U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Wisconsin Electric Power Company
Facility:	Point Beach Nuclear Plant, Units 1 & 2
Location:	6610 Nuclear Road Two Rivers, WI 54241
Dates:	October 19 through December 10, 1999
Inspectors:	F. Brown, Senior Resident Inspector R. Powell, Resident Inspector H. Walker, Reactor Inspector M. Kunowski, Project Engineer
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EXECUTIVE SUMMARY

Point Beach Nuclear Plant, Units 1 & 2
NRC Inspection Report 50-266/99018(DRP); 50-301/99018(DRP)

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers an approximately 7-week inspection period by resident and regional inspectors.

Operations

- The conduct of operations associated with the Unit 1 refueling outage shutdown and startup was very good. Operators were attentive to control board indications, and improvements were observed in the testing of the turbine-driven auxiliary feed water pump. (Section O1.1)

- An inadvertent engineered safety feature actuation occurred as the result of an inappropriate work instruction. No fuel was in the Unit 1 vessel at the time. Spent fuel pool cooling was lost as a result of the actuation, but the pool temperature did not increase significantly. One non-cited violation (NCV) was identified. (Section O2.1)

- The inspectors identified that licensed operators, following guidance in a licensee procedure, could have potentially operated the plant outside the facility's Technical Specifications for electrical distribution systems. No examples of operation outside of the Technical Specifications were identified. (Section O3.1)

Maintenance

- Overall conduct of three complicated Unit 1 refueling outage surveillance tests was good. The surveillance test activities involved several high risk significance, safety-related systems, and required the coordination of numerous personnel, located in several areas of the plant, and from several departments. (Section M1.1)

- Unit 1 outage modification work activities observed by the inspectors were generally conducted well. Department managers and Operational Assessment (quality assurance) personnel were in the field observing work. Three minor examples of failure to properly implement maintenance procedures for safety-related pumps, identified by the inspectors, were the only exceptions to the otherwise good performance. (Section M1.2)

- Licensee surveillance testing revealed that two main steam safety valves were set to lift at pressures in excess of those assumed in the accident analysis. This condition had existed for more than one operating cycle, but was not safety significant. One NCV was identified. (Section M1.3)

Engineering

- Post-maintenance testing of the "B" train safety injection pump identified non-conforming pressure at one particular pump flow rate. The inspector determined that the initial response by system engineering personnel was not appropriate in that it incorrectly attributed the unacceptable test data to instrument inaccuracy. An appropriate operability determination was subsequently developed. (Section E.4.1)

- Two NCVs were issued for the zebra mussel treatment completed in September 1999. This action closed the apparent violation documented in the previous inspection report (50-266/99016(DRP); 50-301/99016(DRP)). (Section E8.1)

Report Details

Summary of Plant Status

Unit 1 was in a refueling outage until December 10, 1999, when its main turbine-generator was connected to the offsite electrical distribution grid. Unit 2 was at 100 percent power throughout the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Conduct of Operations During Unit 1 Shutdown and Startup

a Inspection Scope (Inspection Procedure (IP) 71707 and IP 71711)

The inspectors observed significant portions of the Unit 1 refueling outage shutdown and startup. Most observations were performed in the control room. The inspector used the guidance contained in the IPs to determine whether the plant was operated in accordance with regulatory requirements and the licensee's procedures.

b. Observations and Findings

The conduct of operations in the control room continued to be very good. Procedures were observed to be in use for all major activities. Three-way communications were used effectively. Sufficient personnel were assigned to critical tasks, allowing operators to focus on important parameters without distractions. Control room roles and responsibilities were clearly communicated. Pre-job briefings for infrequently performed tasks and evolutions covered pertinent material, including industry operating experience. The inspectors observed increased management and Operational Assessment (OA, quality assurance) organization presence in the control room during major evolutions.

Control operators (COs, or reactor operators) were attentive to controls and instrumentation. For instance, while draining the Unit 1 reactor coolant system on October 29, 1999, an improperly calibrated level instrument caused a loss of accurate level indication. The CO noted that the level had stopped trending down without a change in the letdown system line-up. The inspectors' review of plant data determined that the CO observed the indication problem within a very short period of time of its occurring. The inspectors also independently verified that the CO had taken appropriate action to put the plant in a safe condition and to exit the procedure in use until corrective action could be taken. The CO promptly aborted the draining of the system and re-established accurate level indication.

The inspectors observed that licensee corrective actions to address some previous operational problems had been effective. For instance, performing the low power operability test for the turbine-driven auxiliary feedwater (AFW) pump had caused appreciable and unanticipated changes to primary power during previous start-ups. The inspectors observed the turbine-driven AFW pump test on December 9, 1999. The test was performed at a slightly higher reactor power than previous tests. This change, along with improved attentiveness by the COs, eliminated the previous problems. The inspectors verified that the turbine-driven AFW pump test was still performed within the time constraints specified in the Technical Specifications (T/Ss).

c. Conclusions

The conduct of operations associated with the Unit 1 refueling outage shutdown and startup was very good. Operators were attentive to control board indications, and improvements were observed in the testing of the turbine-driven AFW pump.

O1.2 Status and Configuration Control During the Unit 1 Refueling Outage

a. Inspection Scope (IP 71711 and IP 71707)

Status and configuration control problems had been a concern to the licensee and the NRC during previous inspection periods. During the Unit 1 refueling outage, the inspectors performed more extensive than normal system inspections, using the guidance contained in the IPs. The inspectors also monitored the licensee-identified status and configuration control problems documented in condition reports (CRs).

b. Observations and Findings

The inspectors did not identify any significant status or configuration control problems during extensive inspections of primary plant and safety-related systems. These inspections included systems inside and outside the primary containment. The only status control problem independently identified by the inspectors was in the control room. A control switch for a nonsafety-related power supply to a Unit 1 safety-related 480-volt electrical bus was left in "pull to lock" vice its normal position of "open" following a major modification. This condition had no effect on plant safety. The inspectors considered the absence of other inspector-identified problems to be good, given the large number and complexity of system modifications performed.

The licensee identified several cases where one or more barriers intended to prevent status or configuration control errors had not been effective. Each case was documented in a CR. The inspectors did not consider any of the identified conditions to represent significant safety or regulatory concerns. Neither the licensee nor the inspectors had completed a comprehensive evaluation of the applicable CRs at the end of the inspection period.

c. Conclusions

The inspectors did not identify any significant status or configuration control problems during extensive inspections during the Unit 1 refueling outage and subsequent startup. At the conclusion of the inspection period, neither the licensee nor the inspectors had completed a comprehensive review of licensee-identified problems.

O2 Operational Status of Facilities and Equipment

O2.1 Inadvertent Engineered Safety Features (ESFs) Actuation

a. Inspection Scope (IP 71707)

On November 8, 1999, an inadvertent Unit 1 ESF actuation occurred. The inspectors responded to the control room to monitor the licensee's recovery actions.

b. Observations and Findings

The ESF actuation was caused by a jumper installed in a control room panel. The actuation involved the Unit 1 "A" train of safety injection (SI) and containment isolation. There was no fuel in the Unit 1 vessel at the time of the event. The actuation caused an isolation of service water (SW) to the spent fuel pool coolers. The SW isolation was not identified until about 20 minutes after the actuation. Operators responded well to the loss of spent fuel pool cooling after it was recognized. The spent fuel pool temperature did not increase significantly during the period that cooling was lost.

The licensee reported that all equipment responded to the ESF actuation as expected. The inspectors concluded that all major pumps, valves, and logic systems actuated as intended.

The jumper that caused the inadvertent ESF actuation was installed per the work plan for Work Order (WO) 9608346. This WO installed and tested a new control switch for the "A" train SI pump, an activity affecting quality. The jumper locations specified in the work plan caused an unintended bypass of the SI block switch, resulting in the ESF actuation for low primary system pressure. Criterion V, "Instructions, Procedures, and Drawings," of 10 CFR Part 50, Appendix B, required that activities affecting quality be prescribed by instructions appropriate to the circumstances. The work plan for WO 9608346 was not appropriate to the circumstances in that the jumper location produced an inadvertent SI actuation, including loss of spent fuel pool cooling. This violation of 10 CFR Part 50, Appendix B, Criterion V, is being treated as a Non-Cited Violation (NCV) (NCV 50-266/99018-01(DRP)), consistent with Section VII.B.1.a of the NRC Enforcement Policy. This issue is documented in the licensee's corrective action program as CR 99-2780 and Licensee Event Report (LER) 50-266/1999-013-00. Section O8.1 addresses the LER.

c. Conclusions

An inadvertent ESF actuation occurred as the result of an inappropriate work instruction. No fuel was in the Unit 1 vessel at the time. Spent fuel pool cooling was lost as a result of the actuation, but the pool temperature did not increase significantly. One NCV was identified for the inappropriate work instruction.

O3 Operations Procedures and Documentation

O3.1 Incorrect T/S Interpretation

a. Inspection Scope (IP 71707)

The inspectors reviewed the licensee's interpretation and implementation of the facility T/Ss.

b. Observations and Findings

The licensee maintained a Duty & Call Superintendent (DCS) Handbook that provided interpretations of, and implementation guidance for, the facility T/Ss. One T/S, 15.3.7.A.1.i, required that all 480-volt safety-related buses be energized from their normal power supply for either unit to be critical. At a pre-job briefing for cross-connecting the Unit 1 480-volt safety-related buses (B-03 and B-04), the operating crew discussed the implementation of T/S Limiting Condition for Operation (LCO) 15.3.7.B.1.e. This LCO allowed B-03 and B-04 to be cross-connected with one unit at power and the other defueled (Unit 1 was defueled at the time), provided that three specific criteria were met. One criterion was that:

> "The required redundant shared ESF for the other unit are operable."

The crew stated that if one of the shared ESF for the other unit (Unit 2) became inoperable, they would enter the applicable LCO for the affected equipment. The crew felt that LCO 15.3.7.B.1.e would continue to be satisfied in this condition based upon an interpretation contained in Section 3.1.29 of the DCS Handbook. The inspectors were concerned because the DCS Handbook interpretation was not consistent with the wording of the T/S. Specifically, if Bus B-03 was energized from other than its normal power supply with shared ESF for the other unit (for example, the AFW Pump P-38B or SW Pumps P-32D, E or F) not operable, then LCO 15.3.7.B.1.e would not be satisfied. Being outside the requirements of T/S 15.3.7.A.1.i without satisfying the appropriate LCO would require shutting down the operating unit in accordance with T/S 15.3.0.B. The potential significance of the incorrect DCS Handbook interpretation was that a unit shutdown could be delayed from the 7 hours specified in T/S 15.3.0.B to the 7 days specified as allowed outage time for a single inoperable SW pump.

The inspectors informed the operations manager of the concern that the on-shift crew would not appropriately apply the T/S if P-38B, P-32D, P-32E, or P-32F became inoperable. Weaknesses in the licensee's application of T/S 15.3.7 had been addressed in previous inspection reports (IRs). The operations manager told the inspectors that he understood the concern and would ensure that all crews correctly implemented the T/Ss should any of the opposite unit shared safeguards equipment become inoperable. The concern was documented in CR 99-2726. Criterion V, "Instructions, Procedures, and Drawings," of 10 CFR Part 50, Appendix B, required that activities affecting quality be prescribed by procedures appropriate to the circumstances. The DCS Handbook was a procedure affecting quality in that it provided licensed operators with guidance on allowed configurations for safety-related electrical buses. The DCS Handbook was not appropriate to the circumstances because it provided direction that could delay the required shutdown of an operating unit. The inspectors were not aware of any instance in which the inappropriate guidance in the DCS Handbook delayed a required shutdown; therefore, this was a minor violation and was not subject to formal enforcement action.

c. Conclusions

The inspectors identified that licensed operators, following guidance in a licensee procedure, could potentially have incorrectly applied one aspect of the facility's T/S for electrical distribution systems. No examples of operation outside of T/Ss were identified.

O8 Miscellaneous Operations Issues

O8.1 (Closed) LER 50-266/1999-013-00: Inadvertent ESF Actuation During Post-Maintenance Testing. This issue is discussed in Section O2.1 above. The inspectors did not identify any problems with the LER or its corrective actions.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Unit 1 Refueling Outage Surveillance Tests

a. Inspection Scope (IP 61726)

On November 17, 22, and 23, 1999, the inspectors observed the performance of surveillance test activities specified in several major Operations Refueling Test (ORT) procedures, listed below.

- ORT 3A, "Safety Injection Actuation With Loss of Engineered Safeguards AC [Alternating Current] (Train A) Unit 1," Revision 32
- ORT 3B, "Safety Injection Actuation With Loss of Engineered Safeguards AC (Train B) Unit 1," Revision 30
- ORT 3C, "Auxiliary Feedwater System and AMSAC [Anticipated Transient Without a Scram Mitigation System Actuation Circuitry] Actuation Unit 1," Revision 2

b. Observations and Findings

The surveillance test activities reviewed by the inspectors involved complicated tests of several high risk significance, safety-related systems. These tests required the coordination of numerous personnel from several departments in several areas of the plant. Areas covered included the control room, the 480-volt switchgear/cable spreading room, the 4160-volt safeguards switchgear room, the AFW pump room, and the emergency diesel generator (EDG) rooms. The tests were led by a relief crew duty shift superintendent (the lead on-shift senior reactor operator). Post-test system restorations were performed/coordinated by the normal shift control room operators.

Overall, conduct of the tests was good. The test director maintained excellent control of the numerous test activities. Operational assessment personnel and Operations Department senior managers provided test activity oversight. Notwithstanding the overall good conduct of the tests, some problems were encountered. These included a delay in recognizing that a direct current (DC) inverter had not been returned to service as intended, improper restoration of an air system valve, an unrecognized chlorine pump restart delay timer, and technicians taking voltage and resistance readings from a Unit 1 relay cabinet instead of the appropriate Unit 2 cabinet. These problems were identified by the licensee, corrected, and entered into the plant's corrective action program. An inspector-identified concern with EDG tests is discussed in Section E1.1.

c. Conclusions

Overall conduct of three complicated Unit 1 refueling outage surveillance tests was good. The surveillance test activities involved several high risk significance, safety-related systems, and required the coordination of numerous personnel, located in several areas of the plant, and from several departments.

M1.2 Unit 1 Outage Modifications

a. Inspection Scope (IP 62707 and IP 60710)

The inspectors observed Unit 1 outage work activities associated with the documents listed below:

- Safety Evaluation (SE) 99-076 for Modification 98-117*A, to replace Westinghouse 4160 volts-AC 50DH350 air magnetic breakers with Westinghouse 50DH-VR350 vacuum breakers;

- Installation Work Plan (IWP) 98-117*A-16 and WO 9802242, Replace existing 50DH350 circuit breaker 1A52-56, 1X-04 LV [low voltage] Station Aux Transformer Incoming Line to 1A-04, with a new 50DH-VR350 vacuum breaker;

- IWP 98-117*A-15, Replace existing 50DH350 circuit breaker 1A52-55, Tie to Bus 1A-02 from 1A-04, with a new 50DH-VR350 vacuum breaker;

- IWP 97-014*D-2, WO 9904886, and SE 99-077, Transfer loads to D11, D16, and D-27 [125 volts-DC distribution panels];

- WO 9904908, Install SI "A" train cables/conduit between 1C-157/2C-157 for isolation of non-essential SW loads in support of modification MR 98-024*U;

- IWP 98-024*D-01, WO 9908443, and SE 99-082, Installation of flush line between P-38A ["A" train, motor-driven AFW pump] SW supply and SW return line;
- WO 9908444, Installation of flush line between 1P-29 [Unit 1 turbine-driven AFW pump] SW supply and the SW return header;
- Modification MR 97-073*A & B, Provide motor operators for 1SI-857A and 1SI-857B that can be operated from the C-01 bench board;
- Nuclear Power Business Unit Procedure (NP) 5.3.1, "Condition Reporting System," Revision 14;
- Routine Maintenance Procedure (RMP) 9006-2, "Component Cooling Water (CCW) Pump Mechanical Seal (John Crane) Overhaul," Revision 5;
- RMP 9005-2, "Safety Injection Pump Overhaul," Revision 4;
- WO 9903127, Replace the pump motor bearings for containment spray pump, P-14B; and
- WO 9908173, Replace inboard and outboard seals with new seal material on CCW pump, P-11A.

b. Observations and Findings

Electrical Maintenance Activities

Modification work activities were conducted in accordance with WOs and work plans and within the limitations of associated SEs. The contractors and plant maintenance personnel who performed the work were experienced and knowledgeable of procedural requirements. Station work group first-line supervisors, lead electricians, and system and design engineers provided good oversight of work activities. Senior managers from the Station Construction and Maintenance Departments and an experienced electrical maintenance OA individual were also observed providing oversight at most of the job sites.

Alignment of Containment Spray Pump 1P-14B after Motor Bearing Replacement

The inspectors observed the motor reinstallation and motor and pump alignment for containment spray pump 1P-14B after motor bearing replacement. Pre-alignment checklist, PBF [Point Beach Form]-9116, was required to be completed by Step 30 of the WO work plan. After completion of the pump/motor alignment, Step 32 of the WO work plan required torquing of the pump/motor coupling bolts. When mechanics attempted to torque these bolts, the bolts were found to be too tight already. Work was stopped and the problem was referred to Maintenance Department management for resolution.

To resolve the issue, the electrical maintenance group changed Step 32 of the WO work plan to delete the requirement to torque the coupling bolts. The inspectors were told that this change was based on the vendor manual, which did not require that the coupling bolts be torqued. The inspectors noted that no CR was written to enter this item in the corrective action system and no action was taken to determine acceptability of the over-torqued coupling bolts. Of most concern to the inspectors was the application of torque requirements to safety-related components. The licensee maintained a controlled listing of prescribed torque values for fasteners used in safety-related applications, but did not specifically reference this list when specifying that the coupling bolts be torqued. The inspectors were informed that licensee management expected the specified torque values to be used when work instructions required that bolts be torqued, but that some Maintenance Department personnel did not consider this to be a requirement. The licensee took action to correct this inconsistency after discussion with the inspectors.

Replacement of Inboard and Outboard Seals on CCW Pump 1P-11A

The inspectors observed the replacement of the seals and bearings on CCW Pump 1P-11A. In verifying measurements of the outboard pump bearing, the mechanics appropriately noted that the bearing tolerances were outside the procedure acceptance criteria. The system engineer reviewed the tolerances and justified the use of the bearing based on the bearing manufacturer's data. This was documented in Step 7.2.34 of the procedure, which stated, "Dimensions as found are satisfactory. Revision to procedure is necessary." Although the continued use of the bearing was appropriate, the change to the acceptance criteria in RMP 9006-2 should have been made via a temporary procedure change instead of by an annotation to Step 7.2.34.

Replacement of the Rotating Assembly on SI Pump 1P-15B

Following reassembly and testing of SI Pump 1P-15B, the inspectors observed that much of RMP 9005-02 had been marked as not applicable (N/A) or had been deleted by a temporary change dated November 1, 1999. The basis for the N/As and temporary change was that a new rotating assembly had been procured, so many specified measurements were no longer necessary. The inspectors had no concern with changing RMP 9005-02 to delete the requirement to obtain measurements provided by the vender. However, after the inspectors questioned whether all the deleted data had been obtained, the licensee identified that some of the measurements removed from the procedure had not been provided by the vender. This invalidated the basis for the temporary change to RMP 9005-02.

Criterion V of 10 CFR Part 50, Appendix B, requires that activities affecting quality be prescribed by procedures appropriate to the circumstances. The three work documents discussed above addressed activities affecting quality. Specifically, each maintenance activity included the performance of work, which if not performed properly could result in the in-service failure of a safety-related pump. In each of the cases described above, some work was not performed as prescribed in the approved instructions. Each such instance was an example of a violation of 10 CFR Part 50, Appendix B, Criterion V. The licensee and the inspectors both concluded that the safety significance of the specific problems described above were minimal; therefore, this was a minor violation and was not subject to formal enforcement action. This issue is documented in the licensee's corrective action program as CR 99-3174.

c. Conclusions

Unit 1 outage modification work activities observed by the inspectors were generally conducted well. Department managers and OA personnel were in the field observing work. Three minor examples of failure to properly implement maintenance procedures for safety-related pumps, identified by the inspectors, were the only exceptions to the otherwise good performance.

M1.3 Inoperable Steam Safety Valves Identified during Surveillance Testing

a. Inspection Scope (IP 92902)

Two steam generator safety valves failed to lift at the specified acceptance criteria when tested during the Unit 1 refueling outage. The inspectors reviewed the licensee's evaluation of, and response to, this condition.

b. Observations and Findings

The licensee issued LER 50-266/1999-011-00 to document the test results for two steam safety valves. The inspectors reviewed the LER, and concluded that it accurately and completely described the condition and its probable cause. The inspectors also verified that the licensee initiated the additional testing required as a result of these test failures.

The licensee concluded that the two valves had been inoperable for more than one entire operating cycle. The T/S 15.3.4.A.1 requirement for steam safety valves specified that eight valves be operable prior to taking a unit critical. As documented in LER 50-266/1999-011-00, the licensee took Unit 1 critical on June 27, 1998, with two inoperable safety valves. The licensee had prior opportunity to identify this condition, which was caused by an inappropriate test methodology used during previous refueling outages. While the prior opportunities had been missed, the licensee's actions, given the facts known at the time, were reasonable. The licensee concluded that the error in valve setpoints did not have an appreciable impact on accident analysis results. The inspectors did not identify any problems with the licensee's evaluation. The violation of T/S 15.3.4.A.1 for taking Unit 1 critical with two inoperable steam safety valves is being treated as a Non-Cited Violation (NCV 50-266/99018-02(DRP)), consistent with Section V11.B.1.a of the NRC Enforcement Policy. This issue is documented in the licensee's corrective action program as LER 50-266/1999-011-00. Section M8.1 addresses the LER.

c. <u>Conclusions</u>

Licensee surveillance testing revealed that two main steam safety valves were set to lift at pressures in excess of those assumed in the accident analysis. This condition had existed for more than one operating cycle, but was not safety significant. One NCV was identified.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 <u>Broken Fuel Assembly Top Nozzle Spring Clamp Hold-down Screws (IP 60710)</u>

The licensee removed all fuel from the Unit 1 core during this outage. A particular batch of the removed fuel was inspected to determine whether the screws holding down the top nozzle spring clamps were broken. This inspection was performed at the recommendation of the fuel supplier and identified broken screws on several of the inspected fuel assemblies. The fuel vender had concluded that the broken screws did not represent a hazard to the safe operation of any of the potentially affected reactors. The licensee used the information provided by the fuel vender in a written operability determination (OD) for Unit 2. The inspectors verified that the vender had informed the NRC of the generic issue associated with the broken screws. The NRC did not identify any problems with the licensee's OD or the vender's approach to the generic problem. The licensee replaced the top nozzle assemblies on all of the potentially affected fuel assemblies prior to reloading the core.

M2.2 <u>Licensee-Identified Material Condition Issues</u>

Licensee staff identified several material condition problems late in the outage. Licensee management typically exhibited a conservative operational philosophy in having damaged equipment replaced rather than deferring work to after start-up or until future outages. An example of one such issue involved the nonsafety-related airlines to the main steam isolation valves. A system engineering supervisor performing system walkdowns observed damage to several of these airlines. The damage included both wall-reducing nicks and bent tubing where personnel had stepped on the airlines. The engineering supervisor initiated a CR for the observed conditions, and the licensee took immediate action to replace the damaged tubing and to install protective covers to preclude future damage. The inspectors considered the licensee response to most material condition issues that were identified during the outage to be good.

One exception occurred just prior to restart of Unit 1. The licensee identified some leakage from the body-to-bonnet joint of check valve SI-853C, on one of the two core deluge lines that penetrate the reactor vessel. This constituted non-isolatable reactor coolant system leakage. The licensee lowered primary system pressure and attempted to perform the valve-vendor recommended seal weld repair of the leak. However, the repair was not successful because of the effect of the active leak on the weld process. Following the failed repair attempt, the licensee proceeded with the Unit 1 restart. While the restart with this minor primary system leakage was allowed by the T/S, a more conservative course of action would have been to completely depressurize the primary system and then attempt the seal weld repair.

M2.3 Inspector-Identified Material Condition Issues

a. Inspection Scope (IP 71707, IP 62707, IP 71750)

The inspectors made frequent tours of the containment, primary auxiliary building (PAB), and other vital areas during the Unit 1 refueling outage. Material condition and housekeeping conditions were evaluated in accordance with the applicable inspection procedures.

b. Observations and Findings

Material condition and housekeeping ranged from fair to good. The inspectors did identify several exceptions to this general standard. Examples are described below.

- Metal insulation covers on the "B" reactor coolant pump (RCP) were damaged so that fibrous material was exposed. Fibrous material is a recognized potential challenge to long-term post-accident core cooling because of clogging of the containment recirculation sump suction strainers. The licensee repaired the damaged insulation covers.

- Fibrous material had been used to block air movement through electrical cable penetrations in the "A" RCP missile shield. The system engineer reviewing this inspector observation identified that fibrous material was also present in the cable trays between the RCP and the missile shield. The licensee evaluated this material, concluded that it did not pose a threat to the sump suction strainer, and left it in containment.

- Component cooling water was overflowing a container in the PAB. The container was collecting leakage from CCW system boundary valves isolating the "A" CCW pump. The "A" CCW pump had been removed for overhaul. The CCW system contains chromates, a known carcinogen. The PAB auxiliary operator responded to the inspector's observation, and cleaned up the spilled CCW. The operator also checked the status of the CCW boundary valves to ensure that none had been bumped open by workers in the area.

The inspectors considered the licensee response to inspector-identified material condition issues to be good. However, the inspectors considered the licensee's decision to leave fibrous material in the electrical penetrations and cable trays to be less conservative than the best current industry practice of removing all such material from containment.

c. Conclusions

Plant material condition during the Unit 1 outage was generally good. Several inspector-identified material condition issues were addressed by the licensee.

M8 Miscellaneous Maintenance Issues

M8.1 (Closed) LER 50-266/1999-011-00: Main Steam Safety Valve Lift Set Point Exceeds Acceptance Criteria. This issue is discussed in Section M1.3 above.

III. Engineering

E1 Conduct of Engineering

E1.1 Testing of EDGs

a. Inspection Scope (IP 61726)

While observing refueling outage surveillance testing, the inspectors noted an apparent discrepancy between testing of the EDGs and the contents of the Final Safety Analysis Report (FSAR). The inspectors reviewed the following documents:

- FSAR Section 8.8, "Diesel Generator (DG) System,"
- Technical Specification 15.4.6.A.2, "Emergency Power System Periodic Tests,"
- IR 50-266/96018(DRS), 50-301/96018(DRS) - Section M3.1.1
- IR 50-266/97010(DRS), 50-301/97010(DRS) - Section E3.2
- IR 50-266/98009(DRP), 50-301/98009(DRP) - Section M8.5
- Point Beach Test Procedure (PBTP) 77, "Transient Response of G-02 Replacement Governor," Revision 0
- PBTP 65(66), "G-01/G-02(G-03/G-04) Functional Test with Unit 2 Accident Loads and Unit 1 Shutdown Loads," Revision 0
- Wisconsin Electric Letter (NPL 97-0629) to NRC, October 10, 1997

b. Observations and Findings

Background

Point Beach has an unusual electrical line-up in that the EDGs can be shared between units. Additionally, the SW system pumps, motor-driven AFW pumps, and DC buses (and battery chargers) are shared between units. As a result, there is cross-unit impact when common safety-related equipment is fed from one unit or the other unit's buses. For example, the "A" AFW pump is fed from a Unit 1 bus, and the "B" AFW pump from a Unit 2 bus, but both pumps are required to be operable for either unit to be at power.

The T/Ss require that an emergency power supply EDG be lined up to each 4160-volt bus (T/S 15.3.7.A.1.i). The licensing basis of the plant, including FSAR Section 8.8, make clear that a single diesel can carry all accident loads on one unit and the safe shutdown loads on the second unit. This is consistent with the plant's original construction of only two diesels (one "A" train and one "B" train) for the two units. Two new diesels were added in the mid-1990's, resulting in the present normal alignment of one dedicated diesel for each 4160-volt bus for each unit (four diesels, four buses). However, T/Ss allow unlimited two unit operation with only two operable diesels (two diesels, four buses). The T/Ss also allow 7 days of operation with only one operable EDG. While the licensee had done a progressively better job at limiting EDG outage time, there was one occasion in the last 2 years when an "A" train EDG was out-of-service for about 12 weeks.

T/S Surveillance Test Requirement

The "Objective" of T/S 15.4.6, "Emergency Power System Periodic Test," is to "verify that the emergency power system will respond promptly and properly when required." The requirement of T/S 15.4.6.A.2 states:

> Automatic start of each diesel generator, load shedding, and restoration of operation of particular vital equipment, initiated by an actual interruption of normal AC station service power supplies to associated engineered safety systems busses together with a simulated safety injection signal. In addition, after the diesel generator has carried its load for a minimum of 5 minutes, automatic load shedding and restoration of vital loads are tested again by manually tripping the diesel generator output breaker. This test will be conducted during reactor shutdown for major fuel reloading of each reactor to assure that the diesel generator will start and assume required load in accordance with the timing sequence listed in FSAR Section 8.2[1] after the initial starting signal.

Section 8.8 of the FSAR describes the EDGs. Section 8.8.3 describes automatic EDG starts and loading, including under loss of offsite power/loss-of-coolant accident (LOOP/LOCA) conditions. One part of Section 8.8.3.6 includes the time lapse for component starting on the LOCA sequencer for Unit 1's "A" train. This table includes both Unit 1 and Unit 2 powered loads.

Surveillance Test as Performed

The refueling outage frequency surveillance tests (ORT 3A and ORT 3B) that are performed to satisfy T/S 15.4.6.A.2 do not include the opposite unit loads that a single EDG lined up to both units would carry in an actual accident. Some of these loads (a SW pump) would be required to support the accident unit, and others (such as, a CCW pump and a charging pump) would be required to support the safe shutdown of the non-accident unit following the LOOP. The inspectors questioned the licensee on the basis for the difference between the test configuration and the potential actual accident loading. Licensee staff indicated that the T/S surveillance test requirement was satisfied as it was performed, but acknowledged that the FSAR description of the test configuration was not clear. The licensee initiated CR 99-3036 to track a revision of the

[1]This FSAR reference is no longer correct. The 1998 FSAR revision led to several examples of T/S references to old Section numbers. This problem is documented in the licensee's corrective action program. The correct current FSAR Section reference is 8.8.

FSAR to more clearly reflect the actual tests performed. The inspectors concurred that the ORT 3A and ORT 3B tests were performed in a practicable manner, and that safety-related buses on an operating unit should not be stripped during these surveillance tests.

In addition to the refueling outage frequency tests, the licensee regularly demonstrated the EDGs' ability to carry rated loads. However, these tests did not demonstrate the EDGs' response to the dynamic nature of accident loading. Specifically, during accident loading the EDGs must be able to respond to the transient loading of motor starting currents. The licensee had also performed one-time tests in 1997 that fully tested the EDGs with the loads of both units. These tests were performed using PBTP 65 and PBTP 66. Both units were shut down at the time, so performing the tests did not challenge the safety of an operating unit. All four EDGs successfully passed the special tests. The licensee had no plans to periodically re-perform these special tests.

Inspector-Identified Concerns

The inspectors compared the ORT 3A and ORT 3B test loads to the loads that a single operable EDG would automatically pick-up during an accident. The test loads were significantly less. Performance of PBTP 65 and PBTP 66 provided assurance that the difference between accident loads and test loads would not affect operability of safety-related equipment during an accident. This assurance was reduced when the licensee performed maintenance or modification work affecting either the EDGs or the loads. The licensee had not demonstrated to the inspectors that any specific ongoing program tracked the potential effects of such changes on the transient loading of the EDGs. For instance, the inspectors identified that the G-02 EDG governor had been replaced following performance of PBTP 65. The PBTPs were not re-performed. The licensee performed PBTP 77 as post-maintenance testing for the new governor. The inspectors reviewed PBTP 77 and concluded that it provided the greatest practicable transient loading for EDG LOOP/LOCA loading with only one unit shut down. The test loads were still lower than the two-unit loads. The licensee had also made changes that affected the EDG transient loading since performance of the PBTPs. For instance, a new CCW pump motor had been installed on Unit 1. The new motor had the same nominal current rating as the old motor, but had a higher starting (locked rotor) current. This pump motor would be part of the opposite unit load not captured in the ORT 3A and ORT 3B testing. As of the end of the inspection period, the licensee had not provided the inspectors with evidence that a technical evaluation of the above changes had been made with respect to transient loading on the EDGs.

The inspectors opened an Inspection Follow-up Item ((IFI) 50-266/99018-03(DRP); 50-301/99018-03(DRP)) to track resolution of two issues. The inspectors will continue to review the licensees design controls over changes to the EDGs and electrical distribution systems. This review will be used to evaluate how the licensee ensured that a single operable EDG would successfully handle two-unit loads associated with an accident in one unit and the safe shutdown of the other unit. The inspectors will also review the practical limitations of the Point Beach refueling outage surveillance tests with NRC headquarters staff to ensure that the magnitude of the difference between test loads and two-unit accident loads are understood and are consistent with the licensing basis of the plant.

c. Conclusions

The inspectors identified that the refueling outage frequency surveillance tests for EDGs were performed with significantly smaller loads than would be experienced under some accident conditions. The EDG response to transient loadings was therefore not being fully tested. Additionally, the licensee had not demonstrated that design controls were in place to compensate for the practical limitations in refueling outage surveillance testing. The inspectors did not identify any current operablility concerns. An IFI was opened to track continued review of this issue.

E4 Engineering Staff Knowledge and Performance

E4.1 Engineering Evaluation of SI Pump (1P-15B) Low Flow

a. Inspection Scope (IP 62707)

The inspectors reviewed the licensee's handling of unsatisfactory pump test flow results obtained during a surveillance test conducted in accordance with Inservice Test 01A, "High Head SI Pumps and Valves (Quarterly), Unit 1," Revision 41. The test was performed, in part, for post-maintenance verification of work performed during the outage. The pump rotating assembly was replaced during this maintenance activity.

b. Observations and Findings

The licensee identified that 1P-15B did not meet the differential pressure requirement specified in the FSAR for 800 gallons per minute flow[2]. The pressure requirements for all other flows were satisfied. Measured differential pressure was approximately 1050 pounds per square inch with flow at 800 gallons per minute. The FSAR requirement was 1065 pounds per square inch. The 800 gallons per minute flow requirement in the FSAR was associated with a main steamline break accident scenario. The licensee documented the condition in CR 99-2899.

The licensee engineering staff initially asserted that the unsatisfactory pump flow test results were the result of known errors in the SI pump test line flow orifice. The inspectors were concerned that the involved engineers considered the flow orifice accurate enough to demonstrate pump operability when the test results were satisfactory, but not accurate enough to demonstrate pump inoperability when the results were not satisfactory. The licensee subsequently concluded that the flow orifice was more accurate than required to satisfy the instrument uncertainty calculations for the accident analysis. The basis for the licensee's position appeared adequate, but the inspectors had not completed an independent review of the orifice accuracy issue at the conclusion of the inspection period.

[2]While the requirement was identified in terms of a required pressure at a given flow, the actual issue was that the required flow would not be developed at a given pressure.

The licensee completed an OD based on the flow and pressure observed during the performance of Inservice Test 01A. The OD concluded 1P-15B was operable but non-conforming. This determination was based on a comparison of the amount of conservatism in the accident analysis (margin) to the amount of non-conformance in the as-measured pump performance. The inspectors reviewed the OD for CR 99-2899, and did not identify any problems with the conclusion.

c. Conclusions

Post-maintenance testing of 1P-15B identified non-conforming pressure at one particular pump flow rate. The inspectors determined that the initial response by system engineering personnel was not appropriate in that it incorrectly attributed the unacceptable test data to instrument inaccuracy. An appropriate OD was subsequently developed.

E8 Miscellaneous Engineering Issues

E8.1 (Closed) Apparent Violation 50-266/99016-03(DRP); 50-301/99016-03(DRP): Work order lacked acceptance criteria. Work Order 9911726, dated August 25, 1999, for the chlorine dioxide treatment of SW for zebra mussels lacked acceptance criteria.

On December 2, 1999, Region III and Headquarters staff met to decide if this apparent violation warranted escalated enforcement action. The staff concluded that it did not because of the lack of actual safety consequences and, consequently, the apparent violation of 10 CFR Part 50, Criterion V, "Instructions, Procedures, and Drawings," for the lack of acceptance criteria in the WO, is recategorized as a Non-Cited Violation (NCV 50-266/99018-04(DRP); 50-301/99018-04(DRP)), consistent with Section VII.B.1.a of the NRC Enforcement Policy. Details of this issue are discussed in IR 50-266/99016-03 (DRP); 50-301/99016-03(DRP). The issue itself was entered into the licensee's corrective action program as CR 99-2177.

In addition, for the issue of the failure of the licensee to conduct a planned chlorine dioxide treatment of the SW system in 1998, the staff concluded that a violation of 10 CFR Part 50, Criterion XVI, "Corrective Action," occurred. Specifically, significant conditions adverse to quality occurred in 1997 when an EDG was rendered inoperable due to zebra mussel plugging, and in 1998 when a containment fan cooler was rendered inoperable due to zebra mussel plugging. Corrective actions taken in response to these conditions did not prevent reoccurrence in 1999 when zebra mussel shells rendered the EDG inoperable and severely degraded the operability of several containment fan coolers. The violation of Criterion XI is being treated as a Non-Cited Violation (NCV 50-266/99018-05(DRP); 50-301/99018-05(DRP)), consistent with Section VII.B.1.a of the NRC Enforcement Policy. This issue was entered into the licensee's corrective action program as CR 99-2177.

IV. Plant Support

There were no significant inspection observations and findings during this inspection period.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management on December 13, 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

Wisconsin Electric Power Company

A. J. Cayia, Regulatory Services and Licensing Manager
R. P. Farrell, Radiation Protection Manger
V. M. Kaminiskas, Maintenance Manager
R. G. Mende, Plant Manager
B. J. O'Grady, Operations Manger
C. R. Peterson, Director of Engineering
M. E. Reddemann, Site Vice President
J. G. Schweitzer, System Engineering Manager

NRC

G. P. Hatchett, Acting Point Beach Project Manager, NRR
B. A. Wetzel, Point Beach Project Manager, NRR

INSPECTION PROCEDURES USED

IP 60710	Refueling Activities
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71711:	Plant Startup from Refueling
IP 71750:	Plant Support Activities
IP 92902:	Followup - Maintenance

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-266/99018-01(DRP) 50-301/99018-01(DRP)	NCV	Work order resulted in unintended switch bypass
50-266/99018-02(DRP)	NCV	Violation of T/S requirement for steam safety valves criteria
50-266/99018-03(DRP) 50-301/99018-03(DRP)	IFI	Design controls over changes to the EDGs and electrical distribution systems
50-266/99018-04(DRP) 50-301/99018-04(DRP)	NCV	Chlorine dioxide treatment of SW for zebra mussels lacked acceptance criteria
50-266/99018-05(DRP) 50-301/99018-05(DRP)	NCV	Failure to take corrective action in 1998 for zebra mussels

Closed

50-266/99018-01(DRP) 50-301/99018-01(DRP)	NCV	Work order resulted in unintended switch bypass
50-266/1999-013-00	LER	Inadvertent ESF actuation during post maintenance testing
50-266/99018-02(DRP)	NCV	Violation of T/S requirement for steam safety valves criteria
50-266/1999-011-00	LER	Main steam safety valve lift set point exceeds acceptance criteria
50-266/99016-03(DRP) 50-301/99016-03(DRP)	AV	Work order lacked acceptance criteria
50-266/99018-04(DRP) 50-301/99018-04(DRP)	NCV	Chlorine dioxide treatment of SW for zebra mussels lacked acceptance criteria

50-266/99018-05(DRP) 50-301/99018-05(DRP)	NCV	Failure to take corrective action in 1998 for zebra mussels

Discussed

None

LIST OF ACRONYMS USED

AC	Alternating Current
AFW	Auxiliary Feedwater
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CO	Control Operator
CR	Condition Report
DC	Direct Current
DCS	Duty & Call Superintendent
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
ESF	Engineered Safety Feature
FSAR	Final Safety Analysis Report
IFI	Inspection Follow-up Item
IP	Inspection Procedure
IR	Inspection Report
IWP	Installation Work Plan
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LOOP/LOCA	Loss of offsite power/loss-of-coolant accident
N/A	Not Applicable
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
OA	Operational Assessment
OD	Operability Determination
ORT	Operations Refueling Test
PAB	Primary Auxiliary Building
PBTP	Point Beach Test Procedure
RCP	Reactor Coolant Pump
RMP	Routine Maintenance Procedure
SE	Safety Evaluation
SI	Safety Injection
SW	Service Water
T/S	Technical Specification
WO	Work Order