



Clinton Power Station
8401 Power Road
Clinton, IL 61727

U-604328
January 13, 2017

10CFR50.73
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 2016-011-00

Enclosed is Licensee Event Report (LER) 2016-011-00: Incorrect Calculation Method Used to Demonstrate Control Room Habitability. 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. Dale A. Shelton, Regulatory Assurance Manager, at (217) 937-2800.

Respectfully,

A handwritten signature in black ink, appearing to read "T. Stoner".

Theodore R. Stoner
Site Vice President
Clinton Power Station

KP/cac

Attachment: Licensee Event Report 2016-011-00

cc:

Regional Administrator— NRC Region III
NRC Senior Resident Inspector - Clinton Power Station
Office of Nuclear Facility Safety — Illinois Emergency Management Agency

IE22
NRR



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 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 1 OF 4
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4. TITLE
Incorrect Calculation Method Used to Demonstrate Control Room Habitability

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
11	17	2016	2016	011	00	01	13	2017	FACILITY NAME	DOCKET NUMBER
										05000
										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)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. POWER LEVEL 099	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT Dale A. Shelton, Regulatory Assurance Manager	TELEPHONE NUMBER (Include Area Code) 217-937-2800
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
				N					

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

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

On November 17, 2016, during the NRC Component Design Basis Inspection (CDBI), Clinton Power Station (CPS) determined that design calculation C-020 "Reanalysis of Loss of Coolant Accident (LOCA) Using Alternate Source Terms," incorrectly took credit for the dual Main Control Room ventilation (VC) supply inlets being single failure proof (SFP). This assumption allowed the calculation to reduce one of the dose terms by a factor of 4 in accordance with the guidance of Regulatory Guide 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants". However, the inlets to VC at CPS are not SFP. This calculational error, when corrected, resulted in a calculated dose of greater than the 5 rem Total Effective Dose Equivalent (TEDE) allowable dose to occupants of the control room. A cause evaluation identified USAR sections that described the VC system were not clear regarding whether the intake structures were SFP. A standing order was issued for compensatory measures in the event of an emergency until calculations were prepared to demonstrate MCR operator dose limits can be met without compensatory measures. Actions have been initiated to finalize the MCR Operator dose analysis assuming single failure of outside air intake dampers and to revise the USAR to indicate that intake structures are not independently SFP. This event is reportable under 10 CFR 50.73(a)(2)(ii)(B), "Any event or condition that results in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety."



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Clinton Power Station, Unit 1	05000461	2016	- 011	- 00

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 the text as [XX]

EVENT IDENTIFICATION

Incorrect Calculation Method Used to Demonstrate Control Room Habitability

A. Plant Operating Conditions before the Event

Unit: 1	Event Date: 11/17/16	Event Time: None
Mode: 1	Mode Name: Power Operation	Reactor Power: 99 percent

B. DESCRIPTION OF EVENT

During the NRC Component Design Basis Inspection (CDBI) on November 17, 2016, CPS determined that Calculation, C-020 "Reanalysis of Loss of Coolant Accident (LOCA) Using Alternate Source Terms," incorrectly took credit for the dual Main Control Room ventilation (VC) supply inlets being single failure proof (SFP). The calculation is used to demonstrate control room habitability in the CPS accident analysis. The calculation assumed dual air inlets for the emergency zones as the type of system used for the Main Control Room ventilation system (VC). The dual inlet type system allows for one of the calculated dose concentrations to be reduced by a factor of 4 in accordance with the guidance of Regulatory Guide 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants." The VC system is SFP, but the individual subsystems at the inlet as designed are not. The calculational error, when corrected, resulted in a calculated dose of greater than the 5 rem Total Effective Dose Equivalent (TEDE) allowable dose to occupants of the control room.

The cause investigation team established that the USAR sections which described the VC system were not clear regarding whether the intake structures were SFP. This condition was concluded as the cause of the event. A review of the design calculation established that C-020 was prepared by Sargent & Lundy. The individual responsible for the design calculation preparation considered that both VC intake structures were independently SFP based on his understanding of the USAR sections that described the VC system. This was an unverified assumption by the preparer which resulted in the use of an incorrect methodology when the calculation assumed the outside intakes for VC were SFP. The lack of technical rigor in the preparation of the design calculation was established a condition which contributed to the event described in this report.



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NARRATIVE

C. CAUSE OF EVENT

The USAR sections that described the VC system were not clear regarding whether the intake structures were SFP. The design calculation preparer's consideration that both outside VC intake structures were SFP is attributable to the lack of clarity of the USAR sections.

D. SAFETY ANALYSIS

There were no safety consequences associated with the event described in this report. The event is reportable under 10CFR50.73(a)(2)(ii)(B) as "any event or condition that results in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety." The event described in this report did not involve degraded performance associated with any portion of the VC system or the Control Room Envelope boundary. It was limited to assumptions used in the performance of a design calculation that demonstrates control room habitability following a design basis accident. This design calculation used an incorrect method and represents a nonconforming condition as described in plant procedures since it did not align with the current licensing basis.

The redundant subsystems of the Control Room Ventilation System during this event remained OPERABLE to ensure that at least one was available, if a single active failure disabled the other subsystem as described in Technical Specification Basis 3.7.3. Plant systems required for the safe shutdown of the plant were also not affected by the event described in this report.

This event report does not identify any safety system functional failures.

E. CORRECTIVE ACTIONS

A standing order was issued for compensatory measures in the event of an emergency until calculations were prepared to demonstrate MCR operator dose limits can be met without compensatory measures. Actions have also been initiated to finalize the MCR Operator dose analysis assuming single failure of outside air intake dampers and revise the USAR to clarify that intake structures are not independently SFP.



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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NARRATIVE

F. PREVIOUS SIMILAR OCCURENCES

No previous Event Reports were identified associated with the event described in this report.

G. COMPONENT FAILURE DATA

This report does not involve the failure of components.