

JAN 09 2007

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

Serial No. 06-1014  
KPS/LIC/RS: RO  
Docket No. 50-305  
License No. DPR-43

**DOMINION ENERGY KEWAUNEE, INC.**  
**KEWAUNEE POWER STATION**  
**LICENSEE EVENT REPORT 2006-013-00**

Dear Sirs:

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

Report No. 50-305/2006-013-00

This report has been reviewed by the Plant Operating 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 Sattler at (920) 388-8121.

Very truly yours,



Leslie N. Hartz  
Site Vice President, Kewaunee Power Station

Attachment

Commitments made by this letter: NONE

IE22

cc: Regional Administrator, Region III  
U.S. Nuclear Regulatory Commission  
2443 Warrenville Road  
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Mr. R. F. Kuntz  
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NRC Senior Resident Inspector  
Kewaunee Power Station

<b>NRC FORM 366</b> <b>U.S. NUCLEAR REGULATORY COMMISSION</b> (6-2004)	<b>APPROVED BY OMB NO. 3150-0104</b>	<b>EXPIRES 6-30-2007</b>
<b>LICENSEE EVENT REPORT (LER)</b> (See reverse for required number of digits/characters for each block)		
Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0066), 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.		

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**TITLE (4)**  
**Reactor Trip from Nuclear Instrumentation Low Range-High Flux Trip Caused by Blind Relay Contact Failure**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
11	10	2006	2006	-- 013	-- 00	01	09	2007	FACILITY NAME	DOCKET NUMBER	
<b>OPERATING MODE (9)</b>		<b>N</b>		<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check all that apply) (11)</b>							
<b>POWER LEVEL (10)</b>		<b>10</b>		20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)	
				20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)	
				20.2203(a)(1)		50.36(c)(1)(i)(A)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		73.71(a)(4)	
				20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)	
				20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A	
				20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)			
				20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)			
				20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)			
				20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)			
				20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)			

**LICENSEE CONTACT FOR THIS LER (12)**

<b>NAME</b> <b>Richard Repshas</b>	<b>TELEPHONE NUMBER (Include Area Code)</b> <b>(920) 388-8217</b>
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**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
X	JC	94	W120	Y					

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

**ABSTRACT**

On 11/10/2006 at 14:20 CST, Kewaunee Power Station experienced a reactor trip while reducing power at 1/2 percent per minute during a planned shutdown to investigate abnormal temperature and vibration indications on the turbine number nine bearing at the turbine generator exciter. At approximately 10 percent reactor power as permissive P-10 cleared, a spurious reactor protection system actuation occurred due to failed open relay contacts on the B train associated with power range nuclear instrumentation N-41. The bistable for power range nuclear instrumentation N-42 was in a tripped condition due to an unrelated failure on 11/09/2006. When P-10 automatically unblocked, the power range nuclear instrumentation low range-high flux trip was generated.

Following the trip, steam supply to reheater B1 inlet valve, MS-201B1, did not fully close and had to be isolated to limit the plant cool down. Main steam isolation valves remained open and the normal condenser heat sink remained available.

Main feedwater regulating valve, FW-7A, did not automatically close on the reactor trip coincident with low Tave (554 deg F). The valve did not respond to manual closure actions. Level in A steam generator rose to 67 percent which initiated a feedwater isolation signal. The feedwater isolation signal tripped the running A main feedwater pump and main feedwater valves isolated. The A and B motor driven auxiliary feedwater pumps started as designed.

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

### Event Description:

On 11/10/2006 at 14:20 CST, Kewaunee Power Station experienced a reactor trip while reducing power at 1/2 percent per minute during a planned shutdown to investigate abnormal temperature and vibration indications on the turbine [TRB] number nine bearing at the turbine generator [TG] exciter [EXC]. At approximately 10 percent reactor [RCT] power, as permissive P-10 cleared, a spurious reactor protection system actuation occurred. The trip signal was generated due to failed open relay [RLY] contacts of B train associated with power range nuclear instrumentation N-41. The bistable for power range nuclear instrumentation N-42 was in a tripped condition due to an unrelated failure for drifting indication on 11/09/2006. When P-10 automatically unblocked, the power range nuclear instrumentation low range-high flux trip was generated. The power range nuclear instrumentation low range-high flux trip is set at 24.5 percent reactor power.

Following the trip, steam supply to reheater B1 inlet valve [V], MS-201B1, did not fully close and had to be isolated to limit the plant cool down. Main steam isolation valves [ISV] remained open and the normal condenser [COND] heat sink remained available.

Main feedwater regulating valve [LCV], FW-7A, did not automatically close on the reactor trip coincident with low Tave (554 deg F). The valve did not respond to manual closure actions taken from the control room. Level in A steam generator [SG] rose to the high-high level (67 percent) which initiated a feedwater isolation signal. The feedwater isolation signal tripped the running A main feedwater pump [P] and main feedwater isolation valves [ISV] isolated. Both motor [MO] driven auxiliary feedwater pumps [P] started as designed.

There were no other unexpected system actuations, all reactor control rods [ROD] fully inserted, and the plant remained in the normal shutdown electrical lineup.

A non-emergency report was made to the NRC Operations Center at 17:33 EST on 11/10/2006 in accordance with 10 CFR 50.72(b)(2)(iv)(B) for actuation of the reactor protection system when the reactor is critical and 10 CFR 50.72(b)(3)(iv)(A) for the valid actuation of the auxiliary feedwater system.

### Event Analysis and Safety Significance:

Overall, the plant response was acceptable with the exception of the reactor trip and the feedwater regulating valve not closing. The steam supply to B1 reheater inlet valve not closing was a previously recognized issue with planned contingencies should a failure occur. The following provides an analysis of the event:

The station began a shutdown on 11/10/2006 due to increased bearing metal temperature on the turbine number nine bearing (generator exciter bearing). The normal running bearing metal temperature is 130 deg F and rose to 194 deg F over a 30 minute period. Inspection found foreign material in the form of a 3/8" diameter circular piece of gasket material in a 3/8" diameter oil supply line to the number nine bearing. The bearing was inspected and no damage was found.

At the time of the event, work was in progress on nuclear instrumentation power range channel N-42 due to a drifting indication. The channel was in the tripped condition. Troubleshooting identified the likely cause to be calibration potentiometers [FD] and an improperly seated ribbon connector [CON].

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### Event Analysis and Safety Significance (continued):

The reactor protection system initiated a plant trip based on a failed open relay contact in the circuitry. A permissive P-10 signal allows blocking of the nuclear instrumentation power range high flux-low setpoint trip and intermediate power range trips. The matrix is a two out of four logic scheme. The matrix was partially made up by the N-42 drawer being out of service. Only one additional relay was required to trip the plant once power dropped below the 10 percent P-10 setpoint. The Relay NC-41P-XB was found with one set of contacts mechanically closed but electrically open. This made up the two out of four logic generating the power range nuclear instrumentation low range-high flux trip.

Anomalies following the reactor trip were associated with the B1 moisture separator reheater steam inlet valve (MS-201B1) and the A train feedwater regulating valve (FW-7A).

MS-201B1, steam supply to B1 reheater inlet valve, did not fully close on the trip. This valve had previously failed to close during a plant trip that occurred on October 30, 2006. While this was a recognized issue prior to this event and compensatory actions were in place, this resulted in increased cool down of the reactor coolant system until an operator was dispatched to close a manual isolation valve. The cool down was limited and the main steam isolation valves remained open. Normal condenser heat sink remained available. An inspection of the valve was performed and stem bushings were replaced.

A reactor trip coincident with low Tave closes the feedwater regulating valves (FW-7A and FW-7B). FW-7A did not fully close. Level in A steam generator increased to 67 percent, at which time the remaining running feedwater pump tripped off and main feedwater valves isolated. This resulted in the automatic start of the A and B motor driven auxiliary feedwater pumps.

Inspection of FW-7A revealed pieces of a tube plug in the bottom of the valve cage. The source was identified as a single tube plug from the 15B high pressure feedwater heater [HX] outlet tubesheet. It appeared the plug entered the valve cage in one piece. The valve at some point then sheared the tube plug end, resulting in two additional pieces of the plug that remain missing. In 2003, tube plugs had been installed in the 15B feedwater heater. 15A feedwater heater has no tube plugs installed. The remaining feedwater heaters (11A, 11B, 12A, 12B, 13A, and 13B) [HX] are not a potential source for the tube plug based on the dimension of the feedwater pump suction strainers [STR] which are downstream of these heaters.

The small sections of the missing tube plug are assumed to have entered the A steam generator secondary side. The steam generator vendor was contacted and based on the size and shape of the pieces, assessment shows that the wear rate will be slow and operation until the end of the current operating cycle will not affect steam generator operation.

A post-trip event review report was prepared, approved, and following equipment repairs, the plant was returned to service with the reactor critical at 05:26 CST on 11/14/2006.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in an automatic actuation of the reactor protection system and auxiliary feedwater system.

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**Cause:**

The cause of the reactor trip is a blind contact failure of relay NC41P-XB associated with power range nuclear instrumentation low range-high flux trip for power range channel N-41. As permissive P-10 cleared at approximately 10 percent reactor power, the reactor tripped since a two out of four reactor trip signal logic was made up by nuclear instrumentation power range channels N-41 and N-42.

The NC41P-XB relay was checked and contacts were found to be mechanically closed but electrically open. The cause is the low current application in which the relay is used, which leads to contact oxidation and tarnish.

**Corrective Actions:**

Short Term:

1. Turbine bearing number nine – Removed lubricating oil blockage and reassembled bearing.
2. Reactor protection system circuit relay contact failure – Replaced relay.
3. Nuclear Instrumentation N-42 – Replaced circuit card and reinstalled ribbon connector.
4. MS-201B1 – Inspected and rebuilt valve.
5. FW-7A – Removed foreign material, inspected and rebuilt valve.
6. 15B feedwater heater – Replaced missing tube plug and inspected the remaining installed plugs.

Long Term:

1. The root cause evaluation of the inadvertent reactor trip due to the reactor protection relay proposes the following actions:
  - To revise instrument channel test and reactor protection logic test procedures to check for blind failures in permissive logic matrices.
  - To modify the system as required to enable testing contacts that are normally de-energized (open) to mechanically wipe the contact surface to remove oxidation layers.
2. Complete the root cause evaluation to evaluate foreign material issue related to the turbine and feedwater systems.

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**Corrective Actions (continued):**

Long Term (continued):

3. Evaluate the work history for reheater inlet steam stop valves for adequacy of past actions taken.
4. Perform an evaluation of foreign material loose parts for steam generator integrity.
5. Evaluate if the 15B feedwater heater failed tube plug was the correct size for the application.

**Similar Events:**

LER 95-005-00, Spurious Reactor Trip During Surveillance Testing.

LER 96-003-01, Spurious Reactor Trip During Surveillance Testing.