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NOV 05 1990

Docket No. 50-305

Wisconsin Public Service Corporation
ATTN: Mr. K. H. Evers
Manager
Nuclear Power
700 North Adams
Post Office Box 19002
Green Bay, WI 54307-9002

Gentlemen:

This refers to the routine safety inspection conducted by Mr. P. I. Castleman and others of this office during the period from September 9 through October 20, 1990, of activities at Kewaunee Nuclear Power Plant authorized by NRC Operating License No. DPR-43 and to the discussion of our findings with Mr. M. L. Marchi at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

No violations of NRC requirements were identified during the course of this inspection.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC Public Document Room.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

R. C. Knop, Chief
Reactor Projects Branch 3

Enclosure: Inspection Report
No. 50-305/90017(DRP)

See Attached Distribution

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Social Services

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-305/90017(DRP)

Docket No. 50-305

License No. DPR-43

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

Facility Name: Kewaunee Nuclear Power Plant

Inspection At: Kewaunee Site, Kewaunee, Wisconsin

Inspection Conducted: September 9 through October 20, 1990

Inspectors: P. I. Castleman
M. J. Davis

Approved By: *J. McCormick-Barger*
J. McCormick-Barger, Chief
Reactor Projects Section 3C

11/5/90
Date

Inspection Summary

Inspection from September 9 through October 20, 1990 (Report
No. 50-305/90017(DRP))

Areas Inspected: Routine unannounced inspection by resident and headquarters based inspectors of: previous inspection findings; operational safety and ESF walkdown; surveillance; maintenance; and followup of written reports of nonroutine events.

Results: Licensee performance, overall, has been good.

Operations: No significant issues.

Maintenance/Surveillance: A reportable event occurred during this inspection period due to both emergency diesel generators being out of service for one hour and forty minutes. The 1B EDG was removed from service for surveillance testing at the same time that the 1A EDG was inoperable. The cause of the inoperability of the 1A EDG was improper installation of a retaining clip in a fuel injector assembly during the 1990 refueling outage. This event is particularly significant because the licensee failed to vigorously pursue an investigation into the cause of anomalous behavior of the 1A EDG when their initial assumption of the cause was disproven. Details contained in paragraph 4.

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Engineering and Technical Support: A design deficiency associated with equipment upgrades to the plant security system manifested itself during the inspection period. This deficiency was an inadequate evaluation of the electrical characteristics of new equipment, which resulted in an overcurrent trip of a supply breaker, and in a 20% reduction in line voltage to the loads in question under full current conditions. Details contained in paragraph 5.

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
- *D. J. Will, Assistant Superintendent, Nuclear Design Change

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

*Denotes personnel attending exit interview.

2. Followup on Previous Inspection Findings (92702)

(CLOSED) Violation (305/89012-02): Failure to Document Emergency Operating Procedures (EOP) Setpoint Calculations.

This severity level IV violation was issued as a result of the EOP inspection performed in 1989 at Kewaunee, during which it was found that the licensee's lack of setpoint calculations would make it impossible for an independent verification that the appropriate data base and calculational methodology had been used in the development of the setpoints. In their response to the Notice of Violation (NOV), the licensee committed to develop a detailed setpoint document which would present the data and calculations used to determine the setpoints included in the EOPs.

The setpoint document was published in September 1990. The inspectors determined that the calculations presented in the document appeared to be detailed and properly based. The licensee plans to maintain the setpoint document in a controlled manner, updating it as revisions are made to the EOPs. The document appeared to address the concerns expressed in the NOV. We have no further questions regarding this issue, and this violation is closed.

3. Operational Safety Verification (71707), (71710)

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 October 3, the licensee conducted their monthly containment inspection. During the inspection, it was noted that the insulation around check valve SI-304B, on the train B safety injection line to the reactor vessel, was wet. A followup containment entry was performed to remove the insulation and inspect the valve for leakage and potential boric acid induced bolt corrosion. This inspection showed that the wetted insulation was due to a body to bonnet leak at a rate of four drops per minute. No degradation of the valve bolts was noted. The resident inspector, who accompanied licensee personnel into the containment, noted the valve to be in good material condition. There appeared to be uniform leakage from around the circumference of the valve body to bonnet joint. The licensee installed a catch basin beneath the valve to contain the flow of water. A followup inspection was performed ten days later, with no increase in leak rate noted. The control room operators have noted no detectable increase in reactor coolant system leakage. The licensee intends to continue monitoring the leakage for any further degradation in the integrity of the body to bonnet joint.

During the inspection period, the inspectors walked down the accessible portions of the Auxiliary Feedwater (AFW) System. Items checked included: an operational valve lineup; proper housekeeping including control of flammable materials; normal pump seal and valve stem leakages; proper electrical breaker and switch lineup; the required instrumentation, including pressure monitors and valve position indicators, were operable, and; proper lineup of the service water and condensate storage support systems. Overall, the system, including both the motor driven and turbine driven pumps, appeared to be in a sound state of operational readiness and no problems were identified.

During routine tours of the facility, the inspectors observed the licensee's security activities including badging of personnel, access control, escorting of visitors, security staff attentiveness and operation of security equipment.

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>
SP 47-010A	Reactor Coolant Temperature and Pressurizer Pressure Instrument Channel Test - Channel 1
SP 35-038A	Boric Acid Tank 1A Level Instrument Calibration
SP 42-047	Diesel Generator Combined Monthly Test
SP 54-058	Turbine First Stage Pressure Instrument Channel Test
SP 24-107	Shield Building Vent Monthly Test
SP 42-109	Diesel Generator Manual 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.

At 1825 on Friday, September 14, 1990, while shutting down the 1A Emergency Diesel Generator (EDG) at the completion of SP 42-047, "Diesel Generator Combined Monthly Test," the control room operators observed the EDG resume full speed operation. To ensure shutdown of the EDG, the operators placed its control switch in the pullout position, and the unit successfully coasted to a complete stop. In evaluating this malfunction, on-shift personnel assumed that the EDG shutdown timing solenoid had failed, and that the operability of the EDG was not affected. Based on this assumption, the licensee elected to not pursue an investigation of the EDG shutdown anomaly over the weekend of September 15-16.

On Monday, September 17, at 0935, the licensee removed the 1A EDG from service to investigate the assumed solenoid failure, and to conduct a surveillance test on the carbon dioxide deluge system. Prior to removing the 1A EDG from service, the licensee performed an operability demonstration of the 1B EDG in accordance with their standard practice for doing so when taking the opposite train EDG out of service. This operability demonstration, conducted under SP 42-109, "Diesel Generator Manual Test," consisted of a local manual start of the EDG, with verification that the unit was able to reach a speed of 900-950 RPM, frequency of 60-63 Hz, and voltage of 4200 V, in less than 10 seconds. In accordance with the licensee's standard practice for EDG demonstration testing, this operability test did not include loading the EDG.

As a result of their investigation, licensee personnel determined that the 1A EDG timing solenoid was performing satisfactorily. The licensee then investigated the engine's governor, but no indications of malfunction were found. The licensee concluded that there must have been a problem with the engine itself, and they contacted the EDG vendor, who dispatched a technical representative.

When the troubleshooting and surveillance testing performed on the 1A EDG were completed, the licensee conducted a demonstration test of the 1A EDG per SP 42-109 prior to removing the 1B EDG from service for the completion of the surveillance testing on the carbon dioxide deluge system. The 1A EDG was started manually, and satisfactorily attained the required operating parameters of engine speed and generator frequency and voltage. Thus, the 1A EDG was declared operable, and the 1B EDG was removed from service for a total of one hour and forty minutes.

The EDG vendor technical representative arrived two days later, on September 19. During his inspection of the 1A EDG, he discovered that a retaining spring was not installed on a clevis pin connecting the engine fuel rack to one of the fuel injectors. The clevis pin had vibrated out of its proper position, thereby allowing the injector linkage to jam the fuel rack and limit its range of motion to no more than 50% open from the "not-fully-closed" position. The malfunction observed in the diesel's performance was, at that time, determined to be caused by the fuel rack not being able to close completely, which allowed continued injection of fuel to the engine during its coastdown to a complete stop. The inoperability of the EDG, however, resulted from the fuel rack's inability to open more than 50%, a condition which would have prevented the EDG from being able to attain its continuous full load rating of 2600 KW. Hence, when the 1B EDG was removed from service for one hour and forty minutes on September 17, both EDGs were inoperable for that time period, a condition which was outside the plant's design basis.

The most probable root cause of this event was determined to be the incorrect installation of the fuel injector linkage retaining clip while overhauling the 1A EDG during the plant's 1990 refueling outage.

This event could have been averted had the licensee removed the 1A EDG from service on Monday, September 17, to vigorously pursue their investigation once the initial assumption of the cause of the anomalous EDG behavior was proven incorrect.

As immediate corrective action, the licensee repaired the 1A EDG and returned it to service. Additionally, to address the generic concern that other fuel injectors might be similarly affected, all injector linkage retaining clips for both EDG's were verified to be properly installed. Long term corrective actions will include training of plant maintenance mechanics on the details of this event, and the licensee will re-evaluate their practice of not loading an EDG during demonstration testing. The licensee also plans to conduct operations personnel training regarding this event, focusing on conservatism in operability assessment.

This issue will be evaluated further upon the inspectors' review of the licensee event report documenting the circumstances surrounding the event.

All activities were conducted in a satisfactory manner and no 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:

- | | |
|-----------|---|
| DCR 2483 | Design Change Request (DCR) to Upgrade Auxiliary Building Special Ventilation Zone Fan Inlet and Outlet Damper Limit Switch Wires |
| PMP 8-1 | Preventive Maintenance on 1B Fire Pump |
| MWR 48333 | Replace 1A Charging Pump Power Supply Breaker |
| MWR 49175 | Changeout 1A2 Service Water Pump |
| MWR 49410 | Repair 1B Emergency Diesel Generator Vibration Monitoring Unit |
| MWR 49451 | Repair Security Multiplexer |

During the inspection period, the circuit breaker supplying a multiplexer in the plant security system tripped open, resulting in the loss of some security monitoring capabilities. The plant security force implemented appropriate compensatory measures for the lost capabilities. As a result of the licensee's investigation into the tripping open of the multiplexer supply breaker, it was determined that the total loads supplied by the breaker were significantly greater than the breaker's current interrupt rating. This condition resulted from the recent installation of several upgrades to the plant's security system. In particular, the design of the upgrades failed to account for the doubling of load due to the addition of heaters in newly installed outdoor equipment, so that, when the heaters energized on the first cold night following installation of the upgrades, the breaker in question tripped open due to an overcurrent condition. The licensee also determined that, under full load current, the line voltage to the multiplexer would be reduced by about 20%. This voltage reduction would adversely impact the operation of the equipment supplied by the multiplexer.

The root cause of the mismatch between the multiplexer loads and the rating of the supply breaker was the licensee's failure to adequately

evaluate the changes in electrical loading resulting from the modifications to the security system. Corrective actions by the licensee included development of a design change that would install a new supply breaker with double the interrupting capacity of the old breaker, and the installation of a constant output voltage transformer to correct the voltage degradation problem.

All other 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 90004 -- Temporary Change to a Procedure Causes the Generator Main Output Breaker to Open, Resulting in an ESF Actuation

On March 18, 1990, during a refueling shutdown, a generator trip and lockout signal was initiated, causing the main generator output breaker (G-1) to open. The 4160V non-safeguards buses, 1-3 and 1-4, and safeguards bus 1-6 were being backfed through breaker G-1, and were de-energized. The event occurred during performance of an instrumentation and controls procedure (ICP) that calibrated a pressure indicator with a sensing line common to a pressure switch in the turbine/generator motoring protection circuitry.

To provide grid electrical power to in-plant busses through G-1 during refueling outages, the licensee's normal practice was to lift several electrical leads in order to disable the generator's motoring protection circuitry. Prior to the 1990 refueling outage, however, the licensee's substation and transmission group requested a change to the practice of lifting the leads because of a concern with disabling generator protection circuitry. In response to this request, a temporary change to the preventive maintenance procedure (PMP) by which the leads were lifted was approved to leave the leads terminated during the outage. However, the pressure indicator calibration ICP was based on the assumption that the leads were lifted. When the instrumentation and controls group calibrated the pressure indicator, the pressure switch actuated, initiating a generator trip signal, which caused G-1 to open. The loss of voltage on safeguards bus 1-6 caused various ventilation dampers and two containment isolation valves to close, constituting a reportable ESF actuation. The root cause of the event was determined to be the failure to recognize the impact of the temporary change to the PMP on the pressure indicator ICP.

Corrective actions included completion of the calibration with the appropriate leads lifted, discussions with the groups involved, and

procedure changes to PMP 39-8, ICP 54.07 and ICP 54.30. The effect of the procedure changes was to group the three pressure sensing and indication components that share the common sensing line under the same calibration procedure, and to ensure lifting of leads when required to bypass protection circuitry. The inspectors found that the licensee's corrective actions for this LER are complete. This LER is closed.

(CLOSED) LER 90005 -- Eddy Current Results Cause Both Steam Generators (SGs) Being Categorized as C-3

On April 4, 1990, at the completion of eddy current testing during the 1990 refueling outage, 97 tubes in SG A and 75 tubes in SG B were declared defective. With the number of defective tubes exceeding one percent of the total number of tubes, both SGs were categorized as C-3, and the licensee made the notifications required by the plant technical specifications.

All defective tubes were plugged and, as a preventive measure, 59 other tubes exhibiting degradation were plugged. Sludge lancing was conducted during the outage to reduce the accumulated sludge inventory within the SGs. To minimize the rate of SG tube degradation, a secondary system boric acid addition program has been implemented to reduce the caustic environment in the tube crevice area. Additionally, portions of two defective tubes were removed for laboratory analysis. The results of this analysis will be forwarded for informational purposes to the NRC's Office of Nuclear Reactor Regulation. The inspectors had no further questions regarding this issue. This LER is closed.

(CLOSED) LER 90008 -- Quality Assurance Audit of the Siemens Energy and Automation Facility in Raleigh, NC Finds Inadequate 10 CFR 50 Appendix B Program

On May 2, 1990, the licensee received the results of an audit of the quality assurance program at the Siemens Energy and Automation Facility. The audit found that this facility had been accepting purchase orders for safety related equipment and services while it had failed to implement a quality assurance program meeting the requirements of Appendix B to 10 CFR 50. A similar audit conducted in March 1987, found that the Siemens facility had an effective quality assurance program for safety related equipment in place.

Licensee corrective actions included removal of the facility from its list of suppliers qualified to provide safety related equipment and services. Also, the licensee identified all equipment procured from the facility since March, 1987, and reviewed the dispositions of those items. All of the equipment procured from Siemens had either been installed in non-safety related applications or was still in the warehouse. The equipment in the warehouse was placed in a hold status, and was tagged with quality assurance non-conformance tags pending either commercial grade dedication or redesignation of the equipment for non-safety related application only. The licensee determined that the provisions of 10 CFR 21 did not apply to this event. However, since the results of the quality assurance audit could potentially affect other licensees, the

licensee elected to promulgate those results in the form of a licensee event report issued for information only. This LER is considered closed.

7. Exit Interview (30703)

The inspectors met with licensee representatives (denoted in Paragraph 1) throughout the period and on October 23, 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.