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ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Serial No. 11-252
LIC/NW/R0
Docket No.: 50-305
License No.: DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
LICENSEE EVENT REPORT 2011-002-00

Pursuant to 10 CFR 50.73, Dominion Energy Kewaunee, Inc., hereby submits the following Licensee Event Report applicable to Kewaunee Power Station.

Report No. 50-305/2011-002-00

This report has been reviewed by the Facility Safety Review Committee and will be forwarded to the Management Safety Review Committee for its review.

If you have any further questions, please contact Mr. Richard Repshas at (920) 388-8217.

Very truly yours,

Stephen E. Scace
Site Vice President, Kewaunee Power Station

Attachment(s)

Commitments made by this letter: NONE

IE22
NRR

cc: Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
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Lisle, IL 60532-4352

Mr. K. D. Feintuch
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NRC Senior Resident Inspector
Kewaunee Power Station

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

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 Service (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
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4. TITLE

Loss of Station Backfeed Results in Loss of One Train of Offsite Power During Refueling Outage

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	10	2011	2011	-- 002 --	00	05	03	2011	FACILITY NAME	05000

9. OPERATING MODE

6

10. POWER LEVEL

0%

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
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (*include Area Code*)
Timothy Olsowy	(920) 388-8796

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

☐ 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*)

At 1549 CST on March 10, 2011 with the plant shutdown and the reactor defueled, power was lost to safeguards 4160 volt bus 6. Emergency diesel generator B started and re-energized bus 6. At the time of the event, bus 6 was energized from the main auxiliary transformer on backfeed. The event was caused by the opening of the 138kV breaker TA2066 as a result of an error by technicians working in the substation.

All equipment operated as expected for the voltage restoration to safeguards bus 6. Safeguards bus 5 remained energized from offsite power through the tertiary auxiliary transformer during the event. Spent fuel pool cooling train A remained in operation during the event. Spent fuel cooling train B was restarted following restoration of power to bus 6.

The event also caused loss of non-safeguards 4160 volt bus 4. In response to the loss of power to bus 4, the technical support center/station blackout diesel generator started but failed to load on 480 volt bus 46 resulting in continued loss of power to the technical support center.

This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A) for any event or condition that resulted in the automatic actuation of emergency ac electrical power systems.

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NARRATIVE

Event Description:

At 1549 CST on March 10, 2011 with the plant shutdown and the reactor [RCT] defueled, power was lost to train B, safeguards 4160V bus [BU] 6. Emergency diesel generator (EDG) [DG] B automatically started and re-energized bus 6. At the time of the event, bus 6 was energized while on backfeed from the substation [FK] through the station's main auxiliary transformer (MAT) [XFMR] with the main generator [GEN] links removed. Train A safeguards 4160V bus [BU] 5 remained energized from offsite power through the tertiary auxiliary transformer (TAT) [XFMR] at the time of the event.

During normal power operation, power is supplied to the station from the grid through the TAT supplying safeguards 4160V bus 5 and the reserve auxiliary transformer (RAT) [XFMR] supplying safeguards bus 6. Power generated from the station is sent through the MAT supplying the station's non-safeguards 4160V buses [BU] 1 through 4 and the grid. During the time of this event, the station was in a refueling outage and the RAT was out of service. Power to the station was being supplied through the available normal offsite supply of the TAT to bus 5 and buses 3, 4, and 6 were being powered by backfeed through the MAT.

This event occurred as a result of work ongoing in the substation. Individuals in the south control house (SCH) were performing functional testing of breakers RA-199W [BU] and RA-199E [BU] which included testing a breaker failure trip output signal from the breaker RST-199 [BU] to RA-199E. These breakers are 138kV breakers that supply power to a new Reserve Supply Transformer (RST) [XFMR] which steps the voltage down from 138kV (supply from the grid) to 20kV (an intermediate voltage). The RST-199 breaker is a new breaker that connects the output breaker from the RST to the RAT which steps down the 20kV (intermediate voltage) to 4160V for plant use. RST-199 has a breaker failure trip signal that feeds breaker RA-199E. Protective relaying [RLY] is used by the power generation and distribution systems to control and minimize the effects of any failures that may occur in the electrical systems. The protective relay scheme is to disconnect a faulty part of the power system from portions that are not affected. Testing was being performed on this new configuration to ensure the protective relaying functions were working as part of a plan to make the system operational by the end of the current refueling outage.

The individuals in the SCH had successfully performed functional testing on RA-199W and had moved on to RA-199E. As part of the functional testing, the trip signal (output 204) from RST-199 to RA-199E needed to be tested. The technician was to perform the testing by plugging a local computer into the serial port on the front of RST-199 panel and inject a test signal, output 204, which is the RST-199 breaker failure relay output to RA-199E.

Because of problems with the battery of the computer being used to provide the test signal through the serial port, technicians decided to use another method to test the relay. This involved remotely inputing a test signal to the relay by use of another computer through the network server. The technician selected what he believed was the RST-199 relay, but in fact had chosen the TST-199 relay.

The TST-199 breaker was the in-service breaker supplying power from the substation to the plant through the TAT. Output 204 exists for both RST-199 and TST-199. The test signal was generated and tripped the TST-199 relay, which caused a partial loss of power in the plant. The technicians in the SCH initially believed the loss of power was caused by another activity of a line-switching evolution that was in progress and started investigating other potential causes. Subsequently, they identified that breaker TA-2066 [BKR] was open. Further review identified the test signal had been sent to the output 204 contact for TST-199 rather than RST-199.

When TA-2066 tripped open, there was a loss of backfeed power to the MAT that resulted in bus 6 being deenergized. The loss of power resulted in both the EDG B and the technical support center/station blackout diesel generator (TSC EDG) [DG] to automatically start as designed. Bus 5 remained energized from the TAT.

With power lost to buses 3 and 4, there was loss of various station service loads. EDG B automatically loaded onto bus 6 as designed and energized bus 6. The TSC EDG failed to automatically load onto bus 46. With the loss of bus 4 and failure of the TSC EDG to power 480V bus 46, the Technical Support Center (TSC) was rendered non-functional due to loss of power. The TSC EDG, which continued to run unloaded, tripped approximately 43 minutes later on high temperature due to no power being available to its support equipment.

Later on the day of the event at 1802 CST, power was restored in the substation to the station's main generator output breaker by reclosing breaker TA-2066. All power restoration through the MAT backfeed was completed and the EDG B was stopped at 2059 CST.

This event was reported in NRC Event Notification Number 46666 on March 10, 2011. Reporting was made pursuant to a valid system actuation under 10 CFR 50.72(b)(3)(iv)(A) for any event or condition that resulted in automatic actuation of emergency diesel generators and under 10 CFR 50.72(b)(3)(xiii) for being considered as a loss of emergency assessment capability due to loss of power to the TSC.

Event and Safety Consequence Analysis:

At the time of this partial loss of offsite power event, the fuel in the reactor was offloaded and both spent fuel pool pumps [DA] A and B were operating. The time to boil in the spent fuel pool assuming all cooling was lost was 11.1 hours. Since bus 5 remained energized at the time of the event, spent fuel pool pump A continued to run and provide required spent fuel pool cooling. After EDG B loaded onto bus 6, spent fuel pool pump B was restarted within 3 minutes of the initiating event.

The initiating event was due to a human error which impacted the Shutdown Safety Assessment. The Power Availability shutdown risk level increased from a Yellow to Orange condition based on available independent power sources. At the time of the event, emergency diesel generator [DG] A had been inoperable for planned maintenance and the latching relay failure associated with the TSC EDG output breaker, which did not allow the TSC EDG to automatically load onto bus 46, caused the increase in shutdown risk level.

The Shutdown Safety Assessment (SSA), whose purpose is to minimize shutdown risk and maximize the availability of critical components and station systems during shutdown conditions, was at a Yellow shutdown risk level for Power Availability prior to the event. When the event occurred, the SSA escalated to an Orange shutdown risk level for Power Availability.

A Yellow shutdown risk level is defined as:

Some reduction exists for the Key Safety Function. It describes a condition in which equipment or system availability is at least equal to a minimum "Defense in Depth." Configurations with this Defense in Depth represent a slightly elevated (but still relatively low risk level).

An Orange shutdown risk level is defined as:

Key Safety Function is considered degraded below a level normally considered acceptable for safe outage evolutions. It is a condition in which equipment or system availability is one requirement less than the minimum "Defense in Depth." Configurations with this Defense in Depth represent an elevated risk level, but one that is tolerable for short durations. Such configurations also represent the case in which a single failure will result in loss of Defense in Depth for the Key Safety Function.

The length of time the station was in the Orange shutdown risk level was from 1549 to 2059. Had the TSC EDG loaded onto bus 46, the shutdown risk level would have remained in a Yellow condition.

Since the partial loss of offsite power lasted for a relatively short duration and spent fuel cooling remained available, there was a very low safety significance associated with this event.

Cause:

The cause of the loss of station backfeed through the MAT was a human performance error in selecting a component from a list of similarly labeled components while using an unapproved method of testing. This was due to less than adequate station interface related to substation work to ensure roles were understood and followed related to use of human performance tools, involving field supervision with work issues, and technicians not obtaining authorization to deviate from an approved work scope and method.

Corrective Actions:

Corrective actions include the following:

- Implement a work agreement between the station and outside groups that support substation work to define and implement roles and responsibilities for the ownership, maintenance, and oversight of activities performed.

- Establish restrictions as determined through agreement with the transmission operator and Kewaunee Power Station related to the use of remote access to substation equipment that can have an impact on plant operation.

Similar Events:

A review of Licensee Event Reports covering the last three years identified the following similar events:

None.