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U-602126
L42-93(04-28)LP
4F.190

April 28, 1993

Docket No. 50-461
Mr. A. B. Davis
Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

10CFR2.201

Subject: Response to Notice of Violation Documented in NRC Inspection
Report No. 50-461/93003 (DRS), dated March 31, 1993

Dear Mr. Davis:

This letter provides the Illinois Power (IP) response to the Notice of Violation documented in NRC Inspection Report No. 50-461/93003 (DRS). The notice discusses a violation of 10CFR50, Appendix B, Criterion III in the failure to verify the adequacy of a modification in the Emergency Diesel Generator run/idle switch. The attachment to this letter provides the response to the Notice of Violation.

The cover letter to the above-mentioned Notice of Violation expressed that the subject violation is a concern because the Clinton Power Station modification process failed to maintain the Emergency Diesel Generators' design basis. The response provided in the attachment to this letter addresses the concerns identified in the Notice of Violation and in the cover letter to the Notice of Violation.

Sincerely Yours,

F. A. Spangenberg, III
Manager, Licensing and Safety

SSG/nls
Attachment

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Document Control Desk
Illinois Department of Nuclear Safety

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The Notice of Violation states in part:

"10CFR50, Appendix B, Criterion III, states in part, that design control measures shall provide for verifying the adequacy of the design.

Contrary to the above, from November 2, 1992, through February 14, 1993, design control did not verify the adequacy of Modification No. DGF024, "Emergency Diesel Generator (EDG) 1A(1B) RUN/IDLE Switch." Specifically, the design control process failed to identify that a necessary seal-in circuit, to bypass the idle mode of operation, had not been provided."

I. Background/Cause of Violation:

Modification DGF024 was designed and installed to provide an idle speed feature for the Divisions I and II Emergency Diesel Generators (EDGs). One facet of this design was to allow the EDGs, while operating in the idle mode, to accelerate to their rated speed and voltage in response to a Loss-of-Offsite Power (LOOP) or a Loss of Cooling Accident (LOCA) signal and energize emergency buses as required. This modification was reviewed by the Nuclear Regulatory Commission (NRC) during the Electrical Distribution System Functional Inspection (EDSFI) at Clinton Power Station (CPS).

In the process of answering NRC questions on the subject modification, Illinois Power's (IP's) Nuclear Station Engineering Department (NSED) determined that the installed design for the idle start feature does not operate as intended for a LOOP scenario. Specifically, the design intent was that if the EDG was operating at idle speed (not paralleled with offsite power) in the "IDLE" mode, a LOOP or LOCA signal would bypass the idle feature and accelerate the EDG to rated speed, allowing the EDG to provide power to the loads on the associated bus. Contrary to a design assumption, the LOOP signal utilized to bypass the idle start feature does not seal in. As a result, the EDG would accelerate to rated speed and the output breaker would close, resetting the LOOP signal. Upon reset of the LOOP signal, the EDG would return to idle speed and the generator would lose excitation (as generator excitation is prevented in the idle mode). Loss of generator excitation results in EDG trip and output breaker lockout. As a result, manual operator action would be required to restore power to the associated bus.

The EDSFI team also identified that the modification would prevent the EDG from performing its automatic safety function. The key-operated run/idle switch modification incorporated the capability to fast start the EDG when the switch was in idle position. The circuit was designed to bypass the EDG maintenance mode for a LOCA, degraded voltage or a LOOP automatic start signal, and realign the EDG into its automatic mode. However, the design did not include a seal-in of the idle bypass circuitry. As a result, on automatic start signal reset the EDG would revert to the

non-safety idle speed operation, and the EDG and its output breaker would trip. Operator action would be required to restore the EDG to its emergency alignment.

In 1990, IP requested the architect/engineer, Sargent & Lundy (S&L), to issue design change documents for modification DGF024. The initial concept for the modification was to permit operation of the Divisions I and II EDGs at idle speed for maintenance purposes. The design change was to install a handswitch in the local control panel of each diesel generator and wire the subject switch to the existing diesel generator circuit and "out of service" alarm circuit in the main control room. The "out of service" alarm would actuate whenever the diesel generator was operated at an idle speed.

On February 2, 1991, S&L issued the preliminary Engineering Change Notices (ECNs) for IP review. During IP's review, it was decided that the design should allow the diesel generator to automatically accelerate from idle speed to the rated speed and load the bus in response to an auto start signal. On April 24, 1991, S&L was requested to revise the ECNs to include this change, which would also delete the need for an out-of-service alarm.

By this time the initial S&L preparer was no longer assigned to the CPS project. Therefore, the S&L reviewer of the design change documents further developed the proposed design change to address IP comments. Part of the criteria for the change to allow an auto start was to make the circuit as simple as possible. The S&L reviewer prepared the design change documents based on the expectation that following the auto start signal the operator would immediately realign the switch to the run position. IP authorized the change since it appeared to meet the operating philosophy and it required only a minimal hardware change.

Since the S&L initial preparer was no longer available and the reviewer had issued the preliminary design change documents, S&L decided to assign a new preparer who was already on the CPS site to complete the final design change documents. The final design change documents were issued on June 4, 1991.

The factors that may have contributed to the root cause include the following:

- * The initial understanding of the preparer (of the auto start feature design) was that both the LOOP & LOCA signals sealed-in, which is the case for LOCA but not the case for LOOP. The run/idle circuits were developed based on that understanding and were never fully verified for each signal. None of the reviews/verifications of the modification package identified this design deficiency.
- * The initial design requirements as transmitted to S&L did not include the need for an automatic recovery from the idle speed with a LOOP and/or a LOCA. This feature was requested after the design was underway and required the design to be reworked.

- Personnel changes were made during the design process resulting in two different preparers for the modification.
- There were considerable periods of time between the conception of the idea for the modification, the approval for the design, and the commencement of design.
- The initial installation schedule for the modification was set for the third refueling outage. However, when the auto start part of the design was prepared and ready for review, it was decided to delay the modification for later installation. The delay changed the priority of the design review. The design schedule was changed again and an ambitious date for design completion was again set. These discontinuities in the design package preparation and review process may have contributed to the inadequate design verification.

II. Corrective Steps Taken:

- The immediate action taken was to request that operators not use the run/idle handswitches for the Divisions I and II Emergency Diesel Generators. The subject handswitches were tagged out on February 11, 1993 (Tagout #93-0149). Applicable emergency diesel generator procedures (CPS 3506.01, 9080.01 and 9080.13) have been revised to allow the option of not using the run/idle handswitches. These procedures provide instructions for demonstrating the operability of EDGs and support systems by satisfying the Technical Specification applicable surveillance requirements.

These corrective actions will ensure the handswitches remain in the run position and allow the EDGs to perform their intended design functions.

- Since this modification was designed, IP has assumed more design responsibilities. This helps assure continuity and promotes better communication during the design process.

III. Corrective Steps to Avoid Further Violations:

- The design of modification DGF024 will be revised, so the Divisions I and II diesel generators, while operating in the idle mode, will accelerate and remain at rated speed in response to a LOOP or a LOCA signal and energize the Class 1E buses as required. The revised design of the modification is scheduled to be completed by August 31, 1993 and installed by January 15, 1994.
- A training session will be conducted for NSED-Design personnel on the lessons learned as a result of this violation. The importance of a thorough verification

review of vendor design will also be discussed in the training session. This action is scheduled to be completed by July 31, 1993.

- An advisory will be issued to the architect/engineer (Sargent & Lundy) on the lessons learned as a result of this violation. A copy of the NSED training materials for the training session mentioned above will be included. This action is scheduled to be completed by August 31, 1993.

- To provide assurance that modification packages have received appropriate reviews, selected packages will be reviewed to examine: (1) the development of the design inputs and their incorporation into the design, (2) the impact of the design changes to the design baseline, and (3) the impact of the design changes to the function of the plant equipment. This action item is scheduled to be completed by August 31, 1993.

IV. Date When Full Compliance Will be Achieved:

IP will be in full compliance with 10CFR50, Appendix B, criteria III by January 15, 1994, following installation of the revised modification for Divisions I and II EDGs.