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SUBJECT: Responds to violations noted in insp rept 50-305/94-12 on 940815-19. Corrective actions: procedures will be developed or current procedures revised.

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October 18, 1994

10 CFR 50

U.S. Nuclear Regulatory Commission
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Washington, DC 20555

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reply to a Notice of Violation, Inspection Report 94-012

Reference: Letter from G. C. Wright (NRC) to C. A. Schrock (WPSC) dated September 15, 1994 (Inspection Report 94-012)

In the reference, the Nuclear Regulatory Commission (NRC) provided Wisconsin Public Service Corporation (WPSC) with the results of the fire protection inspection conducted August 15-19, 1994. During the inspection, the NRC identified one violation. Attachment 1 to this letter provides our response to the violation.

The reference also requested a response to several other NRC concerns. Attachment 2 to this letter provides our response to the issues associated with the fire brigade training concerns. Attachment 3 to this letter provides our assessment of the concern with door #199 and its ability to accomplish its design function.

The following new commitments have been made in response to the violation:

- 1) Procedures will be developed (or current procedures revised) to better: a) define the responsibilities and requirements for reporting deficiencies and fires to the Fire Protection Staff and b) ensure that conditions which are adverse to fire protection are identified and corrective actions taken as required.

The procedure(s) are scheduled for completion by December 31, 1994.

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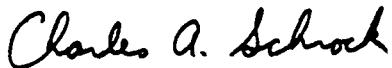
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- 2) To ensure that a high failure rate of emergency lights is readily identified in the future, the emergency lighting maintenance procedure will be revised to require that Appendix R emergency light failures be reported to the Fire Protection Staff. Actions will be taken to increase the reliability of the lights (e.g., more frequent electrolyte level checks, increased battery replacement, superior batteries, relocate battery packs, etc.).

The recommended actions to increase the reliability of the lights will be completed by July 1, 1995.

Sincerely,



Charles A. Schrock
Manager - Nuclear Engineering

DLR/jmf

Attach.

cc - US NRC Region III
US NRC Senior Resident Inspector

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ATTACHMENT 1

to

Letter From C.A. Schrock (WPSC)

to

Document Control Desk (NRC)

Dated: October 18, 1994

Re: Inspection Report 94-012

Notice of Violation

10 CFR Part 50, Appendix B, Criterion XVI requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected, and that in the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

- a. Contrary to the above, conditions adverse to quality had not been promptly identified and corrected. The licensee failed to identify and take prompt corrective action for the high failure rate of emergency lighting units, some of which were needed for the operation of safe shutdown equipment (305/94012-01a(DRS)).
- b. Contrary to the above, on August 18, 1994, an unannounced fire brigade drill was observed and the fire brigade was evaluated as not being able to effectively extinguish a fire. Corrective actions taken by the licensee in response to previous similar events, as documented in the Fire Protection Program Audit Reports 92-157 and 93-041, did not preclude the recurrence of this condition adverse to quality (305/94012-01b(DRS)).
- c. Contrary to the above, the licensee failed to identify a fire in a low level radioactive waste shipping container as a condition needing a prompt evaluation of root cause with effective corrective action taken to preclude repetition (305/94012-01c(DRS)).
- d. Contrary to the above, the licensee failed to identify effective corrective action for two missed fire watches when they were utilized as compensatory measures for impairments (305/94012-01d(DRS)).

This is a Severity Level IV Violation (Supplement I)

Wisconsin Public Service Corporation (WPSC) Response

The fire protection program at Kewaunee Nuclear Power Plant (KNPP) has undergone major improvements in the past few years. This was prompted by the results of several internal fire protection program audits between 1990 and 1992. These audits identified various areas of the fire protection program which needed improvement. As stated in the inspection report many changes have been implemented to address these problems.

While major improvements have already been realized, KNPP is committed to continuously improving the fire protection program. Prior to the inspection, Kewaunee's fire protection staff had identified a number of areas needing improvement and had begun taking action on

the highest priority items. Included in these action items were some of the weaknesses identified by the NRC.

To specifically address the violation identified by the NRC inspectors, procedures will be developed (or current procedures revised) to better define the responsibilities and requirements for reporting deficiencies and fires to the Fire Protection Staff. The procedures will ensure that conditions which are adverse to fire protection are identified and corrective actions taken as required. The procedure(s) are currently scheduled for completion by December 31, 1994.

With respect to the four items that were specifically identified by the inspectors as part of the violation, the following actions have been taken or are planned:

a. Emergency Lights

WPSC agrees that we failed to identify the increased failure rate of emergency lighting and that this is a condition adverse to quality. Prior to the NRC inspection, WPSC had established a policy to ensure that the failure of fire protection equipment was reported to the fire protection staff. This policy is being implemented by revising fire protection system (system number 08) maintenance procedures. Until all the procedures are revised, maintenance has been requested to and has been reporting system 08 failures. Since emergency lighting is not part of system 08, this procedure was missed. The Fire Protection staff is reviewing maintenance procedures to ensure any other system procedures encompassing fire protection equipment implement this policy and were not overlooked.

To address this specific item, past emergency lighting surveillances have been reviewed to determine the probable cause of the increased failure rate. As a result of this review, actions will be taken to increase the reliability of the lights (e.g., more frequent electrolyte level checks, increased battery replacement, superior batteries, relocate battery packs, etc.).

The recommended actions to increase the reliability of the lights will be completed by July 1, 1995.

To ensure high significant failure rates are readily identified in the future, the emergency lighting maintenance procedure, PMP 41-6, "Lighting System (LT) Big Beam Emergency Light Maintenance," will be revised to require that Appendix R emergency light failures be reported to the Fire Protection Staff. This will allow the Fire Protection Staff to monitor and trend the performance of the lights.

This procedure revision will be completed by December 31, 1994.

b. Fire Brigade Training

WPSC had identified weaknesses in drill performance prior to the NRC inspection and had taken significant corrective action. To address the NRC's concern we have enhanced the performance of our drills by assigning an additional individual to observe the drills. This individual will not be encumbered with controlling the drill and will be able to identify deficiencies that may otherwise be overlooked. Drill deficiencies and corrective actions are being tracked to prevent recurring problems. We expect these actions will increase the proficiency of our fire brigade and resolve the concerns raised in the inspection report.

c. Fire Reporting

In accordance with our existing program, Incident Report 94-109 was written on June 14, 1994 (shortly after the event) to document the smoldering plastic bag found in the radioactive waste shipping container. Based on the incident's low safety significance and isolated nature, a root cause evaluation was deemed unwarranted. The fire protection staff was cognizant of this event and plans to review the event with the individuals performing cutting and welding to prevent recurrence.

To enhance our existing program, the procedures for reporting fire protection deficiencies will define the responsibilities and requirements for reporting fires which occur at the Kewaunee Plant. The procedure(s) will define what constitutes a fire, and the definition will be based on the definition provided in NFPA 901, "Uniform Coding for Fire Protection". The procedure will require that the Fire Protection Staff investigate each fire occurrence, determine the root cause, and recommend corrective actions to prevent recurrence. The procedure will also direct the Fire Protection Staff to periodically analyze past fire reports and corrective actions to spot trends in fire occurrences and evaluate the effectiveness of corrective actions.

The procedure(s) will be completed by December 31, 1994.

d. Missed Fire Watches

In 1991 WPSC identified an adverse trend with missed fire watches. Fire watches are performed hourly when penetrations are opened for ongoing work (a frequent occurrence) or when fire protection features are degraded. In response to the trend, corrective actions were taken and the number of missed fire watches has trended downward from approximately 8 per year to 2 per year. However to ensure that missed fire watches are trended, the fire protection deficiency reporting procedure(s) will require that the Fire Protection Staff review each missed fire watch identified at Kewaunee.

The procedure(s) will be revised by December 31, 1994.

Broader actions are also being taken to improve the overall effectiveness of KNPP's corrective action programs. Currently various processes are going through an improvement effort to streamline the processes and make them more effective. Also various groups are discussing methods of consolidating their processes and databases. KNPP's goal is to sustain continuous process improvement, on an individual process basis and on an overall plant basis.

KNPP's self assessment practices have been the topic of frequent discussions between NRC and WPS in the past few years. Based on these discussions and our internal reviews, we have already made a number of changes to improve our self assessment practices, as noted above. This has also been a subject in the recently completed inspection interval of the Resident Inspectors.

A broad effort was initiated in June 1994 to review and improve the self-assessment process at KNPP. The chartering team for this effort has developed a charter which states:

Our aim in this improvement effort is to develop an effective self assessment program/methodology which will facilitate continuous performance improvement in the NPP [Nuclear Power Production] organization. The improvement effort will provide the analytical tools for tracking, trending, evaluation, and proposing process improvement recommendations.

The continuing concerns expressed by the resident inspectors, the fire protection concerns noted in this inspection report, and a number of other related issues will be considered by this self-assessment improvement team.

This effort is scheduled for completion within one year.

NRC Concern (as stated in Inspection Report letter)

"Also in your response [to the NOV], you should address to what extent the planned reorganization will affect the fire protection staff and resources."

Wpsc Response

The planned reorganization will not negatively impact the number of personnel and "ownership" currently afforded the fire protection program. A fundamental concept of the new engineering organization is to create "System Teams" which will be responsible for the engineering support provided to the plant staff for a number of related systems. The fire protection staff will be a part of this team. We expect that the team responsible for fire protection will be able to enhance the support currently provided by the fire protection staff.

ATTACHMENT 2

to

Letter From C.A. Schrock (WPSC)

to

Document Control Desk (NRC)

Dated: October 18, 1994

Re: Inspection Report 94-012

NRC Concern (as stated in Inspection Report letter)

"This inspection identified a number of concerns with the fire protection program; the most significant concern related to fire brigade training activities. Our observations indicate that training drills may not be effective and in fact, may be providing negative training; drills were not effectively controlled to ensure drill objectives were met; significant drill deficiencies were not identified; deficiencies identified receive limited distribution to other brigade members; and drill deficiencies and audit findings were not being evaluated for corrective actions to prevent recurrence. The corrective action issue is part of the apparent violation discussed below. In your response to the violation, please address the other issues associated with fire brigade training discussed above."

WPSC Response

As discussed in response to the violation, we have taken actions to enhance our drills by assigning an additional individual to assist with the performance of the drill. This practice will help ensure that drill deficiencies are more readily identified, evaluated, and corrected. In addition, we are confident that as we continue this practice the fire brigade performance will become more proficient, and the concerns raised during the inspection will be resolved.

Though we agree that our drill performance can be enhanced, we also believe that our fire brigade drills are effective and improving, and do not provide negative training. We are providing additional information regarding some of the items which were classified as "significant deficiencies not identified by the licensee" as stated in section 2.3 of the inspection report to explain why we believe this to be the case.

Deficiency "a." identified by the inspectors states: *"Throughout the scenario, communication between the brigade leader, brigade members, and the control room was inadequate due to dead zones throughout the plant and the inability of the individuals to communicate through Self Contained Breathing Apparatus (SCBA) face piece. This contributed to the brigade leader's inability to effectively coordinate the team to fight the fire and caused him to enter a smoke and carbon dioxide filled room to direct actions without the use of an SCBA, which would have resulted in his incapacitation. The radio system is scheduled for replacement during the 1995 outage; however, there has been no effort to establish an alternate method of communication."*

Kewaunee had previously recognized problems associated with radio communications in certain plant areas and had previously established an alternate method of communication. Specifically, "Emergency Operating Procedure - Fire", E-FP-08 specifies that Channel 5 of the Gaitronics be cleared for fire fighting communications during a fire event. The Fire Brigade has been trained to use the Gaitronics System when they encounter "dead zones" within the plant, and routinely do so during the performance of drills. It should be noted that we do not have any plans to replace the radio system. We are currently investigating

other options to improve the current system (e.g., replacing batteries more frequently, purchasing new radios, etc.).

Determining whether or not the levels of CO₂ and/or smoke in the Screenhouse Tunnel would have been significant enough to incapacitate the Fire Brigade Leader can only be speculated and is greatly influenced by the size and intensity of the fire, the effectiveness of the ventilation system, etc. However, assuming that the levels of CO₂ and smoke do become significant enough to classify the tunnel as a hazardous atmosphere, it is reasonable to conclude that the Fire Brigade Leader was prepared for the event and would have taken proper actions (e.g., recognize the hazard, back off, proceed to a safe area, and don his mask prior to entering), because:

- The hazardous atmosphere is readily recognizable due to the "winter green" odorizer provided in the CO₂ System, the smell of smoke, and by visual observation. The winter green is provided within the system for the sole purpose of alerting individuals to the presence of CO₂.
- The Fire Brigade Leader, through training, is familiar with potentially hazardous atmospheres as a result of a fire, the physical layout of the plant, and the fire barrier configurations in the fire area.
- The Fire Brigade Leader had his SCBA pack on his back and mask in hand when he opened the door to the Screenhouse Tunnel (just in case it was a hazardous atmosphere).
- The Fire Brigade Leader has demonstrated his ability to recognize and perform strenuous activities within hazardous atmospheres during annual live fire training.

During a proficiency drill it is difficult to simulate the "line" between hazardous and non-hazardous atmospheres. Ordinarily, for the purposes of a drill, the controller requires that fire brigade members don their SCBA prior to entering the area of the simulated fire (which in this case was the B Diesel Room). During a fire response, the Fire Brigade Leader dons his SCBA pack and keeps his mask in hand just in case he must enter a hazardous area. He normally stages in a safe area (e.g., nearest non-hazardous atmosphere) to avoid donning his mask, which enhances his ability to communicate with the control room and other brigade members.

The drill controller did not find fault with the Fire Brigade Leader at this point in the scenario because his actions did not indicate that he would enter a hazardous atmosphere without donning his SCBA. The door from the Screenhouse Tunnel to the B Diesel Room had been secured and the fire was extinguished. At this time both the Fire Brigade Leader and the drill controller reasonably concluded that the Screenhouse Tunnel was not a hazardous area (e.g., the Screenhouse Ventilation System had removed sufficient quantities

of smoke and CO2 that may have progressed into the tunnel while the door was blocked open).

Deficiency "b." identified by the inspectors states: *"The fire brigade did not demonstrate the understanding that the use of foam is the preferred method of fighting a lube oil fire. The foam cart was not brought to the scene during the initial response to the fire nor was it requested. In addition, the drill coordinator did not force the scenario in that direction."*

We recognize that the objective as written in the drill scenario was not met because foam was not utilized to fight the simulated fire, and agree that the coordinator did not "force" the drill in a direction which would require the use of foam. The fire drill scenario was set up to render the automatic CO2 system ineffective (not inoperable) by blocking open a Diesel Room door. When the brigade arrived on the scene and recognized that the CO2 system had automatically actuated, the controller informed him that the fire was still burning (e.g., "CO2 is not effective"). When checking for fire extension one of the brigade members noticed the Diesel Room door was blocked open. The brigade member then closed the door and reported the condition to the Fire Brigade Leader. Realizing that the door may have rendered the system ineffective, the Fire Brigade Leader directed another member to manually dump the CO2 system, effectively suppressing the fire.

During the drill in question the controller recognized the actions of the fire brigade to be realistic and effective, and allowed the drill to proceed in that direction. It is recognized however that a drill may need to be forced in a specific direction to reenforce identified deficiencies with a particular crew.

Deficiency "c." identified by the inspectors states: *"The reflash watch was stationed with only a discharged fire extinguisher and left alone in the diesel room with no means of communication."*

WPSC agrees that this was a poor practice and we plan to correct this deficiency through future critiques and training.

Deficiency "d." identified by the inspectors states: *"A few items of fire protection equipment were either not donned or not donned properly (i.e., boots, gloves, and helmets) which could have resulted in personnel injury."*

The root cause of the exposed thighs (e.g., inadequate turnout gear) had been self-identified and corrective actions had already been underway to correct this deficiency. Specifically, depending on the size of the individual brigade member, the boots used for the drill may not be tall enough to cover the thigh. Bunker pants were procured in June of this year. The brigade members were trained with the bunker pants during live fire training this past summer, and the pants have now been provided at the fire brigade staging area.

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October 18, 1994
Attachment 2, Page 4

Contributing factors to the exposed necks included not providing properly sized coats, and personal discomfort to some members while conducting the drill. We have since provided additional coats at the staging area to ensure a variety of sizes are available for the brigade members. In addition, we will use the drill critique sessions and quarterly training to instruct brigade members to close their collars when simulating fire fighting activities.

Though we did not identify specific problems regarding the donning of helmets and gloves during the drill in question, we will maintain an awareness for such deficiencies during future drills.

Deficiency "e." identified by the inspectors states: "*A search of the area for injured personnel was not conducted.*"

A search for injured personnel was not conducted as part of the drill because the scenario did not simulate (e.g., make it apparent) that individuals were trapped in the area of the fire. Search and rescue techniques are taught at live fire training, however, these techniques are not normally incorporated for each drill. The brigade would search for individuals when directed by the Shift Supervisor (following an accountability check), or if it is apparent (or there is evidence) that some workers may be trapped in the area of the fire.

ATTACHMENT 3

to

Letter From C.A. Schrock (WPSC)

to

Document Control Desk (NRC)

Dated: October 18, 1994

Re: Inspection Report 94-012

NRC Concern (as stated in Inspection Report letter)

"Separate from the fire protection issues, the inspectors identified a concern with the ability of door #199 to effectively function as a steam exclusion boundary because of a glass window in the door. In your response to the Notice, please provide your assessment, including thermal and dynamic effects, of door #199's ability to accomplish its design function."

WPSC Response

During the fire protection inspection, inspectors noticed and questioned the usage of doors which contain windows as steam exclusion boundaries. This issue was identified by plant personnel at KNPP during a Steam Exclusion SSFI (Safety System Functional Inspection) performed in July of 1992.

In July of 1992 when the concern was internally identified, calculation C10432 was performed. This calculation looked at the boundaries in the Steam Exclusion Zones and identified the doors which contained glass. It then identified the potential steam sources in the areas. The steam impingement curves contained in the USAR provide a plot of the maximum (peak of dynamic) steam jet centerline pressure versus distance from source. The calculation conservatively assumed perpendicular impingement and maximum pressure over the entire glass surface. With these assumptions a worst case door (door #140) was identified. It was determined that door #140 has the potential to see 2.4 psi from the postulated line break/crack.

Because of the conservative assumptions and modeling, and the margin included in the allowable stresses, the calculation found the potential existed that the glass in the worst case door may not provide the needed strength. The calculation also considered the remaining doors. The distance to steam sources for all other doors was farther than for door #140 such that, all other doors were determined to be within the allowable stresses. Due to the floor plan, door #199 has a concrete block wall between it and the potential steam source (a feedwater line). Therefore the steam pressure seen at door #199 would be that of the room environment without impingement forces.

When the determination was made that glass in door #140 may not provide the necessary strength, a steel plate was placed over the window on the steam side of the door. This provided additional assurance needed that the Steam Exclusion boundary would retain its integrity.

Thermal and dynamic effects have been questioned because they were not explicitly addressed in the calculation but were addressed using engineering judgement. Thermal effects were not calculated (for the worst case door) because the assumed steam jet was 13 feet away from the glass and the glass was assumed to heat uniformly. This creates through-

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Attachment 3, Page 2

plane thermal effects and not localized effects. Since the glass is sandwiched in the frame, the edges can expand outward reducing the stress effects of any thermal expansion. In addition the brittle failure mechanism of glass decreases with elevated temperature, and the melting point is extremely high.

Furthermore, the maximum steam pressure used by calculation C10432 was determined by using the jet impingement curves from the USAR against the worst case door (#140). Due to the physical geometry of the position of door #199 versus the steam source, any impingement pressure would be reduced by distance and impingement angle. The calculation for the worst case door therefore bounds any postulated dynamic forces on the glass in door #199 and other steam exclusion doors with glass. It was determined, by engineering judgement, that door #199 had the ability to accomplish its design function.

After the NRC fire protection inspection identified the concern with door #199, additional reviews were performed. An informal check using a more accurate model of the glass supported on four sides was performed. The results showed a significant increase in the pressure allowed against the glass and therefore showed that steel plate installed over the glass on door # 140 was not needed (steel plate was not removed however). The pieces of glass in the doors are either tempered glass or wire reinforced which significantly increases their strength over plate glass. Glass vendors were also contacted to obtain additional design data. The additional information and modeling supported the original analysis and engineering judgements and verified the conservative nature of the original calculation.