

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-305/90014(DRP)

Docket No. 50-305

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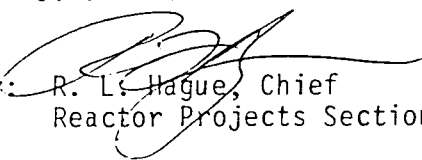
Licensee: Wisconsin Public Service Corporation
P. O. Box 19002
Green Bay, Wisconsin 54307-9002

Facility Name: Kewaunee Nuclear Power Plant

Inspection At: Kewaunee Site, Kewaunee, WI

Inspection Conducted: June 1 through July 21, 1990

Inspectors: P. I. Castleman
C. J. Phillips
J. Gadzala

Approved By:  R. L. Hague, Chief
Reactor Projects Section 3C

9/7/90
Date

Inspection Summary

Inspection from June 1 through July 21, 1990 (Report No. 50-305/90014(DRP))
Areas Inspected: Routine unannounced inspection by resident and region based inspectors of: operational safety; surveillance; maintenance; followup of written reports of nonroutine events; and temporary instruction followup.
Results: The licensee's performance in all areas inspected continues to be good. One violation pertaining to conduct of surveillance testing prior to resumption of plant operation at the conclusion of the 1990 refueling outage was noted during the course of the inspection.

DETAILS

1. Persons Contacted

- *M. L. Marchi, Plant Manager
- *D. J. Ropson, Assistant Manager, Plant Maintenance
- *C. A. Schrock, Assistant Manager, Plant Operations
- R. E. Draheim, Assistant Manager, Plant Services
- *J. J. Wallace, Superintendent, Plant Instrument and Control
- C. S. Smoker, Supervisor, Plant Quality Programs
- D. R. Berg, Superintendent, Plant Information Systems
- D. T. Braun, Superintendent, Plant Operations
- M. T. Reinhart, Superintendent, Plant Radiation Protection
- *D. S. Nalepka, Plant Licensing Supervisor
- G. J. Youngwirth, Plant Electrical Maintenance Supervisor
- F. D. Evitch, Plant Security Supervisor
- T. J. Webb, Plant Nuclear Engineer

The inspectors also talked with and interviewed members of the Operations, Maintenance, Health Physics, Instrument and Control, Quality Control, Chemistry, and Security groups.

*Denotes personnel attending exit interview.

2. Followup on Previous Inspection Findings (92701)

In response to a request from the Director, Division of Reactor Projects, NRC Region III, the inspector conducted a review of the licensee's activities related to the control of zebra mussels. The objective of this review was to assess the licensee's progress in the establishment of measures to counteract the anticipated incursion of the mussels into Great Lakes waters, particularly regarding key components and systems which would be subject to thermal and hydraulic performance degradation following zebra mussel infestation.

The licensee has established a program to monitor plant intake water from Lake Michigan for zebra mussels. This program is conducted under a contract with the University of Wisconsin at Milwaukee. Water samples are taken on a semi-monthly basis from the service water screenhouse, and the samples are analyzed for the presence of zebra mussel larvae. The sample point used ensures that the service water, fire protection, and circulating water systems are monitored for infestation. The licensee plans to enhance their monitoring program by the use of "bio-boxes" to collect samples of entrained sediment from the service water and circulating water systems. These boxes contain several baffled chambers in which sediment will deposit from the water stream being sampled. The sediments thus collected would be analyzed for the presence of zebra mussel larvae. The use of the bio-boxes will allow for more frequent assessment of zebra mussel infestation.

At the time of the inspectors' review, the licensee was evaluating the various options available to control the zebra mussel population should infestation occur. The licensee's efforts in this area have focused on the use of chemical additives. In anticipation of the potential to use such measures, the licensee had submitted an application to the Wisconsin State Department of Natural Resources for a chemical additive permit. The chemical options under consideration by the licensee included two biocides, and the possibility of continuous chlorination. Aspects of chemical control under consideration by the licensee included assessments of zebra mussel control effectiveness, costs associated with a chemical control program, and methods of biocide injection. The licensee's primary concern, however, related to minimizing environmental impact, and their efforts in this regard included assessment of how environmentally benign biocides may be, consideration of methods to detoxify water returned to Lake Michigan, and studies to optimize the combined use of biocides (aiming for greater overall effectiveness while using less biocide).

3. Operational Safety Verification (71707)

The inspectors observed control room operations, reviewed applicable logs and conducted discussions with control room operators throughout the inspection period. The inspectors verified the operability of selected safety-related systems, reviewed tagout records, and verified proper return to service of affected components. The inspectors observed a number of control room shift turnovers. The turnovers were conducted in a professional manner and included log reviews, panel walkdowns, discussions of maintenance and surveillance activities in progress or planned, and associated LCO time restraints, as applicable.

The inspectors conducted tours of the auxiliary and turbine buildings. During these tours, observations were made regarding plant equipment conditions, fire hazards, fire protection, adherence to procedures, radiological controls and conditions, housekeeping, tagging of equipment, ongoing maintenance and surveillance activities, containment integrity, and availability of safety-related equipment. The overall material condition of plant systems and equipment was noted to be good, as were the observed housekeeping and fire protection practices.

On June 2, 1990, at 1811 hours, the operations crew began a plant power backdown to 66% power. This backdown was necessitated by the loss of one of the power lines on the transmission grid during a severe thunder storm. The plant was returned to full power at 1918 hours the next day following restoration of the failed power line. The backdown and subsequent return to full power were conducted without incident. The plant operated at full power for the remainder of the inspection period.

On June 10, 1990, at 2055 hours, the control rods in control bank D automatically inserted in response to a valid rod speed and direction demand signal. The control room operators observed that the plant parameters which provide input signals to the rod drive control circuitry to be stable at 100% power, so they switched rod control mode from automatic to manual and pulled the rods to their fully withdrawn

position. The bank D rods had moved inward a total of three steps. Technicians from the Instrument and Controls (I&C) group performed troubleshooting on the affected circuitry, but were unable to detect any abnormalities. Recording instrumentation was connected to test points in the rod control circuitry, in order to obtain real time diagnostic data should the control rods unexpectedly insert again. The control room operators then returned the rods to automatic control mode. On June 23, at 2044 hours, the control bank D rods once again unexpectedly inserted. As with the previous occurrence, all significant parameters were stable at their normal values for 100% power operation. Again, the operators took manual control of the rods, stopping the insertion at three steps, and pulled the rods to the fully withdrawn position. The I&C technicians performed additional troubleshooting, and were again unable to identify any equipment failures or out of tolerance conditions which may have caused the unexpected rod motion. However, by reviewing the data traces from the temporarily installed monitoring equipment, they were able to eliminate the average temperature input as a possible cause of the rod movement. The temporary monitoring equipment was then connected to different sample points in the rod control circuitry and the operators returned control of the rods to the automatic mode. No further instances of unexpected rod motion occurred for the remainder of the inspection period.

All activities were conducted in a satisfactory manner and no violations or deviations were identified.

4. Monthly Surveillance Observation (61726)

The inspectors reviewed/observed the following Technical Specification required surveillance testing:

<u>Surveillance Procedure</u>	<u>Test</u>
48-004F	One Point Nuclear Power Range Channel Quarterly Calibration - Data Acquisition
47-010B	Reactor Coolant Temperature and Pressurizer Pressure Instrument Channel 2 (White) Test
05A-027	Steam Generator Level Instrument Channel Test
35-147A	Boric Acid Tank 1A Level Instrument Test, 1B Logic Test
39-227	Bus 1-5 and 1-6 Loss of Voltage Relay Test

The following items were considered during the inspection: the testing was performed in accordance with approved procedures; that test instrumentation was calibrated; that test results conformed with technical specifications and procedure requirements and were reviewed by personnel other than the individual directing the test, and; that any deficiencies identified during the testing were reviewed and resolved by appropriate management personnel.

Following observation of SP 05A-027, Steam Generator Level Instrument Channel Test, the inspectors reviewed the documentation for the last three performances of this test. During this review, it was noted that this test had not been performed within the required periodicity prior to

the plant startup following the 1990 refueling outage. Before the plant entered the refueling outage, SP 05A-027 had been performed on February 6, 1990. When this surveillance procedures's (SP) regularly scheduled monthly performance came due on March 5 and April 5, respectively, conduct of the test was delayed until after completion of the refueling outage. SP 05A-027 was successfully performed on April 20. The reactor had been shutdown for refueling on March 2, and was taken critical on April 15. It is significant also to note that the SP under which the steam generator level instruments are annually calibrated, SP 05A-028B, had been performed on February 16, 1990, prior to entering the refueling outage. This calibration satisfies the requirement to perform the monthly test per SP 05A-027. In summary, after the steam generator level instruments were satisfactorily calibrated on February 16, 1990, they were not tested until April 20, following the plant's return to power operation. The inspectors concluded that the licensee returned the plant to operation without having satisfactorily tested the steam generator level instrumentation. This conclusion was based on the following: the Kewaunee Nuclear Power Plant (KNPP) Technical Specifications (TS) states, in part, that a system or component is considered operable when it has been tested periodically in accordance with applicable surveillance testing requirements, and that it has met its performance criteria; TS Table 4.1-1 states that the steam generator level instruments shall be tested monthly, and; TS 3.5c and table 3.5-2 state that at least two Lo-Lo Steam Generator Water Level channels must be operable, otherwise, the plant shall be maintained in hot shutdown.

The inspectors questioned the licensee regarding the plant startup without having demonstrated the operability of the steam generator level instrumentation. The licensee responded that it had been the utility's practice, since the first Kewaunee refueling outage in 1975, to defer instrumentation surveillance testing until "as soon as practicable" after the plant was returned to power operation following a refueling outage. The licensee stated that a search of the archival surveillance procedure performance records would show that this practice had been used for fifteen years, and that surveillance tests on many pieces of instrumentation had been affected. The licensee maintained that the "as soon as practicable" criterion originated as a result of verbal guidance provided by an NRC inspector to plant management in the mid-1970's, although no documentation to substantiate this contention could be provided. This criterion was loosely implemented by the plant staff until the late 1980's, when "as soon as practicable" was defined as requiring that affected surveillance tests be performed within one week of resumption of plant operation. The one week criterion was derived from Section XI of the ASME Boiler and Pressure Vessel Code, which generally allows delay of periodic performance testing of nuclear power plant pumps and valves until one week following a major plant outage. The licensee stressed to the inspectors that, regarding the issue of surveillance testing following a major outage, there was never any intent on their part to hide this practice from the NRC. The licensee's position was that they believed this practice to be technically adequate, and that, since the NRC had never questioned the practice, it was satisfactory from the regulatory standpoint. Additionally, the licensee never perceived a need to discontinue this practice because no technical problems had ever arisen as a result of the practice.

The inspectors reviewed hundreds of instrumentation and controls surveillance procedures for the years 1988, 1989, and 1990. In all three years, many examples were found of failure to demonstrate reactor trip and engineered safety feature (ESF) actuation instrumentation operability by successful conduct of required surveillance testing or calibration prior to reactor startup following a refueling outage. This finding supported the licensee's statement that SP's had been routinely deferred until after the completion of a refueling outage. Based on the sample of I&C surveillance procedures reviewed, the inspectors determined that the following instrumentation had not been verified operable by surveillance test prior to the return to power operation following the 1990 refueling outage:

- Engineered Safety Feature Logic Trains A and B
- Reactor Protection Logic Trains A and B
- Containment Pressure Instrumentation
- Pressurizer Level Instrumentation
- Pressurizer Pressure Instrumentation
- Steam Generator Level Instrumentation
- Steam Generator Pressure Instrumentation
- Reactor Coolant System Flow Instrumentation

Collectively, the above instrumentation is required to be verified operable in order for the following reactor trip and ESF functional units to be considered operable:

a. Reactor Trips

- Nuclear Flux Power, Intermediate and Source Range
- Overtemperature delta T
- Overpower delta T
- Pressurizer Pressure High and Low
- Pressurizer Water Level High
- Reactor Coolant System Low Flow
- Lo-Lo Steam Generator Water Level
- 4-Kv Bus Undervoltage
- Steam Flow/Feedwater Flow Mismatch
- Reactor Trip Breakers

b. Engineered Safety Features

- Automatic Safety Injection initiation signals
- Automatic Containment Spray initiation signals

Making the reactor critical without having demonstrated the operability of these functional units by successful performance of surveillance testing within the required periodicity is a violation of KNPP TS 3.5c, which states that if less than the minimum required number of channels of each respective type of functional unit is operable, as delineated in TS Tables 3.5-2 through 3.5-4, then the reactor shall be maintained in the hot shutdown condition. (305/90014-01(DRP))

Of all the surveillance procedures reviewed, the inspectors found only one instrument channel setpoint which was discovered to be out of tolerance during the conduct of an SP performed after the plant was returned to power. While this setpoint, which was on one of the low steam pressure bistables, was nonconservatively out of tolerance, the minimum number of channels required for operability (two channels per loop) was maintained. Therefore, of the SP's sampled, there were no cases found where the reactor had been started up with reactor trip or ESF trains which were unable to perform their safety function if called on to actuate. The inspectors attributed this very low rate of out of tolerance measurements to the fact that the vast majority of instrument calibrations had been performed during the two months prior to commencement of the refueling outage. Thus, when the instrument surveillance tests had been conducted, the instruments under test had generally been recently calibrated and were therefore less likely to have experienced significant setpoint drift.

The inspectors reviewed a sample of maintenance work requests documenting repair work or design changes performed on reactor trip and ESF instrumentation from the 1989 and 1990 refueling outages to determine whether the instrumentation under repair or modification had been retested upon completion of the work. In all cases, the inspectors found that adequate retests had been performed prior to returning the instrumentation to service.

Additionally, the inspectors reviewed the 1979-1990 annual reports for the licensee's internal audits conducted under Wisconsin Public Service Corporation Quality Assurance Directive 12.1, "Surveillance Requirements Audit." None of the audit reports identified the delay of SP conduct until after the return to power operation as deficient, although the practice was acknowledged by auditors. Specifically, some of the audits reviewed stated that all I&C SP's had been performed in accordance with the TS required periodicities, except for those which had been deferred until after the completion of refueling outage, and that for those SP's deferred, the deferral was properly documented on a Surveillance Procedure Exception Report. This finding supports the licensee's contention that this long standing practice was accepted as technically adequate among the utility staff.

In response to the inspectors' findings and concerns regarding this issue, the licensee reassessed their policy of deferring performance of instrumentation surveillance testing at the completion of refueling outages. In the future, the licensee will ensure the applicable surveillance is current prior to entering the mode at which the equipment is required unless otherwise stated in the existing KNPP technical specifications. For those few instances where implementation prior to entering the mode is not reasonably achievable, the licensee will pursue the appropriate technical specification amendment. The inspectors determined that this licensee policy revision should effectively resolve the NRC concerns regarding the conduct of instrumentation surveillance testing.

No other violations or deviations were identified.

5. Monthly Maintenance Observation (62703)

Station maintenance activities of safety related systems and components listed below were observed/reviewed to ascertain if 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: the limiting conditions of operation were met 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; parts and materials used were properly certified; radiological controls were implemented; and fire prevention controls were implemented.

The following maintenance activities were observed/reviewed:

MWR 43678	Install test connection on B Battery Room Fan Coil Unit
MWR 47236	Install resistance temperature detector wells on Service Water piping for the Auxiliary Building Fan Coil Units
MWR 48293	Replace Mechanical Seal on Refueling Water Purification Pump
MWR 48581	Overhaul 1A Component Cooling Water Pump
DCR 2396	Rewire control cable for valve AFW-111C

All activities were conducted in a satisfactory manner and no violations or deviations were identified.

6. Followup of Written Reports of Nonroutine Events (92700)

The inspectors, through observations, discussions with licensee personnel, and review of records, reviewed the following event reports to determine that reportability requirements were satisfied, that corrective action was implemented, and that the response to the event was adequate and met regulatory requirements, license conditions, and commitments, as applicable.

(Closed) (LER 89-006) Failure to Implement a Technical Specification Surveillance Dealing with Containment Ventilation Due to Procedural Inadequacy

During the plant's 1989 refueling outage, the licensee determined that the containment fan coil unit emergency backdraft dampers had not been adequately tested since 1984. The KNPP TSs required that the dampers be tested once every operating cycle or every eighteen months, whichever occurred first. The licensee determined the root cause of the TS violation to be an inadequate SP. As corrective action, the licensee revised the SP in question (SP 55-167-9) to include requirements to test the backdraft dampers, and the dampers were tested and found to be operable. As an additional corrective action, the licensee committed to revise the associated TS requirement (TS 4.5.a.3) to more clearly state the surveillance test requirements for the backdraft dampers. This TS revision was approved

for inclusion in the KNPP TS on June 22, 1990. The inspector found that the licensee's corrective actions for this LER are complete and satisfactory. This LER is closed.

(Closed) (LER 90-007) A Technical Specification Required Surveillance Procedure was not Performed as Required Due to Inadequate Guidance Dealing with the Procedure

On April 18, 1990, the licensee discovered that the containment personnel airlock leak rate surveillance test had not been performed since the airlock had been opened for access on April 12. Per technical specification 4.4.b.4.c, the associated leak rate test would have needed to be performed no later than April 15. As immediate corrective action, the licensee performed the leak rate test, with satisfactory results. This event was attributed to weak administrative controls governing the performance of the test in question. Therefore, to prevent recurrence of this event, the licensee strengthened the administrative controls over the conduct of containment personnel airlock leak rate tests. The specific corrective actions, as well as all the circumstances surrounding this LER, are discussed in detail in inspection report 50-305/90007. In that report, the inspector wrote a non-cited violation (NCV 305/90007-01(DRP)) in response to this technical specification violation because the licensee had discovered the discrepant condition, and had initiated effective action to correct the condition and to prevent its recurrence. We have no further questions regarding this issue, and this LER is closed.

All activities were conducted in a satisfactory manner and no violations or deviations were identified.

7. TMI Action Plan Requirement Followup (2515/065)

The inspectors reviewed the TMI action items listed below in accordance with the requirements of Temporary Instruction 2515/065. The inspection effort included, as applicable, research of previous WPS and NRC commitments and licensing actions regarding the issues, verification of installation of design changes, and verification of the implementation of necessary documentation revisions.

TMI Action Item II.F.2.4 Install Additional Instrumentation for the Detection of Inadequate Core Cooling

The inspectors verified that the licensee has installed the necessary Inadequate Core Cooling Monitoring System (ICCMS), that the operation and maintenance of this system are governed by approved procedures, and that the plant operators are trained in the use of the ICCMS. The acceptability of the licensee's ICCMS design was approved by the NRC in a safety evaluation forwarded by the Office of Nuclear Reactor Regulation (NRR) on June 10, 1987. This TMI action item is closed.

TMI Action Item II.K.3.25.B Effect of Loss of AC Power on Reactor Coolant Pump Seals

This action item required the licensee to demonstrate that the integrity of the reactor coolant pump (RCP) seals would be maintained during a loss of offsite power (LOSP) event. The licensee's response to this item, dated December 17, 1981, showed that, within seconds of an LOSP, the emergency diesel generators would reenergize the component cooling water system, which would then provide cooling water to the RCP thermal barrier heat exchangers, thus protecting the integrity of the RCP seals. In a letter dated June 24, 1982, NRR found that the licensee's response to this TMI action item was acceptable. This item is closed.

All activities were conducted in a satisfactory manner and no violations or deviations were identified.

8. Exit Interview (30703)

The inspectors met with licensee representatives (denoted in Paragraph 1) throughout the period and on July 26, 1990, and summarized the scope and findings of the inspection activities.

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