

- Preventive Maintenance of D2 Emergency Diesel Generator (EDG). The inspectors attended the weekly planning and scheduling meeting during which the scheduled outage for the D2 EDG was discussed. The primary purpose of the outage was to perform a required 18 month surveillance inspection. The inspectors concluded that the licensee demonstrated an appropriate level of concern for coordinating maintenance and surveillance activities to minimize diesel outage time. The actual EDG outage was conducted without incident.

No violations, deviations, unresolved or open items were identified.

5. Surveillance (61726, 71707)

The inspectors reviewed Technical Specification required surveillance testing as described below, and verified that testing was performed in accordance with adequate procedures, test instrumentation was calibrated, and limiting conditions for operation were met. The inspectors further verified that the removal and restoration of affected components were properly accomplished, test results conformed with Technical Specifications and procedure requirements, test results were reviewed by personnel other than the individual directing the test, and deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel.

Portions of the following test activities were observed or reviewed:

- SP 1047 Control Rod Exercise.
- SP 1750 Post Outage Containment Closeout Inspection Procedure (Unit 2). The inspectors verified that this procedure includes an inspection of the containment safeguards recirculation sump (Sump B). The inspectors also verified that Sump B was clear of debris and that its grating was in place.
- SP 2035A Reactor Protection Logic Test. During the performance of this test on March 26, 1992, the control room operator placed No. 22 turbine-driven auxiliary feedwater (AFW) pump in manual control. The surveillance procedure required that the motor-driven AFW pump be placed in manual. No. 21 motor-driven AFW pump was incorrectly verified in manual by another operator. At 8:32 a.m., an Instrumentation and Control Technician actuated the Train A Lo-Lo steam generator level bistables per procedure and No. 21 motor-driven AFW pump started automatically. The inspectors observed the licensee's recovery actions. The licensee intends to submit a licensee event

report. The inspectors will complete their review of this event by verifying the corrective actions proposed in the LER.

- SP 2070 Reactor Coolant System Integrity Test.
- SP 2090 Containment Spray Pump Test.
- SP 2093 D2 Diesel Generator Slow Start and Train B Auto Load Sequencer Test
- SP 2103 No. 22 Turbine Driven Auxiliary Feedwater Pump Test. During the performance of this test on February 19, 1992, the operator allowed water level in one steam generator to drop to the setpoint for automatic start of the No. 21 motor-driven AFW Pump. At 12:51 a.m., No. 21 AFW pump started automatically and appropriate steam generator inventory was quickly recovered. The inspectors observed the licensee's recovery from this event and discussed the event with the operator and other personnel. The operator considered his personnel error (observing wide range level instead of narrow range level) to be the primary cause of this event, although other factors contributed. This event was reported by Licensee Event Report (LER) 306/92-001. The inspectors will complete their review of this event by verifying the corrective actions proposed in the LER.
- SP 2218 Monthly 4 kV Bus 25 Undervoltage Relay Test.
- SP 2264 RVLIS (Reactor Vessel Level Indication System) Instrument Calibration.

No violations, deviations, unresolved or open items were identified.

6. Engineering/Technical Support (37700, 92701, 40500)

a. Fire Protection Design

During a Design Basis Reconstitution evaluation of Appendix R concerns regarding safe shutdown capability from outside the control room, the licensee identified three potential "hot short" conditions during a control room fire that could adversely affect the ability to maintain a hot shutdown status. One hot short from a positive wire originating from the same battery as the wires to the reactor coolant system (RCS) head vent solenoid valves could result in the opening of these valves and the subsequent loss of RCS inventory. This would result in a more rapid decrease in pressurizer level than was predicted in the original Appendix R analysis. To address this concern, the licensee issued a temporary memorandum (TM-92-47) with instructions for the



Auxiliary Building operator, in the event of evacuation of the control room due to a fire, to pull fuses for the head vent solenoid valves, causing these valves to shut. The licensee intends to revise the Control Room Evacuation (fire) - Safe Shutdown Procedure (Appendix B of Section F5 to the Plant Operations Manual, Revision 12) to specify fuse pulling for the head vent valves. The inspectors discussed the licensee's planned corrective action with Appendix R specialists in Region III and the NRC Office of Nuclear Reactor Regulation (NRR). The inspectors were informed that an Appendix R exemption was required to accept the licensee's planned corrective action.

The original Appendix R inspection conducted in April 1987 identified a deficiency with the licensee's control room evacuation safe shutdown procedure in that the licensee's method of control for the pressurizer PORV high/low pressure interface valves was by procedural action prior to evacuation of the control room (shutting the PORV block valves). Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements", states that a reactor trip is the only manual action usually credited prior to control room evacuation. In response to this concern, the licensee revised the control room evacuation safe shutdown procedure to secure pressurizer PORVs outside the control room by pulling fuses. This was considered an open item (282/87004-02; 306/87004-02) pending final review and approval. This open item was closed in Inspection Report 282/88013; 306/88013. No Appendix R exemption was required for accepting the licensee's corrective action of pulling fuses.

GL 86-10 states that the licensee should conduct a bounding analysis to assure that safe conditions can be maintained from outside the control room with the assumption that offsite power is lost as well as automatic starting of the onsite a.c. emergency diesel generators (EDG) and the automatic function of valves and pumps whose control circuits could be affected by a control room fire. The analysis should demonstrate that malfunctions of valves that permit the loss of reactor coolant can be corrected before unrestorable conditions occur. GL 86-10 further states that for any control room actions, other than manual reactor trip, deemed necessary prior to evacuation, assurance would have to be provided that such actions could not be negated by subsequent spurious actuation signals resulting from the postulated fire.

The licensee's Appendix R analysis assumes that manual start of the EDG would require 30 minutes from the initiating event, during which time RCS makeup would not be available. Following start of the EDG, makeup would be provided by the RCS charging pumps. The inspectors are concerned that should a hot short cause the PORV block valves to open subsequent to control room evacuation, the licensee cannot prevent the loss of pressurizer level before the Auxiliary Building operator is able to pull fuses for the PORVs, causing these valves to shut. Appendix R Section III.1., in

defining alternative and dedicated shutdown capability for PWRs, states that the RCS makeup function shall be capable of maintaining the reactor coolant level within the level indication range in the pressurizer.

The two other identified hot short conditions involved the No. 12 diesel driven cooling water pump and the 4160 VAC breaker lockout relay reset circuits for several safeguards pump motors. The inspectors also discussed these design deficiencies with Region III Appendix R specialists. The licensee's short term corrective action for these conditions appears adequate.

Evaluation of the licensee's resolution of all three hot short issues is considered an open item (282/92004-01; 306/92004-01) requiring further review by Region III and NRR.

b. Lubricant Traceability

Near the close of the last inspection period the licensee observed abnormal operation of the No. 12 AFW pump motor outer bearing oil slinger ring. The licensee changed the oil and retained samples of the oil that was removed. Analysis of the oil samples revealed that the oil was not the type expected (Mobil DTE Light). The licensee evaluated the analyses and determined that although the oil sampled was not Mobil DTE Light, it was suitable for use and had not affected the operability of the AFW pump. The inspectors observed that the visible behavior of the oils was similar enough so that mechanics using the oil would not have noticed any significant difference. The licensee stated that current practice is to sample each drum of oil after receipt to verify its content. In the past, one barrel in a lot would be sampled to verify the content of the entire lot. The licensee found that the barrel most likely to have been used to provide oil for the AFW pump motor bearings did not contain Mobil DTE Light and did not have markings indicating that it had been individually sampled. The licensee stopped using oil from any barrels that had not been individually sampled and began a program to sample oil in all safety related pumps. The licensee's current program appears acceptable. The inspectors will review the results of the licensee's oil sampling program during a future inspection.

During the Unit 2 outage the licensee used an air-operated valve (AOV) diagnostic system (Flowscanner) to assess four Unit 2 AOV's and one Unit 1 AOV. The system performed well and the licensee is now planning to develop a program for regular use of Flowscanner.

c. Pipe Corrosion

The licensee identified additional microbiologically induced corrosion (MIC) indications in safety-related cooling water piping. This piping is considered ASME Code Section XI, Class 3 piping for regulatory purposes, although it was originally

designed and fabricated to comply with the ANSI B31.1 Power Piping Code. As a result of MIC, some areas of the cooling water piping have wall thickness less than allowed by the ASME Code for Class 3 piping. This MIC was discovered as a result of the licensee's erosion and corrosion inspection program. The inspectors verified that the licensee had done a prompt operability determination for the affected piping. The licensee radiographically examined the piping to better characterize the corrosion. At the close of the inspection period the licensee was preparing a request for relief (GL 90-05) from the NRC to allow operation until the two-unit outage in October 1992.

d. Pump Interaction

During the startup from the Unit 2 refueling outage, the licensee was transferring the Unit 2 feedwater load from the No. 22 turbine driven AFW pump to the motor driven AFW pump when the No. 22 AFW pump tripped on overspeed. The inspectors discussed this trip with the system engineer. The licensee concluded that the trip was caused by interaction between the two AFW pumps in conjunction with less than optimum adjustment of the No. 22 AFW pump governor. The licensee adjusted the turbine control system and successfully tested the No. 22 AFW pump. Based on the discussion with the licensee, the inspectors concluded that the overspeed trip was not indicative of a problem that would have affected the operability of the No. 22 AFW pump. The inspectors will review the licensee's written report when it is completed.

e. Diesel Cylinder Evaluation

During the 18 month inspection of D2 EDG, the inspectors verified that the licensee inspected the cylinder liner inner surface dent that had been seen during the previous EDG inspection. The EDG vendor had previously informed the licensee that the dent would not affect the operation of the EDG. The licensee concluded that, since there was no evidence that there were any negative effects associated with the dent, the area would not be inspected during future EDG inspections.

No violations, deviations, or unresolved items were identified. One open item was identified.

7. Emergency Preparedness (71707, 92701)

On March 4, 1992, the licensee stationed personnel near most of its emergency preparedness (EP) alert sirens to observe operation of these sirens during a monthly test. The remaining sirens were observed locally on March 11, 1992. Normally a contractor verifies the results of the siren test by observing a locally mounted indicating light that was designed to stay on about three days after successful operation of each siren during a test. Overall siren operability was 85%, which was lower than expected. Region III EP inspectors reviewed the licensee's

alert siren activities during a routine inspection conducted from March 30 to April 3, 1992.

No violations, deviations, unresolved or open items were identified.

8. Security (71707, 92701)

The licensee identified two separate occurrences where safeguards information was not properly secured and also identified an instance of inadequate control of a vital area barrier. The inspectors reviewed these issues and discussed them with Region III security specialists. These items will be reviewed in a future security inspection.

No violations, deviations, unresolved or open items were identified.

9. Licensee Event Report (LER) Followup (92700, 92701)

- a. (Closed) LER 282/89-18: Auto-starts of Auxiliary Building special Ventilation System As a Result of Radiation Monitor Spikes.

This LER reported a series of four automatic initiations of the Auxiliary Building Special Ventilation System (ABSVS) due to spikes of unknown, but non-radiological origin on radiation monitor 2R-37. The licensee's intended corrective action was to replace monitor 2R-37 and other similar radiation monitor modules with an upgraded model. The licensee revised the LER three times based on delays in obtaining the replacement modules. In Inspection Report 50-282/90014(DRP); 50-306/90014(DRP), the inspectors closed four similar LERs (282/88-07, 282/88-11, 282/89-08, and 282/89-16) with the corrective action so that the module replacement project be tracked by only one open LER.

The radiation monitors were replaced in early 1991. After some initial problems with the new monitors as reported by the licensee in LERs 282/91-02 and 282/91-03, they appeared to work correctly for the next year. Any remaining improvements to the radiation monitor circuits will be tracked by LERs 282/91-02 and 282/91-03. This item is closed.

- b. (Open) LER 50-282/91-02, Revision 1: Discovery That a Contract Employee Was Improperly Granted a Security Clearance.

A contract employee was improperly granted access authorization. The request for access came from a contractor company which had a licensee approved, access authorization program. It was later determined that the contract employee had a suitable inquiry record that had not been provided to the licensee. The licensee revoked the contract employee's access authorization and revoked its previous approval of the contract company's access authorization program. This LER will be reviewed in a subsequent security inspection.

- c. (Open) LER 50-306/92-01: Unplanned Auto-Start of An Auxiliary Feedwater Pump Due To Personnel Error.

This event is described in paragraph 5 and will be reviewed further in a subsequent inspection.

- d. (Closed) LER 50-282/92-02: Design Basis Reconstitution Effort Identified a Condition Outside 10 CFR Part 50 Appendix R Requirements.

The licensee identified 4160 VAC breaker lockout relay circuits for several safeguards pump motors that were not adequately protected from a "hot short" condition postulated to occur during a control room fire. The licensee's immediate corrective actions were to revise the Control Room Evacuation Procedure to identify and direct replacement of potentially blown fuses and to place spare fuses and fuse pullers at the affected fuse panels. The inspectors verified that the procedure change had been made and that the spare fuses and pullers were in place. There is additional discussion of Appendix R concerns in paragraph 6.a. Followup of the licensee's immediate and long term corrective actions will be completed by the closeout of open item 282/92004-01(DRP), 306/92004-01(DRP). This LER is closed.

- e. (Open) LER 50-282/92-03: Failure to Adequately Test a Sealed Radioactive Source Due to Procedure Inadequacy.

As a result of reviewing another licensee's LER, the licensee evaluated its method of leakage testing of sources. The licensee determined that its method of testing a source in an alloy analyzer was inadequate. The content of this LER was discussed with a Region III radiation protection specialist. Since the event has minor safety significance and the most recent leakage test of the source was adequate, this LER will be reviewed by Region III inspectors in a future inspection.

- f. (Open) LER 50-282/92-04: Failure to Perform a Full Flow Test of Turbine-Driven Auxiliary Feedwater Pumps Due to Personnel Error.

During a review of Technical Specification surveillance requirements, licensee system engineers realized that existing procedures did not ensure testing of the turbine-driven AFW pumps at the required frequency. Further review revealed that there had actually been four historic occasions when the required surveillance interval had been exceeded. The inspectors verified that the pumps had been last tested within the required surveillance frequency. The inspectors plan further review of this event to evaluate causes and corrective actions.

No violations, deviations, unresolved or open items were identified.



10. Open Items

Open items are matters which have been discussed with the licensee, and will be reviewed further by the inspector. These involve some action on the part of the NRC or licensee or both. An open item identified during the inspection is discussed in paragraph 6.a.

11. Management Interview (71707)

The inspectors met with the licensee representatives denoted in paragraph 1 after the conclusion of the report period on April 16, 1992. The inspectors discussed the purpose and scope of the inspection and the findings. The inspectors also discussed the likely information content of the inspection report with regard to documents or processes reviewed during the inspection. The licensee did not identify any documents or processes as proprietary.