

LICENSEE EVENT REPORT (LER)

Facility Name (1) LaSalle County Station Unit 1	Docket Number (2) 0 5 0 0 0 3 7 3	Page (3) 1 of 0 4
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Title (4)
Reactor Scram on Low Reactor Water Level Caused by Feedwater Heater String Isolations Due to Design Deficiency

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)				
1	2	1	6	8	7	8	7	---	0 3 8	0 0	0 1	1 5	8 8	0 5 0 0 0 1 1

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)									
POWER LEVEL (10) 0 7 8	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in Text)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)							

LICENSEE CONTACT FOR THIS LER (12)	
Name Randy Dus, Technical Staff Engineer, extension 324	TELEPHONE NUMBER AREA CODE 8 1 5 3 5 7 - 6 7 6 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
B	S	M		Y					

SUPPLEMENTAL REPORT EXPECTED (14) <input type="checkbox"/> Yes (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	Expected Submission Date (15) Month Day Year
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 0955 hours on December 16, 1987, with Unit 1 in Operational Condition 1 (Run) at 77.5% power, Unit 1 scrambled on low reactor water level (level 3, +12.5 inches) due to a level transient caused by feedwater heater string isolations. The string isolations occurred while operating personnel were attempting to restore the "12C" low pressure feedwater heater to a normal operating condition.

The root cause of the event was a design deficiency in the "11C" feedwater heater which caused it to become "air-bound". This heater was originally intended to have a continuous operating vent, but the vent was never installed. With the "11C" heater "air-bound," the "12C" heater became overloaded and a high level situation occurred (in the "12C" heater) which initiated a string isolation.

The safety consequences of this event were minimal. All required actuations occurred as expected.

Modifications are scheduled during the next Unit 1 and Unit 2 refueling outages to install a continuous operating vent on the "11/21" and "12/22" feedwater heaters.

This event is reportable pursuant to the requirements of 10CFR50.73(a)(2)(iv) due to the automatic actuation of the Reactor Protection System.

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

A. CONDITION PRIOR TO EVENT

Unit(s): 1 Event Date: 12/16/87 Event Time: 0955 Hours

Reactor Mode(s): 1 Mode(s) Name: Run Power Level(s): 77.5%

B. DESCRIPTION OF EVENT

At 0955 hours on December 16, 1987, with Unit 1 in Operational Condition 1 (Run) at 77.5% power, Unit 1 scrambled on low reactor water level (level 3, +12.5 inches) due to a level transient caused by feedwater heater (HD [SM] string isolations. The string isolations occurred while operating personnel were attempting to restore the "12C" low pressure feedwater heater to a normal operating condition. The "12C" heater had been placed in an abnormal drain valve lineup (normal and emergency drain valves open) because of a previous heater transient which had occurred two (2) days prior to this event (on December 14).

In the previous event, the "C" feedwater heater string isolated due to a high level condition in the "12C" feedwater heater. During that transient, the unit operator (NSO, licensed reactor operator) was able to drop reactor power sufficiently in order to prevent a reactor scram. Due to this event, it was decided to operate for a period of time with the "12C" heater normal drain valve (1HD068C), as well as the emergency drain valve (1HD065C), open for better level control in the heater. The normal drain valve lineup for the "11" and "12" low pressure heaters is to have the emergency drain valve open and the normal drain valve closed.

On December 16, Operating personnel were attempting to restore the normal drain valve lineup for the "12C" heater by closing the normal drain valve (1HD068C) from the local level indicating controller. As drain valve 1HD068C was being closed, level began increasing in the "12C" heater and the valve was immediately re-opened. While re-opening the drain valve, a high level signal in the "12C" heater initiated a "C" string isolation. The ensuing transient eventually led to the isolation of the remaining heater string ("B" then "A").

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TEXT

B. DESCRIPTION OF EVENT (Continued)

The unit operator manually downshifted both Reactor Recirculation (RR) [AD] pumps in order to reduce power and the required feedwater flow. Several attempts were made to re-open the feedwater string isolation valves during the transient to re-establish flow. However, both feedwater pumps ("A" turbine driven and motor driven) eventually tripped on low suction pressure. The motor driven feedwater pump was restarted and the feedwater heater string bypass valve (1CB007) was opened, but sufficient feedwater flow was not provided to prevent the low level scram. The entire transient, from "C" heater string isolation to scram, took approximately 6 minutes.

This event is reportable pursuant to the requirements of 10CFR50.73(a)(2)(iv) due to the automatic actuation of the Reactor Protection System (RPS, JP) [JC].

C. APPARENT CAUSE OF EVENT

The root cause of this event is a design deficiency in the "11C" feedwater heater which caused it to become "air-bound." All "11" and "12" heaters were designed to have continuous operating vents, but the vent lines were never installed.

A review of feedwater temperatures from the "11" and "12" heaters for this event, as well as from the previous event (December 14), revealed that the feedwater temperature rise across the "11C" heater was significantly reduced (indicating an "air-bound" condition). This results in relatively cooler feedwater being delivered to the "12C" heater and creates an overloading condition (excessive condensation condition). A condition which the "12C" heater drain line (through the 1HD065C valve) could not adequately handle. This "air-bound" condition was not discovered during the investigation of the previous event prior to the scram.

All of the "11" and "12" heaters are currently equipped with startup vents which are intended to remove non-condensables on unit startup. These vents are open during unit startup and are closed during normal power operation. It has been confirmed that operating vents should also exist in order to remove non-condensables that accumulate during power operation.

D. SAFETY ANALYSIS OF EVENT

The safety consequences of this event were minimal. The actions of the operating personnel during this event were proper. All Emergency Core Cooling (ECCS) Systems and Reactor Core Isolation Cooling (RCIC, RI) [BN] were available, but were never initiated. All required actuations occurred as expected.

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E. CORRECTIVE ACTIONS

Initial troubleshooting on this event began with disassembly of the "12C" heater emergency drain valve (1HDO65C) to look for any obstruction in the valve and/or the drain line. No obstructions were found.

A review of various heater parameters was conducted to look for any unusual trends. From this review, it was determined that the "11C" feedwater heater was "air-bound" and needed venting. Since the "1C" has no operating vent, a procedure was written (LLP-87-030, Venting of the "11/21" and "12/22" Low Pressure Feedwater Heaters) to provide a method of venting the "11" and "12" heaters by using the existing startup vents. The procedure was successfully used during the subsequent startup, and an improved performance from the "11C" heater was obtained.

Modifications are scheduled during the next Unit 1 and Unit 2 refuel outages which will install a continuous operating vent for the "11/21" and "12/22" feedwater heaters. Until the modifications are installed, a Temporary System Change has been implemented on Unit 1 which allows for continuous venting (through the startup vents) of the "11" heaters during power operation. The "12/22" and "21" heaters will be vented as needed during power operation in accordance with LLP-87-030. Action Item Record (AIR) 373-200-87-10700 will track the completion of these modifications.

An investigation into the air in-leakage for the "11C" heater was conducted. No significant air in-leakage was found and no noticeable increase in off gas flow has been observed.

This event has been reviewed by all Shift Engineers and Operating Engineers, emphasizing the need for appropriate preplanning when performing infrequent evolutions.

F. PREVIOUS EVENTS

LER Number	Title
373/87-032-00	Reactor Scram on Low Level During Shutdown

G. COMPONENT FAILURE DATA

None.



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LaSalle County Nuclear Station
Rural Route #1, Box 220
Marseilles, Illinois 61341
Telephone 815/357-6761

January 15, 1988

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

Dear Sir:

Licensee Event Report #87-038-00, Docket #050-373 is being submitted to your office in accordance with 10CFR50.73(a)(2)(iv).

R.D. Bahr
for G. J. Diederich
Station Manager
LaSalle County Station

GJD/RSD/kg

Enclosure

xc: Nuclear Licensing Administrator
NRC Resident Inspector
NRC Region III Administrator
INPO - Records Center

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