FirstEnergy

Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, Ohio 43449-9760

NP-33-00-004-00

Docket No. 50-346

License No. NPF-3

May 20, 2000

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Ladies and Gentlemen:

LER 2000-004
Davis-Besse Nuclear Power Station, Unit No. 1
Date of Occurrence - April 22, 2000

Enclosed please find Licensee Event Report 2000-004, which is being submitted to provide written notification of the subject occurrence. This LER is being submitted in accordance with 10CFR50.73(a)(2)(v).

Very truly yours,

James H. Lash
Plant Manager
Davis-Besse Nuclear Power Station

GMW/s

Enclosure

cc: Mr. J. E. Dyer, Regional Administrator, USNRC Region III
Mr. K. S. Zellers, DB-1 NRC Senior Resident Inspector
Utility Radiological Safety Board

IE22

RGN-001

COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station in this document. Any other actions discussed in the submittal represent intended or planned actions by Davis-Besse. They are described only as information and are not regulatory commitments. Please notify the Manager - Regulatory Affairs (419-321-8466) at Davis-Besse of any questions regarding this document or associated regulatory commitments.

COMMITMENTS	DUE DATE
1. Discuss event, including the causes and corrective actions with all Electrical Shop, licensed Operators, and Plant Engineering personnel to reinforce the use of self-checking and peer checking event free tools. Also discuss management expectations for personnel behavior in knowledge-based situations.	1. June 30, 2000
2. Integrate this event, including causes, corrective actions, and lessons learned, into the initial and continuing training programs for Electrical and Control maintenance personnel.	2. July 14, 2000
3. Review the two previous performances of similar bus transfer tests to ensure that any previous lessons learned, such as test deficiencies, have been incorporated into the bus transfer tests as applicable. Modify test procedures as necessary.	3. August 31, 2001
4. Review the control room transformer lockout alarm procedures to verify that they reflect current operating characteristics of the alarms. Review the operation of the control room bus lockout alarms to determine if these alarms operate similar to the transformer lockout alarms. Identify any bus or transformer lockout alarm procedure changes necessary to reflect current operating characteristics of the alarm.	4. June 16, 2000

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50.0 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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)

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TITLE (4)

Personnel Error During Bus Transfer Testing Results In Loss of Offsite Power

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	22	2000	2000	-- 004 --	00	05	20	2000		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	D	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	000		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)	X	50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Gerald M. Wolf, Engineer - Licensing	(419) 321-8114

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

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

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (if yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 22, 2000, with the reactor defueled, a loss of offsite power occurred during performance of the Off-Site AC Sources Bus Transfer Test. Due to the test configuration, all station loads were powered from a single offsite source via Startup Transformer 01. When the Startup Transformer 02 lockout alarm automatically cleared during testing, the cause of the unexpected alarm response was investigated. The electrician checking the status of the lockout relays mistakenly checked the relays on the wrong side of the electrical panel, which were for the main generator instead of Startup Transformer 02. While checking the status of the relays, a main generator protection relay was actuated, which locked out the only available offsite AC power source, resulting in the loss of offsite power. Both emergency diesel generators started and loaded onto their respective essential buses. Offsite power was restored in ten minutes, and an Unusual Event was declared due to the loss of offsite power. This event is being reported in accordance with 10CFR50.73(a)(2)(v) as an event or condition that alone could have prevented the fulfillment of a safety function.

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

DESCRIPTION OF OCCURRENCE:

Davis-Besse Nuclear Power Station (DBNPS) Technical Specification Surveillance Requirement 4.8.1.1.1.b states that each qualified circuit between the offsite transmission network and the onsite Class 1E A.C. electrical power distribution system be demonstrated operable at least once each refueling interval during shutdown by manually and automatically transferring unit power supply to each of the offsite circuits. On April 22, 2000, during the twelfth refueling outage with the reactor defueled, Surveillance Test DB-SC-03022, Off-Site AC Sources Bus Transfer Test, was initiated to fulfill this Surveillance Requirement. All station loads were being powered from the 345 kV Bayshore line [FK] through Startup Transformer 01 [EA-XFMR] and 13.8 kV bus A [EA-BU] in accordance with this test to allow testing to be conducted on 13.8 kV bus B. Refer to Figure 1 for a diagram of the DBNPS electrical system.

With switchyard breaker 34563 [FK-BRKR] open, an automatic (fast dead) transfer of Bus B from Startup Transformer 02 to Startup Transformer 01 was performed by simulating a fault on Startup Transformer 02. Breaker HX02B [EA-BRKR] tripped isolating Bus B from Startup Transformer 02, and breaker HX01B closed to power Bus B from Startup Transformer 01. Switchyard breakers 34562 and 34564 and Ohio Edison breakers B-88 and B-115 at the Beaver Substation opened to isolate Startup Transformer 02 from the 345kV distribution system. All associated equipment performed as expected. Annunciator alarm 1-1-G, Startup Transformer 02 Lockout, was also illuminated as expected in the control room.

The test leader (an Operations Advisor with a Senior Reactor Operator's License) then contacted the FirstEnergy load dispatcher per the test procedure to check that the breakers at the Ohio Edison Beaver Substation opened as expected. While discussing the step with the load dispatcher, the test leader was informed by the Reactor Operator (RO) that annunciator alarm 1-1-G, when acknowledged by the RO, had cleared (the light had extinguished). The test leader considered the clearing of the alarm to be inappropriate. The test leader thought that the alarm would stay illuminated until the lockout relays [EA-86], and the lockout, were reset in accordance with the test procedure.

The test leader requested an electrician check if the Startup Transformer 02 lockout relays in cabinet C5750B had energized. These relays were listed in the procedure and a status check of these relays is the next procedure step to be completed. The procedure, which the electrician had in hand, listed the relays as being "...inside panel C5750B on the rear left panel." The rear left panel of C5750B contains the relays for Startup Transformer 01 and 02; the rear right panel of C5750B contains similar relays for the main generator. The relays in each side of the panel perform similar functions for either the startup transformers or the main generator, and have similar labeling based on the function of the relay. The electrician entered C5750B, looked at the rear right panel, and found relays labeled XG, XH, XJ, XK, and XF as expected. These relays did not have complete labels on them as described in the test procedure such as 86-1B/X02 XG. The electrician visually inspected each relay, announcing to the test leader that relays XG, XH, and XJ were not energized as expected. The electrician then tried checking the relay labeled XK. At this point the

DESCRIPTION OF OCCURRENCE: (Continued)

electrician was looking at relay 74-B/GX(XK), which is a main generator protection relay, instead of the relay he should have been looking at, 86-4B/X02(XK), which is for Startup Transformer 02.

The electrician was able to visually determine the status of the XG, XH, and XJ relays through the glass window of the relay covers. However, the status of the 74-B/GX(XK) relay could not be determined through the relay cover window. Therefore, the electrician removed the cover from the XK relay to determine its status (energized or de-energized). With the cover off, he still could not identify from visual inspection the status of relay XK. The electrician touched the front of the relay to discern, by vibration, if the relay was energized. This resulted in actuation of the XK relay.

The actuation of the main generator protection relay 74-B/GX(XK) at 2340 hours on April 22, 2000, caused a lockout of the main generator [EL-TG] and main transformer [EL-XFMR], opening switchyard breakers 34560 and 34561. This interrupted the circuit between the Bayshore line and Startup Transformer 01, resulting in a loss of offsite power. Both emergency diesel generators [EK-DG] started and loaded onto their respective essential buses. The loss of offsite power resulted in a loss of flow in the spent fuel pool cooling system [DA] since the spent fuel pool cooling system is not powered from an essential electrical bus (the reactor core was off-loaded to the spent fuel pool at the time). Station and instrument air alarms were also received due to the loss of electrical power to the air compressors.

At 2350 hours, the lockout relays were reset for Startup Transformer 01. Switchyard breaker 34561 was reclosed by the load dispatcher to re-energize Startup Transformer 01, and then 13.8 kV buses A and B were re-energized to restore offsite power to the station. Following the restoration of offsite power, the lockout relays were reset for Startup Transformer 02, and Ohio Edison breakers B-88 and B-115 at the Beaver Substation were reclosed by the load dispatcher to re-energize Startup Transformer 02. Switchyard breakers 34562 and 34564 were then reclosed by the load dispatcher to reconnect the Bayshore Line to the switchyard.

At 0010 hours on April 23, 2000, An Unusual Event was declared in accordance with Emergency Action Level 4.A.1, "Loss of Offsite Power Or Loss of Onsite AC Power Capability," of the DBNPS Emergency Plan. The NRC was notified of the Unusual Event at 0038 hours, and at 0054 hours, the Unusual Event was terminated since offsite power had been restored. At 0205 hours the main transformer lockout was reset, and at 0215 hours switchyard breakers 34560 and 34561 were closed to restore the switchyard ring bus.

This event is being reported in accordance with 10CFR50.73(a)(2)(v) as an event or condition that alone could have prevented the fulfillment of a safety function. This is in accordance with the guidance contained in NUREG-1022, Event Reporting Guidelines, that if either offsite power or onsite emergency

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DESCRIPTION OF OCCURRENCE: (Continued)

power is unavailable to the plant (i.e., completely lost), it is reportable regardless of whether the other system is available. General Design Criterion 17 defines the safety function of each electrical system as providing sufficient capacity and capability, etc., assuming that the other system is not available.

APPARENT CAUSE OF OCCURRENCE:

Self-checking and peer checking were not applied to ensure the correct component was identified while investigating the unexpected alarm behavior. This resulted in the electrician removing the cover of a relay in the wrong side of the cabinet, touching the relay, and inadvertently actuating the relay, causing the loss of offsite power.

Test deficiencies were written during the two previous performances of the Off-Site AC Sources Bus Transfer Test in 1998 and 1996, stating that the Startup Transformer Lockout annunciator alarm cleared before the lockout was reset. The resolution of these deficiencies was that the lockout annunciator alarm performed as designed, and automatic clearing of the annunciator is normal. This information was not added to the test procedures. This resulted in the test leader requesting verification of relay status in order to investigate the cause of the unexpected alarm behavior.

ANALYSIS OF OCCURRENCE:

The reactor was defueled during the performance of the Off-Site AC Sources Bus Transfer Test. The reactor core had been off-loaded to the spent fuel pool in order to perform 10-year inservice inspections on the reactor vessel. When the loss of offsite power occurred, normal cooling flow to the spent fuel pool was lost. Both emergency diesel generators started and loaded onto their respective safety buses. Operators monitored the heat-up of the spent fuel pool while offsite power was unavailable, and observed that the temperature increased no more than one degree Fahrenheit during the time there was no cooling flow to the spent fuel pool. Decay Heat Train 1 was available, with power from Emergency Diesel Generator 1, for cooling of the spent fuel pool if necessary during the ten minutes offsite power was unavailable. Decay Heat Train 2 was not available during the event due to maintenance. The spent fuel pool pumps were restarted 17 minutes following restoration of off-site power.

Based on the plant conditions during this event, reactor defueled, and the availability of Decay Heat Train 1 to provide long-term cooling to the spent fuel pool, this loss of offsite power had minimal safety significance.

CORRECTIVE ACTIONS:

Following the loss of offsite power, stand-down meetings were held to communicate the event and management expectations to station workers. Following the stand-down meetings, additional management oversight was provided during pre-evolution briefs to ensure the critical aspects of the activity were

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CORRECTIVE ACTIONS: (Continued)

adequately addressed. Additional management oversight was also provided in the field to reinforce the desired behaviors to prevent human errors.

The test procedure (DB-SC-03022) was altered on April 26, 2000, to use alternate indication to verify the status of the subject relays instead of direct observation of the relay contacts. The test procedure was also changed to provide information regarding the automatic clearing feature of the startup transformer lockout annunciator alarm. This test was successfully performed on April 30, 2000, to fulfill Technical Specification Surveillance Requirements.

This event, including the causes and corrective actions, will be discussed with all Electrical Shop personnel and all licensed Operators to reinforce the use of self-checking and peer checking event free tools. This event will also be discussed with all Plant Engineering personnel, who often act as test leaders. Management expectations for personnel behavior in knowledge-based situations will also be discussed. These discussions will be conducted by June 30, 2000. Furthermore, this event, including causes, corrective actions, and lessons learned will be integrated into the initial and continuing training programs for Electrical and Control maintenance personnel by July 14, 2000.

The previous two performances of similar bus transfer tests will be reviewed to ensure that any previous lessons learned, such as test deficiencies, have been incorporated into the bus transfer tests as applicable. This review, including any necessary procedure modifications, will be completed by August 31, 2001.

The control room transformer lockout alarm procedures will be reviewed to verify that they reflect current operating characteristics of the alarms (such as clearing when acknowledged vice when the lockout is reset). The operation of the control room bus lockout alarms will be reviewed to determine if these alarms operate similar to the transformer lockout alarms. Any bus or transformer lockout alarm procedure changes necessary to reflect current operating characteristics of the alarm will be identified by June 16, 2000.

FAILURE DATA:

DBNPS LER 98-006 documents an event where a tornado and accompanying straight-line winds, rain and lightning damaged switchyard components and transmission lines, resulting in a complete loss of offsite power. None of the lessons learned from the tornado event would have prevented the loss of offsite power that occurred during performance of the Off-Site AC Sources Bus Transfer Test. No other previous similar events have occurred at the DBNPS.

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

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FIGURE 1-DAVIS-BESSE ELECTRICAL DISTRIBUTION SYSTEM