FENOC
FirstEnergy Nuclear Operating Company

5501 North State Route 2
Oak Harbor, Ohio 43449

Barry S. Allen
Vice President - Nuclear

419-321-7676
Fax: 419-321-7582

May 2, 2011

10 CFR 50.73

L-11-130

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

Subject:
Davis-Besse Nuclear Power Station, Unit 1
Docket Number 50-346, License Number NPF-3
Licensee Event Report 2011-003

Enclosed is Licensee Event Report (LER) 2011-003, "Radio Usage Renders Emergency Feedwater Inoperable." This LER is being submitted to provide written notification in accordance with 10 CFR 50.73(a)(2)(v)(A) and 10 CFR 50.73(a)(2)(v)(B) as a loss of safety function.

There are no regulatory commitments contained in this letter or its enclosure. The actions described represent intended or planned actions, are captured in the Davis-Besse Nuclear Power Station (DBNPS) Corrective Action Program, and are described for information only. If there are any questions or if additional information is required, please contact Mr. Patrick J. McCloskey, Manager – Site Regulatory Compliance, at (419) 321-7274.

Sincerely,

Barry S. Allen

Barry S. Allen

Enclosure: LER 2011-003-00

cc: NRC Region III Administrator
NRC Resident Inspector
NRR Project Manager
Utility Radiological Safety Board

IE22
NRR

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Davis-Besse Nuclear Power Station	05000346	1 OF 5

4. TITLE
Radio Usage Renders Emergency Feedwater Inoperable

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 05000
03	03	2011	2011	- 003 -	00	05	02	2011	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE: 1

10. POWER LEVEL: 100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☒ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☒ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Vicki A. Wadsworth, Advanced Nuclear Specialist, Regulatory Compliance	(419) 321-7690

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

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

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

On March 3, 2011, with the Davis-Besse Nuclear Power Station (DBNPS) operating at approximately 100 percent power, fire detector testing was being conducted at the Auxiliary Shutdown Panel (C3630). When a radio used by Instrumentation and Control personnel for communications was keyed twice while instrumentation cabinet doors were open, momentary reductions in the control signals to the Auxiliary Feedwater Pump and Motor Driven Feedwater Pump discharge valves occurred. These momentary signal reductions resulted in the rendering of all three trains of Emergency Feedwater inoperable for approximately two minutes.

The cause of this event was a station decision made in 1991 to remove the specific requirement to exclude radio usage in the vicinity of the Auxiliary Shutdown Panel. A sign restricting radio usage in the Auxiliary Shutdown Panel Room was installed shortly after this event occurred, and procedures will be revised to prohibit the use of portable radios within six feet of cabinets in the room when the cabinet doors are open. This event is being reported in accordance with 10 CFR 50.73(a)(2)(v)(A) and (B) as a loss of safety function.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Davis-Besse Unit Number 1	05000346	2011	-- 003 --	00	2 OF 5

NARRATIVE

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

DESCRIPTION OF EVENT:

System Description

The Emergency Feedwater (EFW) [BA] consists of two Auxiliary Feedwater (AFW) trains and the Motor Driven Feedwater Pump (MDFP) train.

The AFW System consists of two steam turbine driven AFW pumps, each of which provides a nominal 100 percent capacity and supplies water via two headers, each capable of feeding either steam generator. The AFW System provides a safety related source of feedwater to the secondary side of the steam generators in the event of a loss of normal feedwater [SJ] flow to remove reactor decay heat and to prevent over-pressurization of the Reactor Coolant System [AB]. Among other requirements for the Auxiliary Feedwater System is the requirement to remove decay heat via the steam generators in the event of a small break loss of coolant accident (LOCA). The AFW also prevents at least one Steam Generator from being boiled dry in the event of a Main Steam Line Break (MSLB). The specific amount of Auxiliary Feedwater flow required is dependent on the break size, but within the Auxiliary Feedwater System capacity for all break sizes that require Auxiliary Feedwater.

The Motor Driven Feedwater Pump (MDFP) train provides feedwater to the steam generators during normal plant startup and shutdown. The MDFP train is also designed to provide a backup supply of feedwater to the steam generators in the event of a total loss of both AFW and main feedwater (MFW). The MDFP discharge can be aligned to either the AFW System or the MFW System. During plant operation when reactor power is greater than 40 percent rated thermal power (RTP), the MDFP train is aligned as the EFW train and is capable of delivering water to both steam generators. In addition, since the MDFP uses the AFW flowpaths to discharge to the steam generators, the position of the steam generator inlet valves affects the MDFP in addition to the AFW pumps.

The Auxiliary Shutdown Panel (C3630) [IU-PL] provides an alternate location from which the reactor can be placed and maintained in a safe shutdown condition in the event the control room should become uninhabitable. The Auxiliary Shutdown Panel contains indication for pressurizer level, Reactor Coolant System pressure and temperature, Steam Generator level, and Main Steam pressure, and contains controls for the pressurizer heaters and Auxiliary Feedwater pump governor, and Service Water isolation valves.

Technical Specification(s):

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.7.5, requires three Emergency Feedwater (EFW) Trains, consisting of 2 trains of AFW and the Motor Driven Feedwater Pump (MDFP), be operable while the plant is operating in Modes 1, 2, 3 and Mode 4 when the steam generator is relied upon for heat removal. With one required train of EFW inoperable in Modes 1, 2 or 3, TS LCO 3.7.5 Condition B requires the inoperable EFW train be restored to Operable status in 72 hours (3 days). If this action and associated completion time cannot be met, or if two EFW trains are inoperable, then TS LCO 3.7.5 Condition D requires the plant be placed in Mode 3 in 6 hours and in Mode 4 in 12 hours.

NARRATIVE

Event Description:

On March 3, 2011, with the DBNPS operating in Mode 1 at approximately 100 percent power, Maintenance Instrument and Control technicians were performing a fire detection test in the Auxiliary Shutdown Panel Room. Two smoke detectors [IC-DET] are located inside the Auxiliary Shutdown Panel cabinet (C3630). The test for these detectors require local light verification of the fire alarm on the cabinet and verification of the testing at the local fire panel which is located outside the Auxiliary Shutdown Panel Room. For testing efficiency, the technicians used portable radios [FI] to communicate between the person performing the test in the field and a technician located at the local fire panel. The technician decided to leave both doors of the cabinet open when applying smoke to the detectors to allow for smoke to dissipate and not cause further alarms. When the technician keyed his radio (approximately two feet from the cabinet), he unknowingly affected electronic equipment. The control room received unexpected indications for Steam Generator level and pressure; Auxiliary Feedwater, High Pressure and Low Pressure Injection flow, Pressurizer level and Reactor Coolant System temperature and pressure. The change in Steam Generator level signal due to the radio usage resulted in a momentary reduction in the control signals to the Auxiliary Feedwater Pumps and Motor Driven Feedwater Pump discharge valves [BA-FSV].

Approximately 20 years ago, a modification was completed to replace the existing station antenna system and to expand the system to satisfy 10 CFR 50 Appendix R concerns. In preparation for this modification, a test was performed by vendor personnel to determine what safety-related plant equipment may be affected by radio transmissions. The testing was performed with a radio transmitter of greater power than the portable radios used in the plant. The final report recommended (in part) that the Auxiliary Shutdown Panel (Room 324) be posted with notices prohibiting radio use within six (6) feet when cabinet doors were open due to the susceptibility of the equipment in the Auxiliary Shutdown Panel to Electro-Magnetic Interference (EMI). However, following a meeting in 1991 between station personnel to establish a list of areas in the plant where radio usage would be restricted, the final restriction listing did not include the Auxiliary Shutdown Panel Room.

CAUSE OF EVENT:

The root cause for the momentary reductions in the control signals to the Auxiliary Feedwater Pump and Motor-Driven Feedwater Pump discharge valves was the station decision in 1991 to remove the specific requirement that had been put in place to exclude radio usage in the vicinity of the Auxiliary Shutdown Panel. The basis behind this inadequate station decision was not documented. The decision resulted in the Auxiliary Shutdown Panel not being labeled as a radio restricted area; thus allowing the use of radios within the vicinity of the Auxiliary Shutdown Panel.

A contributing cause is the lack of content and knowledge of procedure, DB-OP-06441, Radio Communication System. This procedure does not list the area in the vicinity of the Auxiliary Shutdown Panel (within 6 feet) as a radio restricted area when the cabinet doors are open and only provides a general recommendation for radio users to be advised not to operate their radios within two feet of plant electrical and electronic equipment. The maintenance personnel involved in the fire detection test were not aware of this procedure.

NARRATIVE

ANALYSIS OF EVENT:

When the technician keyed his radio in the vicinity of the Auxiliary Shutdown Panel, two momentary reductions (a total of 27 seconds in length) in the control signals to the Auxiliary Feedwater Pump and Motor Driven Feedwater Pump discharge control valves were experienced. These signal reductions would have caused the control valves to open and increase Emergency Feedwater flow to the Steam Generators if the equipment was operating. The control signals returned to normal after each momentary event.

Due to the Steam Generator startup level's induced signal, the Auxiliary Feedwater level controllers would have caused the Steam Generator level to increase. Increasing the flowrate would also cause an overcooling of the Reactor Coolant System (RCS). The overcooling of the RCS introduces positive reactivity into the core. Therefore, the potential for recriticality during a transient was evaluated. Review of the Davis-Besse Updated Safety Analysis Report (USAR) Chapter 15 accident analysis indicates that Auxiliary Feedwater is needed to mitigate several accidents including the loss of Main Feedwater, Main Steam Line break and a small-break LOCA. The Auxiliary Feedwater requirements for a loss of Main Feedwater event are more severe than other events that require operation of the Auxiliary Feedwater system. Also, the worst-case overcooling event and corresponding potential for recriticality occurs for a Main Steam Line event. A worst-case condition that is bounding for all transients was analyzed by computing the positive reactivity insertion associated with the worst-case increase in the Auxiliary Feedwater flowrate due to the induced signal. This reactivity change was then compared to the reactivity margin available for the Main Steam Line break.

Based on the evaluation performed, it can be concluded that sufficient design margin is available to accommodate the worst-case induced Auxiliary Feedwater flowrate increase of 800 gallons per minute for a conservative duration to both Steam Generators. If the temporary Auxiliary Feedwater flowrate increase would have occurred during any of the transients described in the USAR, the performance of all plant systems would have been acceptable. Therefore, this event was of very low safety significance.

Reportability Discussion:

During the time the radio was in use at the Auxiliary Shutdown Panel, Radio Frequency Interference caused the Steam Generator level signals to the level control valves for both trains of Auxiliary Feedwater and the Motor Driven Feedwater pump to be momentarily reduced, rendering all 3 trains of Emergency Feedwater inoperable. With all trains of Emergency Feedwater inoperable, this issue represented an event or condition that at the time of discovery could have prevented the fulfillment of a safety function of a system needed to (A) shutdown the reactor and maintain it in a safe shutdown condition and (B) remove residual heat which is reportable per 10 CFR 50.73(a)(2)(v)(A) and (B).

On March 3, 2011, at 2011 hours, the NRC Operations Center was notified of the loss of safety function as required by 10 CFR 50.72(b)(3)(v)(A) and (B), (Event Number 46653).

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Davis-Besse Unit Number 1	05000346	2011	-- 003 --	00	5 OF 5

NARRATIVE

CORRECTIVE ACTIONS:

The affected instrumentation was verified to be indicating correctly following the event and declared operable per the Technical Specifications.

A sign was installed shortly after this event occurred restricting radio usage within the Auxiliary Shutdown Panel Room. This sign will be replaced with specific signs restricting radio usage within six feet of specified cabinets when the cabinet doors are open. An action to revise and post plant sign notices to include restrictions on cell phone usage has also been initiated.

The basis for radio usage restrictions from the vendor's final test report will be developed and captured in appropriate site document(s).

Procedures that govern in-plant radio communications and security communications will be revised to prohibit the use of portable radios in the Auxiliary Shutdown Panel area as well as other areas identified in the vendor's final test report.

Training will be provided to the appropriate personnel to ensure awareness and adherence to radio communication use in the vicinity of plant equipment.

PREVIOUS SIMILAR EVENTS:

No prior similar events involving radio usage adversely affecting plant equipment at the DBNPS were identified.