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Docket No. 50-461

10CFR50.73

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station - Unit 1
Licensee Event Report No. 97-010-00

Dear Madam or Sir:

Enclosed is Licensee Event Report (LER) No. 97-010-00: Incorrect Voltage in Procedure for Verification of Off-Site Power Sources. This report is being submitted in accordance with the requirements of 10CFR50.73.

Sincerely yours,

Wilfred Connell

Wilfred Connell
Vice President

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BGS/krk

Enclosure

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety
INPO Records Center

160069

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Clinton Power Station	05000461	1 OF 4

TITLE (4)
Incorrect Voltage in Procedure for Verification of Off-Site Power Sources

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									None	05000
04	08	92	97	010	00	05	08	97	FACILITY NAME	DOCKET NUMBER
									None	05000

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
	5		20.2201(b)		20.2203(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)		
POWER LEVEL (10)			20.2203(a)(1)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)		
	000		20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71		
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER		
			20.2203(a)(2)(iii)		50.36(c)(1)	X	50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A		
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
R. C. Reichert, Engineering Projects	(217) 935-8881, Extension 3970

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

In 1992, a concern was raised throughout the nuclear industry about degraded voltage protection. Illinois Power (IP) engineers began a study of the effects of degraded voltage on safety-related 120 Volt Alternating Current (VAC) equipment loads. This study involved, in part, a review of the calculations used to set the minimum bus voltage required to ensure proper operation of safety-related (Class 1E) 120-VAC equipment. In review of these calculations, plant engineers determined a new minimum voltage value of 4030-VAC required to be present at the off-site power sources vice the previous value of 3744-VAC. Review of past voltage data during the first week of April, 1997, showed that fluctuations in bus voltages had resulted in voltage less than the new minimum value of 4030-VAC and that one of the off-site power sources should have been declared inoperable. It was determined that the required action as stated in the Improved Technical Specifications (ITS) section 3.8.2.A.2.4, "Initiate action to restore required off-site power circuit to OPERABLE status immediately," was not met. This event was personnel error in the failure to adequately review operability requirements of plant equipment. Corrective action will include a revision to the appropriate surveillance procedures that determine equipment operability.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Clinton Power Station	05000461	97	010	00	2 OF 4

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

DESCRIPTION OF EVENT

On April 10, 1997, Nuclear Station Engineering Department (NSED) personnel were performing a review of Clinton Power Station (CPS) surveillance procedure 9082.02, "Electrical Distribution Verification Mode 4 and 5," as part of a modification to the undervoltage protection circuitry, when it was discovered that the minimum voltage value specified in the procedure was incorrect according to the calculated value presented by NSED. The plant was in Mode 4 (COLD SHUTDOWN), reactor [RCT] coolant temperature was about 110 degrees Fahrenheit, reactor coolant pressure was atmospheric with the sixth refueling outage (RF-6) in progress.

In April 1992, a question was raised by the Electrical Distribution System Functional Inspection (EDSFI) concerning degraded voltage issues at other nuclear power plants . NSED then began a study of the calculations used as the basis for the setpoints of the Auxiliary Power (AP)[EC] undervoltage protection circuitry at CPS. It was determined then that adequate voltage might not be assured if the installed circuits were in the worst case configuration allowed by the bounding design specifications. This condition, and the subsequent corrective actions to resolve it, were addressed by Licensee Event Report (LER) 94-005 which was initiated in May of 1994. The corrective steps initiated to resolve LER 94-005 were modifications to replace the undervoltage protection circuitry and installation of an alarm [ALM] to alert operators of a possible degraded voltage condition.

On February 22, 1996, Illinois Power (IP) submitted a proposed amendment to the CPS Improved Technical Specifications (ITS), in part, to revise the setpoints for the degraded voltage protection instrumentation. This amendment required several calculations to be performed for varying plant conditions. The calculations performed by NSED had to account for changes in loading due to a postulated Loss Of Coolant Accident (LOCA) and the modifications previously made to the undervoltage protection circuitry. These modifications included installation of new relays with the proper setpoint and new regulating transformers [XFMR] for the 120-VAC safety-related loads.

During the installation of this modification in RF-6, the regulating transformers were experiencing spurious trips. It was then determined that the old, non-regulating transformers be re-installed, but with a different number of windings on the primary side. This variance in the transformer windings is commonly referred to as a transformer tap change [TTC].

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Clinton Power Station	05000461	97	010	00	3 OF 4

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

On April 10, 1997, while reviewing the modifications associated with the degraded voltage issue, NSED performed a review of associated procedures. The specified values for minimum voltage in CPS 9082.02 were found to be non-conservative based on the results of the NSED calculations for the minimum bus [BU] voltage and required off-site power source. These calculations are required to be re-performed due to changing plant conditions. These changing plant conditions consist of the installation of new undervoltage protection relays [27] and transformer tap changes for each divisional distribution bus. In this case, the new undervoltage protective circuitry had not yet been installed and the tap settings had not yet been changed thus requiring a higher bus voltage of 4030-VAC to ensure the required minimum voltage for the 120-VAC level. When it was realized that the bus voltage may not be adequate, current bus voltage was analyzed and found to be above the new minimum value. A review of previous bus voltage data found that the off-site voltage had gone below the new minimum value in the past. This discrepancy was documented on Condition Report (CR) 1-97-04-084. Because this undervoltage condition had not been recognized, the action specified in the Improved Technical Specifications (ITS) section 3.8.2.A.2.4, "Initiate action to restore required off-site power circuit to OPERABLE status immediately," was not met.

No automatic or manually initiated safety system response was necessary to place the plant in a safe and stable condition. No other equipment or components were inoperable at the start of this event to the extent that their inoperable condition contributed to this event.

CAUSE OF EVENT

The cause of this event was determined to be personnel error in the failure to adequately review operability requirements of plant equipment. When the undervoltage relays were determined to be inadequate in May of 1994, it was not recognized that this condition also had an impact on ITS Surveillance Requirements (SR) for bus voltage and off-site power voltage.

CORRECTIVE ACTION

CPS procedure 9082.01, "Electrical Distribution Verification Mode 1, 2 and 3," and CPS procedure 9082.02, will be revised to indicate the new minimum voltage value calculated by NSED. Also, CPS procedure 5008.05, "Annunciator Procedure for Alarm Panel 5008 Row 5, Safety Related 4KV Bus Voltage," will be revised to include the new minimum voltage values. The calculations performed by NSED must be updated whenever a change in the undervoltage protection circuitry has been completed by the design modifications commenced during RF-6. These modifications are being performed to correct the events discussed in LER 94-005-00 and LER 97-008-00, "Diesel Generator Undervoltage Relays Inoperable."

CPS administrative procedure 1014.06, "Operability Determination", has initiated a new program to determine the operability of Systems, Structures or Components (SSC), and is used when a degraded or nonconforming condition exists which could potentially impact SSC operability.

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Clinton Power Station	05000461	97	010	00	4 OF 4

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(i)(B), 10CFR50.73(a)(2)(ii)(C) and 10CFR50.73(a)(2)(v)(B) because the off-site power source was degraded to a point that the safety related 120-VAC loads may not have had sufficient voltage to perform their designed functions.

This event was identified as having potential nuclear safety significance. Since initial plant startup on September 29, 1986, to April 12, 1997, if a LOCA had occurred while grid voltage was below the minimum value, sufficient voltage may not have been available for proper safety system equipment operation. Although the emergency diesel generators [EK][DG] automatically start on a LOCA signal, they do not automatically energize all safety loads unless a degraded/loss of voltage condition exists. Because the setpoints were set too low, the diesel generators would not have energized safety loads on an undervoltage condition.

ADDITIONAL INFORMATION

LER 94-005 and LER 97-008 have additional information on the undervoltage issues addressed by CPS.

There was no equipment failure associated with this event.

For further information regarding this event, contact R. C. Reichert, Project Engineer at (217)935-8881, extension 3970.