



Clinton Power Station
8401 Power Road
Clinton, IL 61727

U-604163
March 20, 2014

10 CFR 50.73
SRRS 5A.108

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Licensee Event Report 2014-001-00

Enclosed is Licensee Event Report (LER) No. 2014-001-00: Premature Failure Of Air Supply Solenoid Results In Isolation Of Fuel Building Ventilation System And Loss Of Secondary Containment Differential Pressure. This report is being submitted in accordance with the requirements of 10 CFR 50.73.

There are no regulatory commitments contained in this report.

Should you have any questions concerning this report, please contact
Mr. Jeffrey E. Cunningham, Acting Regulatory Assurance Manager, at (217)-937-3160.

Respectfully,

A handwritten signature in black ink, appearing to read "B. Keith Taber".

B. Keith Taber
Site Vice President
Clinton Power Station

RSF/blf

Enclosure: Licensee Event Report 2014-001-00

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – IEMA Division of Nuclear Safety

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NRK

**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Clinton Power Station, Unit 1

2. DOCKET NUMBER

05000461

3. PAGE

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4. TITLE

Premature Failure Of Air Supply Solenoid Results In Isolation Of Fuel Building Ventilation System And Loss Of Secondary Containment Differential Pressure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	22	2014	2014	001	00	03	20	2014		05000
9. OPERATING MODE			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
1			<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)		
			<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)		
			<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)		
			<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)		
10. POWER LEVEL 097			<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)		
			<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		<input type="checkbox"/> 73.71(a)(4)		
			<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(5)		
			<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)		<input checked="" type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> OTHER		
			<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)		Specify in Abstract below or in NRC Form 366A		

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

Jeffrey E. Cunningham, Regulatory Assurance Manager

TELEPHONE NUMBER (Include Area Code)

(217) 937-3160

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	VG	SOL	A499	Y					

14. SUPPLEMENTAL REPORT EXPECTED☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

On 1/22/14, the plant was at 97 percent reactor power and operators were placing Main Control Room Ventilation (VC) system Train B in service. While starting the VC Train B supply fan, operators received unexpected alarms caused by the trip of the in-service Fuel Building Ventilation system (VF) supply fan with the Fuel Building and Secondary Containment (SC) differential pressures (d/p) no longer being maintained negative, as required. In response to the loss of SC d/p, operators entered Emergency Operating Procedure (EOP) - 8, SC Control, declared SC inoperable, and entered the Technical Specification Actions. Troubleshooting and circuit analysis identified that the power source for VF inboard exhaust isolation damper also includes VC system supply air B zone isolation dampers and return air B dampers. During start of the VC system B train, the VC system dampers cycled and the VF system inboard exhaust isolation damper closed. The cause of this event was a prematurely degraded VF exhaust isolation damper air supply solenoid that responded to a minor perturbation of supply voltage or surge of current on the bus by dropping out during the VC Train B startup resulting in isolation of the VF system inboard exhaust isolation damper and a VF system trip. The prematurely degraded solenoid has been replaced. The VF system damper failed closed, fulfilling its safety function.

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Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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NARRATIVE**PLANT AND SYSTEM IDENTIFICATION**

General Electric -- Boiling Water Reactor, 3473 Megawatts Thermal Rated Core Power
Energy Industry Identification System (EIS) codes are identified in text as [XX].

EVENT IDENTIFICATION

Premature Failure Of Air Supply Solenoid Results In Isolation Of Fuel Building Ventilation System And Loss Of Secondary Containment Differential Pressure

A. Plant Operating Conditions Before the Event

Unit: 1 Event Date: 1/22/14 Event Time: 19:56 CST
Mode: 1 Mode Name: Power Operation Reactor Power: 97 percent

B. DESCRIPTION OF EVENT

On 1/22/14, the plant was in Mode 1 at 97 percent reactor power and operators in the Main Control Room (MCR) were in the process of placing Train B of the Main Control Room Ventilation (VC) system [VI] into service. At 1956 hours, while starting the VC system Train B supply fan [FAN] 0VC03CB, operators received unexpected alarms [ALM] for trouble in the Fuel Building Ventilation (VF) system [VG] and high Fuel Building differential pressure (d/p).

Operators discovered the causes of the alarms were the trip of the in-service VF system supply fan 1VF03CA and the Fuel Building [ND] and Secondary Containment differential pressures no longer being maintained negative, as required. Fuel Building d/p was plus 0.5 inches water column (inWC) and Secondary Containment d/p had risen to 0.0 inWC. Secondary Containment d/p is required to be less than or equal to a minus 0.25 inWC in accordance with Technical Specification Surveillance Requirement 3.6.4.1.1.

In response to the loss of secondary containment d/p, operators entered Emergency Operating Procedure (EOP) - 8, Secondary Containment Control. After several seconds the VF system exhaust fan (1VF04CA) tripped and VF system exhaust fan 1VF04CB automatically started and ran for several seconds before also tripping. Operators declared Secondary Containment inoperable due to secondary containment differential pressure being greater than minus 0.25 inWC, and entered Technical Specification (TS) 3.6.4.1, Action A.1 that requires secondary containment to be restored to an operable status within 4 hours.

At 1958 hours, operators in the MCR noticed VF system inboard exhaust isolation damper [DMP] 1VF07Y change position from intermediate to open. Based on a review of computer point information, operators determined that at about 1956 hours isolation damper 1VF07Y had travelled to the closed position. With the isolation damper closed (no flow path) the VF supply fan tripped as designed on either low flow or high Fuel Building d/p (greater than 0.0 inWC). The VF system exhaust fan is also designed to trip on low flow. Therefore, the fan trips and subsequent loss of Secondary Containment negative d/p were expected system responses when the VF system inboard exhaust isolation damper 1VF07Y closed.

At 2003 hours Fuel Building ventilation was restored, the inboard exhaust isolation damper was re-opened, the VF system was restarted, and Secondary Containment d/p was restored to normal. With the Fuel Building d/p and Secondary Containment d/p restored to normal values, operators exited the TS required action. At 2013 hours, operators exited EOP-8.

Troubleshooting of this event identified that VF system inboard exhaust isolation damper 1VF07Y unexpectedly closed at almost exactly the same time as the start of VC system Train B supply fan 0VC03CB. Circuit analysis

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identified that the power source for VF system damper 1VF07Y also provides power to the VC system supply air B zone isolation dampers and return air B dampers. This review confirmed that the VF system inboard exhaust isolation damper 1VF07Y closed during the cycling of the VC dampers during the start of the VC system B train. The trouble shooting team concluded that during the VC Train B startup, the air supply solenoid [SOL] on the VF system inboard exhaust isolation damper 1VF07Y responded to a minor perturbation of the supply voltage or a surge of current on the bus by repositioning (dropping out) because the solenoid was weak or degraded, resulting in isolation of the VF system inboard exhaust isolation damper. The VF system inboard exhaust isolation damper failed closed, thus fulfilling its safety function.

This event is reportable under the provisions of 10 CFR 50.73(a)(2)(v)(C) as an event that could have prevented fulfillment of the Secondary Containment safety function needed to control the release of radioactive material. Event Notification Number 49758 was made to the NRC on 01/22/2014 at 2236 hours Central Standard Time.

This event was entered into the Clinton Power Station corrective action program under Issue Report 1611216.

C. CAUSE OF EVENT

The apparent cause of this event is the VF system inboard exhaust isolation damper 1VF07Y air supply solenoid was prematurely degraded and caused the damper to isolate the VF system flow-path during the VC Train B startup, resulting in a VF system trip. This solenoid is currently replaced on an 8-year Preventive Maintenance frequency and was most recently replaced on 11/25/13. The cause of the premature failure of the solenoid is being evaluated by an independent laboratory.

D. SAFETY CONSEQUENCES

This event had no actual consequences. Operators entered EOP-8 for Secondary Containment d/p greater than minus 0.25 inWC and entered TS 3.6.4.1, Action A.1 to restore secondary containment to an operable status within 4 hours. Secondary Containment d/p was greater than minus 0.25 inWC for about 7 minutes. The VF system is the non-safety ventilation system which is normally in service to maintain secondary containment d/p. The Standby Gas Treatment system (VG) [BH] is the safety-related system which is credited to perform this function in an accident condition. The VG system was fully operable at the time of the event and capable of performing the required safety function. The VG system was subsequently placed in service and demonstrated the ability to perform the safety function. Therefore, the ability of the Station to maintain secondary containment in an accident scenario was never jeopardized or challenged by the VF system exhaust isolation damper repositioning. An Engineering evaluation has concluded that the safety function of the VF system exhaust isolation damper is to close during the accident condition to ensure the Secondary Containment safety function can be met. Since the VF system exhaust isolation damper failed closed during this event, the damper safety function was met, and therefore this event is not being counted as a Safety System Functional Failure for the NRC performance indicator.

E. CORRECTIVE ACTIONS

The prematurely degraded solenoid has been replaced.

F. PREVIOUS OCCURRENCES

A review for previous occurrences did not identify a similar event at Clinton Power Station. The station reviewed Licensee Event Report 1987-009 that reported a manual actuation of the VG system that occurred due to a trip of the VF system exhaust fan resulting in Secondary Containment d/p greater than minus 0.25 inWC. The cause of the event was a random failure of the solenoid valve on the VF system supply outboard

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isolation damper. Engineering concluded that the solenoid valve failure mechanism described in LER 1987-009 was different from the event described in this report (LER 2014-001).

G. COMPONENT FAILURE DATA

Component Description: Solenoid Valve; Type: 3 way; Size 3/8 inch; Material: Brass; Orifice: 9/32 inch
Manufacturer: ASCO-Automatic Switch Co
Model: NP8321A6E