



Byron Generating Station

4450 North German Church Road
Byron, IL 61010-9794
www.exeloncorp.com

May 3, 2016

LTR: BYRON 2016-0046
File: 1.10.0101 (1D.101)
2.07.0100 (5A.108)

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Byron Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Licensee Event Report (LER) No. 454-2016-001-00, Auxiliary Feedwater Diesel Intake Design Deficiency Related to Turbine Building High Energy Line Break Resulted in an Unanalyzed Condition Due to Insufficient Validation of Vendor Analysis Inputs

Enclosed is Byron Station Licensee Event Report (LER) No. 454-2016-001-00 regarding an unanalyzed condition due to insufficient validation of vendor analysis inputs for the Auxiliary Feedwater diesel combustion air intake. This condition is being submitted in accordance with 10 CFR 50.73, "Licensee Event Report System."

There are no regulatory commitments in this report.

Should you have any questions concerning this submittal, please contact Mr. Douglas Spitzer, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

A handwritten signature in black ink, appearing to read "Mark E. Kanavos", written over a horizontal line.

Mark E. Kanavos
Site Vice President
Byron Generating Station

MEK/GC/sg

Enclosure: LER 454-2016-001-00

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Byron Generating Station



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

Byron Station – Unit 1

2. DOCKET NUMBER

05000454

3. PAGE

1 OF 4

4. TITLE

Auxiliary Feedwater Diesel Intake Design Deficiency Related to Turbine Building High Energy Line Break Resulted in an Unanalyzed Condition Due to Insufficient Validation of Vendor Analysis Inputs

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
03	04	16	2016	001	00	05	03	16	Byron Station – Unit 2	05000455
									N/A	N/A

9. OPERATING MODE		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
1 (both units)	<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	<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 checked="" 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 checked="" 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

Douglas Spitzer – Manager, Byron Regulatory Assurance

TELEPHONE NUMBER (Include Area Code)

(815) 406-2800

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
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete 15. EXPECTED SUBMISSION DATE) NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On March 4, 2016, during the Braidwood NRC Component Design Basis Inspection, a concern was raised regarding why it was acceptable for the diesel driven Auxiliary Feedwater (AF) pump engine combustion air intake to be located in the turbine building, a non-safety related structure. On March 7, 2016, the additional evaluations that were completed for Byron determined that the existing configuration did not adequately support diesel engine operation with high energy line break (HELB) conditions in the turbine building, and at 0400 hours Operations entered Technical Specification Limiting Condition for Operation 3.7.5, "Auxiliary Feedwater (AF) System," Condition A, "One AF train inoperable," for one train (B-train) of AF inoperable for both Units 1 and 2. The AF trains were declared operable following a corrective action to install a temporary configuration change to provide an engine combustion air intake from the auxiliary building.

The cause of the event was insufficient validation of vendor analysis inputs in 1993 while reviewing the AF diesel engine's ability to function during a turbine building HELB event.

The corrective actions planned are to develop and install a permanent modification to re-route the AF diesel engine intakes for Unit 1 and 2.

NRC FORM 366A
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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 Infocollections.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-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	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Byron Station – Unit 1	05000454	2016	- 001	- 00

NARRATIVE

A. Plant Operating Conditions Before the Event:

Event Date: March 4, 2016

Unit: 1 Mode: 1 Reactor Power: 100 percent
 Unit: 2 Mode: 1 Reactor Power: 100 percent

Unit 1 Reactor Coolant System (RCS) [AB]: Normal operating temperature and pressure
 Unit 2 Reactor Coolant System: Normal operating temperature and pressure

No structures, systems or components were inoperable at the start of this event that contributed to the event.

B. Description of Event:

On March 4, 2016, during the Braidwood NRC Component Design Basis Inspection, a concern was raised regarding why it was acceptable for the diesel driven auxiliary feedwater (AF) [BA] pump engine combustion air intake to be located in the turbine building, a non-safety related structure. Combustion air intake draws air from the turbine building via an intake pipe that enters the safety-related auxiliary building to the AF diesel room.

During the review of documentation related to the air intake for Byron Station, it was identified that the existing configuration did not adequately support diesel engine operation with high energy line break (HELB) environmental conditions in the turbine building. Prior evaluations did not fully account for the combustion air being a steam-air mixture in a post-HELB environment that reduces the available air density during the event.

This issue was determined to be applicable to Byron Station and on March 7, 2016 at 0400 hours, Byron Operations entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.7.5, "Auxiliary Feedwater (AF) System," Condition A, "One AF train inoperable," for one train (B-train) of AF inoperable for both Units 1 and 2. NRC Event Notification (ENS) 51772 was made on March 7, 2016 at 1118 hours.

A temporary configuration change was implemented to provide engine combustion intake air from the auxiliary building. The change allowed air from the AF diesel-driven pump rooms to supply the Unit 1 and Unit 2 AF diesel engines and a wire mesh screen cap was installed to prevent incidental intrusion of debris that could be present in the proximity of the air intake. On March 8, 2016, following the installation of changes, the Byron AF trains were declared operable. Additionally, compensatory measures were implemented to 1) monitor for a potential radioactive material release from the engine exhaust to the atmosphere, and 2) institute a fire watch due to the configuration change disabling the CO2 system and opening the doors for the AF diesel rooms.

This condition is reportable in accordance with 10CFR50.73(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. Additionally, TS LCO 3.7.5 Condition A requires restoring the AF train to OPERABLE status within 72 hours. As the AF combustion air intake was installed per the original plant design, this condition existed for a longer period of time than is allowed by LCO 3.7.5 Condition A. Therefore, this event is also being reported pursuant to 10 CFR 50.73(a)(2)(i)(B), any operation or condition which was prohibited by TSs. Further, as there were multiple times during the past three years where the Unit 1 and Unit 2 A-train AF system were inoperable for surveillance testing, this event is also being reported pursuant to 10 CFR 50.73(a)(2)(v)(B) as a condition that could have prevented the fulfillment of a system's safety function.

NRC FORM 366A
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Byron Station – Unit 1	05000454	2016	- 001	- 00

NARRATIVE

C. Cause of Event:

The cause of the condition of inadequate combustion air available for AF diesel engine operation during a FW HELB was insufficient validation of vendor analysis inputs in 1993 while reviewing the AF diesel engine's ability to function during a turbine building HELB event. The technical error originated from the AF diesel engine manufacturer. An engineering product that was completed in 1993 utilized the vendor input as a fact and did not perform any independent reviews or analysis to verify the vendor's conclusion.

D. Safety Consequences:

This condition had no actual safety consequences impacting plant or public safety since Byron Station has not experienced a turbine building HELB event.

During a postulated design basis Main Feedwater (FW) HELB event in the turbine building, the diesel-driven AF pump may not be functional due to the lack of oxygen available at the combustion air intake located in the turbine building. Included in the design basis event is a single active failure of the A-train AF pump which would result in the loss of safety function of the AF system. During this postulated event, the RCS would heat up and the resultant volume expansion would begin filling the pressurizer. Station procedures include steps to restore AF flow or a non-safety related water supply to the secondary-side of the steam generators. If all attempts to restore a secondary heat sink are unsuccessful, "feed and bleed" operations would be implemented to cool the RCS while secondary heat sink restoration efforts continued.

The adverse turbine building conditions would be present for a limited duration based on the finite volume in the secondary water systems and the ability to manually isolate a postulated pipe break. As the turbine building conditions return to normal, air would become available at the diesel-driven AF pump combustion air intake and AF flow would be restored to the steam generators if required.

This event has a low safety significance based on the historical availability of the A-train AF pump, the limited population of secondary pipe breaks (low probability of occurrence) which would adversely affect the B-train AF pump, and the ability to restart the B-train AF pump when the turbine building conditions return to normal.

E. Corrective Actions:

Corrective Actions Completed – A temporary configuration change was completed to provide engine combustion air intake from the auxiliary building, and install a wire mesh screen cap to prevent incidental intrusion of debris into the air intake. Additionally, compensatory measures were implemented to monitor for a potential radioactive material release from the engine exhaust to the atmosphere and to institute a fire watch due to the configuration change disabling the CO2 system and opening the doors for the AF diesel rooms.

Corrective Actions planned – Develop and install a permanent modification to re-route the AF diesel engine intakes for Unit 1 and 2.

NRC FORM 366A
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



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

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	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Byron Station – Unit 1	05000454	2016	- 001	- 00

NARRATIVE

F. Previous Occurrences:

There have been no previous Licensee Event Reports at Byron on this issue.

G. Component Failure Data:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model</u>	<u>Mfg. Part Number</u>
N/A	N/A	N/A	N/A