

Illinois Power Company
Clinton Power Station
P.O. Box 678
Clinton, IL 61727
Tel 217 935-8881

**ILLINOIS
POWER**

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10CFR50.73

Docket No 50-461

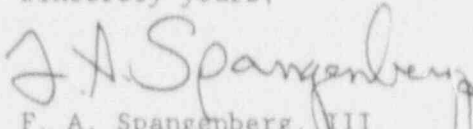
Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station - Unit 1
Licensee Event Report No. 92-006-00

Dear Sir:

Please find enclosed Licensee Event Report No. 92-006-00:
Design of Instrument Air Isolation Logic Results in Unexpected
Instrument Air Isolation during Restoration of Circuit Link. This
report is being submitted in accordance with the requirements of
10CFR50.73.

Sincerely yours,


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

RSF/alh

Enclosure

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

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Handwritten initials/signature

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST, 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH IF 5301, U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TITLE (4) Design of Instrument Air Isolation Logic Results in Unexpected Instrument Air Isolation during Restoration of Circuit Link

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 NAMES		DOCKET NUMBER(S)
0 4	2 5	9 2	2 9 2	0 0 6	0 0	0 5	2 2	9 2	None		0 5 0 0 0

OPERATING MODE (9) 5

POWER LEVEL (10) 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input checked="" type="checkbox"/> 20.406(e)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.38(a)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.38(a)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	

LICL-SEE CONTACT FOR THIS LER (12)

NAME W. L. Shurlow, Supervising Specialist-Nuclear Station Engineering Department, extension 3223	TELEPHONE NUMBER 2 1 7 9 3 5 - 1 8 8 8 1
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On April 25, 1992, with the plant in REFUELING, containment and drywell Instrument Air (IA) system isolation valves closed unexpectedly while Control and Instrumentation (C&I) technicians were performing a channel calibration of a Division 1 reactor vessel water level channel. About the time that the valves closed, the C&I technicians were restoring a circuit link which had been removed to prevent closing of the IA isolation valves since the IA valves have a one-out-of-two isolation logic. Control room operators first noted that the containment and drywell ventilation systems had shutdown and then that some IA isolation valves and the reactor water sample outboard isolation valve were in the intermediate position. In response to this event, the assistant shift supervisor directed that instrument air be restored to the containment and drywell. The cause of this event is attributed to the design of the instrument air isolation logic. No corrective actions are required. However, procedures will be reviewed to ensure they have a caution or warning that restoring the circuit link may result in actuation of IA valves and to ensure they have a step verifying that the IA valves are still open after the circuit link restoration. A modification to change the instrument air isolation logic will be evaluated.

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TEXT (If more space is required, use additional NRC Form 305A's) (17)

DESCRIPTION OF EVENT

On April 25, 1992, the plant was in Mode 5 (REFUELING), reactor [RCT] pressure was atmospheric and reactor temperature was being maintained between eighty and one hundred degrees Fahrenheit.

At about 0830 hours, Control and Instrumentation (C&I) technicians received permission from the Line Assistant Shift Supervisor (LASS) to perform surveillance procedure CPS 9433.05, "ECCS Reactor Vessel Water Level B21-N091E Channel Calibration". This procedure provides instructions for performing a channel [CHA] calibration on Division 1 Emergency Core Cooling System (ECCS) reactor water level channel 1B21-N091E. This test initiates a Reactor Vessel Water Low Level 1 signal to close Division 1 Instrument Air (IA) system [LE] containment isolation valves [ISV] 11A005 and 11A008. Since the IA valves have a one-out-of-two isolation logic, the procedure requires removal of a circuit link (jumper) to prevent the signal from causing the instrument air valves to close, thereby maintaining station air to containment and drywell components.

At about 1430 hours, C&I technicians were performing the restoration section of the channel calibration. The "A" Control Room Operator (CRO) verified the reactor vessel water low level 1 annunciator [ANN] was reset and then reset the containment level 1 isolation signal by depressing the push button switch [HS] on panel [PL] 1H13-P601 as required by the surveillance procedure. The CRO verified the level 1 isolation signal was reset by observing the red indicator light [IL] above the Division 1 push button switch extinguish as the push button was depressed.

Following reset of the isolation signal, a C&I technician reinstalled the Division 1 IA isolation circuit link in panel 1H13-P861 per procedure. The technician did not hear any relay [RLY] clicking nor did he hear any alarms [ALM] at the time he installed the circuit link. At about the same time as C&I technicians were installing the link, Main Control Room (MCR) personnel noted that the Containment Building Ventilation (VR) system [VA] and Drywell Purge (VQ) system [VB] had shut down. These systems shut down on loss of station air. MCR personnel did not notice any indication of a loss of station air. As the MCR operators were investigating the VR/VQ system shutdown, the C&I technicians reported the completion of the instrument air isolation circuit link restoration to MCR operators. When this report was made, the LASS associated the circuit link restoration to the shutdown of the ventilation systems and noticed indication that some of the instrument air isolation valves were in the intermediate position. The LASS notified the "B" CRO of this indication. The CRO then observed on the 1H13-P800 panel that drywell IA header inboard isolation valve 11A008 (Group 18), containment IA outboard isolation valve 11A005 (Group 13), and drywell IA outboard isolation valve 11A007 (Group 18) were shut and containment IA inboard isolation

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

valve 11A006 (Group 13) was intermediate (both the red and green lights were illuminated). The CRO also noted that reactor water sample outboard isolation valve 1B33-F020 indicated intermediate due to loss of station air; annunciator [ANN] 5003-5M, "Containment/Drywell IA Isolation Valve Closure," alarm was locked in; the VR and VQ systems were shut down as previously noted; and reactor reject flow to the condenser [COND] through the Reactor Water Cleanup system [CE] was being lost.

At this point, the LASS directed the "B" CRO to restore instrument air to the containment and drywell, and to perform off-normal procedure checklist CPS 4001.02C001, "Automatic Isolation Checklist." The checklist identified that the instrument air valves had shut. When the CRO pushed the reset push button switches for Divisions 1 and 2 isolation logics, he noted the trip indicator lights above the switches were not illuminated either before or after pushing the reset switch. When instrument air was being restored, the reactor operator opened valves 11A005 and 11A008 using the control switch; when these valves opened, valves 11A006 and 11A007 opened automatically. Since 11A006 and 11A007 did not require manual action to reopen, the valves did not receive an isolation signal to close but rather closed as designed due to a loss of station air caused by 11A005 closing.

The scram pilot low pressure alarm was not received as normal because the alarm was locked in as a result of a scram signal which was present in support of electrical maintenance work activities.

On April 25, 1992, surveillance CPS 9433.05 was completed with satisfactory results at about 1445 hours.

The process computer did not recognize that valves 11A005 and 11A008 had shut because isolator panel PL56JA was deenergized for Division 1 Direct Current (DC) power maintenance. Therefore the process computer did not actuate the IA isolation alarm until after valve 11A007 drifted shut due to a loss of station air. (The 11A007 valve is energized by Division 2 DC power.)

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

CAUSE OF EVENT

Investigation has determined that the cause of this event is attributed to the design of the instrument air isolation logic.

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Troubleshooting of the trip circuit which included re-performing the restoration portion of the surveillance procedure did not identify a cause for the actuation. Trip signals were initiated and reset while technicians looked for stray voltage or leakage in the load driver output. The checks did not produce a signal of sufficient magnitude to cause the trip.

Investigation of this event was unable to identify any errors in the C&I technicians' performance of the work, procedural errors, equipment malfunctions or other activities which could have resulted in the instrument air valves closing.

Since the load drivers in this system are solid state devices rather than dry contacts of a relay, there is a voltage potential at the load even with the load driver turned off. Although this voltage potential would not normally energize the load, there is a possibility for momentarily turning on the load driver at the time of connecting the load via the circuit link (jumper). Although the probability of this occurring is very small, since the circuit link restoration is performed at least four times a month, an actuation of the load driver and instrument air isolation valves could eventually occur.

Based on a review of this event and seven previous occurrences of instrumentation air isolations (LER 86-009, 87-005, 87-017, 88-009, 88-013, 89-008, 89-035), Illinois Power has concluded that the design of the instrument air isolation logic makes performance of maintenance difficult without some risk of inadvertent actuation when the system is energized and in service.

LER 87-017 could be considered similar to LER 92-006 since the cause of the instrument air isolation described in LER 87-017 could not be firmly established. At that time, the cause was considered to be personnel error in failing to reset the isolation signal which was sealed in during the surveillance test. Corrective action for LER 87-017 included revising surveillance procedure CPS 9030.01, "Analog Trip Module (ATM) Channel Functional and Calibration Check Instructions," to include a verification that instrument air valves remain open following reset of the isolation signal and relanding of the lifted leads. This action does not prevent an unexpected isolation but does allow operators to restore instrument air to the containment and drywell and thus prevents a reactor scram.

CORRECTIVE ACTION

No corrective action is necessary for this event. This determination is based on: the small probability that a similar event (unexpected instrument air isolation logic initiation with no personnel error) will

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

reoccur; the system responded properly to an initiation signal; the event was not nuclear safety significant; and the wear and tear on the valves and electronics due to the unnecessary actuation is inconsequential to their overall availability.

However, since unexpected isolation of the Instrument Air system is an undesirable transient which can lead to a scram of the reactor, actions will be taken to maintain IA to the containment and drywell. Procedures that require removal of the circuit link to prevent instrument air isolations will be reviewed. This review will ensure the procedures have a caution or warning before the circuit link restoration step identifying that restoring the circuit link may result in actuation of IA valves. The review will also ensure the procedures have a step verifying the IA valves are still open after the restoration of the circuit link. These actions will facilitate quick restoration of instrument air to the containment and drywell in the event of an instrument air isolation during circuit link restoration.

Illinois Power will evaluate a modification which would change the instrument air isolation logic from one-out-of-two on reactor vessel water level to some other logic scheme. This evaluation is expected to be completed by August 15, 1992. Installation of a different logic scheme for the instrument air isolation would make removal and restoration of the circuit link unnecessary and thus would reduce the frequency of instrument air isolations.

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(iv) due to the unplanned automatic actuation of Engineered Safety Features.

Analysis of the safety consequences and implications of this event indicates that this event was not nuclear safety significant for existing plant conditions or other plant modes or power levels. Events resulting from the loss of the Instrument Air system have been analyzed in Chapter 15 of the Updated Safety Analysis Report. The analysis determined that the transients resulting from the loss of the Instrument Air system are within the limits of the plant design.

ADDITIONAL INFORMATION

No components failed during this event.

Seven previous LERs identify isolations of the Instrument Air system during surveillance activities. These LERs were 86-009, 87-005, 87-017, 88-009, 88-013, 89-008, 89-035. LER 37-017 could be considered a similar cause since cause could not be firmly established. The "Cause of Events"

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section of LER 92-006 provides further explanation of the LER 87-017 event. The other six previous LERs had causes different from LER 92-006.

For further information regarding this event, contact W. L. Shurlow, Supervising Specialist-Nuclear Station Engineering Department at (217)935-8881 extension 3223.