



SVP-19-086

10 CFR 50.73

December 20, 2019

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

Quad Cities Nuclear Power Station, Unit 1
Renewed Facility Operating License No. DPR-29
NRC Docket No. 50-254

Subject: Licensee Event Report 254/2019-003-00 "Water Found in Control Room Emergency Ventilation Air Filtration Unit"

Enclosed is Licensee Event Report 254/2019-003-00 "Water Found in Control Room Emergency Ventilation Air Filtration Unit", for Quad Cities Nuclear Power Station, Unit 1.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) for any operation or condition which was prohibited by the plant's Technical Specifications. It is also being submitted in accordance with 10 CFR 50.73(a)(2)(v)(D) for any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact Rachel Luebke at (309) 227-2813.

Respectfully,

A handwritten signature in black ink, appearing to read "K. S. Ohr", written over a horizontal line.

Kenneth S. Ohr
Site Vice President
Quad Cities Nuclear Power Station

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station



LICENSEE EVENT REPORT (LER)

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

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 Information Services Branch (T-2 F43), 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, NE08-10202, (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

Quad Cities Nuclear Power Station, Unit 1

2. Docket Number

05000254

3. Page

1 OF 4

4. Title

Water Found in Control Room Emergency Ventilation Air Filtration Unit

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
10	27	2019	2019	003	00	12	20	2019	Quad Cities Nuclear Power Station Unit 2	05000265
									Facility Name n/a	Docket Number 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 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)
100	<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 checked="" 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)	Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact

Richard Swart – Regulatory Assurance

Telephone Number (Include Area Code)

309-227-2810

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
X	KP	ISV	B350	Y	N/A				

14. Supplemental Report Expected

15. Expected Submission Date

☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No

Month	Day	Year
n/a		

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On October 27, 2019, at 1605 hours CDT, the Quad Cities Nuclear Power Station (QCNP) Unit 1 and Unit 2 Control Room Emergency Ventilation (CREV) system was declared inoperable due to finding water in the Air Filtration Unit (AFU) filter housing. Water leaked into the B CREV AFU through an air operated fire suppression system isolation valve and sprinkler heads internal to the AFU resulting in partial submersion of the AFU filters. Maintenance on the isolation valve actuator on October 10, 2019, did not include post-maintenance testing, which resulted in inadvertently leaving the valve in a condition that provided a path for leakage into the AFU.

The cause of the event was an absence of adequate work instructions for the performance of effective post-maintenance testing. Immediate Corrective actions completed include replacement of the AFU filters. Followup Corrective actions include a repair of the valve, and improvements to the model work order.

This is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), any operation or condition which was prohibited by the plant's Technical Specifications, for the CREV system being inoperable longer than the seven (7) days allowed by Technical Specification 3.7.4, "Control Room Emergency Ventilation (CREV) System.". It is also being reported under 10 CFR 50.73(a)(2)(v)(D), any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

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

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Quad Cities Nuclear Power Station Unit 1	05000254	2019	- 003	- 00

NARRATIVE**PLANT AND SYSTEM IDENTIFICATION**

General Electric - Boiling Water Reactor, 2957 Megawatts Thermal Rated Core Power

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

EVENT IDENTIFICATION

Water Found in Control Room Emergency Ventilation Air Filtration Unit

A. CONDITION PRIOR TO EVENT

Unit: 1 Event Date: October 27, 2019 Event Time: 1605 hours CDT
Reactor Mode: 1 Mode Name: Power Operation Power Level: 100%

There were no other structures, systems or components (SSC) inoperable during this event time period that could have contributed to this event.

B. DESCRIPTION OF EVENT

On October 10, 2019, maintenance was performed on the Fire Protection Air Operated Valve (AOV)[ISV] 0-4199-315 in the B Control Room Emergency Ventilation (CREV)[VI] System's Air Filtration Unit (AFU)[AHU]. AOV 0-4199-315 is a single isolation between the fire system header and the sprinkler heads in the AFU. These sprinkler heads are a system feature to address potential fires in the AFU charcoal beds. The scope of the AOV 0-4199-315 maintenance included a rebuild of the actuator. The expected post-maintenance test (PMT) requirement should be full stroke of the valve and verification of proper seating; however, there were no instructions provided for generating the proper system logic to fully stroke the AOV, so the PMT was not performed. Issue Report (IR) 4287032 was generated on October 11, 2019, to document the lack of an adequate PMT. AOV 0-4199-315 was left in a closed position, and the isolation valves related to the maintenance boundary were returned to their full open positions on October 11, 2019. This allowed fire header pressure to reach AOV 0-4199-315, which subsequently leaked water past the valve seat and through to the sprinkler heads in the AFU.

On October 27, 2019, an Equipment Operator (EO) observed water dripping from the CREV system AFU. Further inspection revealed that approximately three (3) inches of the bottom Charcoal Filter Drawers, the Pre-filter, and Post HEPA Filters were submerged in water. Consequently, the AFU was determined to be unable to perform its design function and was declared inoperable. The source of the water intrusion was seat leakage from the AOV 0-4199-315. Therefore, this event is reportable under 10 CFR 50.73(a)(2)(v)(D), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

On October 27, 2019, at 2236 hours ET, ENS #54355 was made to the NRC in accordance with 10 CFR 50.72(b)(3)(v)(D) as an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Quad Cities Nuclear Power Station Unit 1	05000254	YEAR	SEQUENTIAL NUMBER	REV NO.
		2019	- 003	- 00

NARRATIVE

Based on the amount of water found in the AFU on October 27, 2019, it is conservatively assumed that leakage past AOV 0-4199-315 started when the isolation from the fire protection system was removed on October 11, 2019 following maintenance. It is also conservatively assumed that the AFU was not functional from October 11, 2019, until the filters were replaced and the AFU returned to service on October 29, 2019. This 18 day period exceeds the seven (7) day Completion Time allowed under Technical Specification (TS) 3.7.4 Condition A. Therefore, this event is also reportable under 10 CFR 50.73(a)(2)(i)(B), for any operation or condition which was prohibited by the plant's Technical Specifications.

C. CAUSE OF EVENT

Due to lack of instructions in Work Order (WO) 1845827, a PMT to stroke AOV 0-4199-315 to verify full disk to seat contact following maintenance activities was not performed.

Previous WO No. 345740 which entailed performing the same work scope in 2005 included PMT instructions to verify that the valve did not leak. This information was not included in the 2019 WO.

The cause of the event is inadequate technical human performance in the preparation and review of the 2019 work instructions. A contributing cause is a lack of questioning attitude on both the scope of the work and the possible outcomes of the work.

D. SAFETY ANALYSIS

System Design

Habitability systems are provided to ensure that Main Control Room operators are able to remain in the Main Control Room and operate the plant safely under normal conditions and to maintain the plant in a safe condition under accident conditions. The worst-case design basis accident (DBA) for habitability considerations is postulated as a loss of coolant accident (LOCA) with main steam isolation valve leakage at TS limits.

Per Updated Final Safety Analysis Report (UFSAR) Section 6.4, "Habitability Systems," the Control Room Heating, Ventilation, and Air Conditioning (HVAC) systems are capable of maintaining the control room atmosphere suitable for occupancy throughout the duration of a DBA. The AFU provides filtration functions to support CREVs operation. The emergency operation of CREVs does require manual actions.

Per UFSAR Section 6.5.1.2, "Control Room Ventilation System Filter Pack," temperature is monitored at the filter pack inlet, after the electric heater and after the activated carbon adsorber bed. The temperature element after the activated carbon adsorber provides an interlock to allow the fire protection deluge to be activated.

Safety Impact

Per TS Bases 3.7.4, the CREV System is considered operable when a booster fan is operable, High Efficiency Particulate Air (HEPA) filter and charcoal adsorbers are not excessively restricting flow and are capable of performing their filtration functions, the heater, ductwork, valves, and dampers are operable, and air circulation through the filter train can be maintained.

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

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1. FACILITY NAME

Quad Cities Nuclear Power Station Unit 1

2. DOCKET NUMBER

05000254

3. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2019	- 003	- 00

NARRATIVE

The wetting of the charcoal filter, prefilters, and HEPA filters, precluded the capabilities of the AFU to perform the expected filtration functions. Air flow may have also been restricted; therefore, CREV system was declared inoperable as a result of this condition. An exact time of inoperability could not be determined, so the date that the work isolation boundary was removed, October 11, 2019, is conservatively considered the start time. This time period exceeds the seven (7) day Completion Time for TS 3.7.4, Condition A, Required Action A.1.

Risk Insights

The plant Probabilistic Risk Assessment (PRA) model gives no credit to the Control Room Envelope (CRE) and does not include it in the model; hence, the CREV AFU filter wetting event did not contribute to a measurable increase in risk.

This event is a Maintenance Rule Functional Failure (MRFF) and a Safety System Functional Failure (SSFF).

E. CORRECTIVE ACTIONS**Immediate:**

1. Isolated fire suppression system leakage
2. Replaced charcoal trays, prefilters, and HEPA filters.

Follow-up:

1. Repair AOV 0-4199-315 to ensure proper seat leakage.
2. Correct the model work orders to include proper PMT instructions.
3. Modify the fire protection deluge line to the AFU to provide additional protection against filter wetting.

F. PREVIOUS OCCURRENCES

No previous LERs or Issue Reports were identified at QCNPS address wetting or submergence of AFU filters. No similar ICES/IRIS events were found in the last 10 years.

G. COMPONENT FAILURE DATA

Failed Equipment: VALVE, AOV; 1" 600# S/N 80349
Component Manufacturer: BW/IP INTERNATIONAL, INC.
Component Model Number: 104DA6.001
Component Part Number: N/A

This event has been reported to ICES/IRIS.