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CP-201400258  
Log # TXX-14032

REF 10CFR50.73(a)(2)(iv)(A)

March 19, 2014

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

SUBJECT: Comanche Peak Nuclear Power Plant, Docket No. 50-445,  
Licensee Event Report 445 / 14-001-00, Unit 1 Automatic Reactor Trip Due to Generator  
Lockout Relay Trip

Dear Sir or Madam:

Enclosed is Licensee Event Report (LER) 445 / 14-001-00, "Unit 1 Automatic Reactor Trip Due to  
Generator Lockout Relay Trip," for Comanche Peak Nuclear Power Plant (CPNPP) Unit 1.

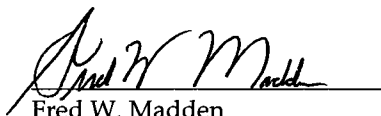
This letter contains no new regulatory commitments regarding CPNPP Units 1 or 2.

If you have any questions regarding this report, please contact Timothy A. Hope at 254-897-6370 or  
timothy.hope@luminant.com.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By:   
Fred W. Madden  
Director, External Affairs

A member of the STARS Alliance

Callaway · Comanche Peak · Diablo Canyon · Palo Verde · Wolf Creek

*IE22*  
*NRK*

Enclosure

c - Marc L. Dapas, NRC Region IV  
Balwant K. Singal, NRR  
Resident Inspectors, Comanche Peak Nuclear Power Plant

**LICENSEE EVENT REPORT (LER)**  
(See Page 2 for required number of  
digits/characters for each block)

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollects.Resource@nrc.gov](mailto: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.

**1. FACILITY NAME**

Comanche Peak Nuclear Power Plant (CPNPP) Unit 1

**2. DOCKET NUMBER**

05000 445

**3. PAGE**

1 OF 4

**4. TITLE**

Unit 1 Automatic Reactor Trip Due to Generator Lockout Relay Trip

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		
01	18	2014	14	- 001 - 00		03	19	2014	FACILITY NAME	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)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)	
			<input type="checkbox"/> 20.2201(d)			<input type="checkbox"/> 20.2203(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
			<input type="checkbox"/> 20.2203(a)(1)			<input type="checkbox"/> 20.2203(a)(4)			<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
			<input type="checkbox"/> 20.2203(a)(2)(i)			<input type="checkbox"/> 50.36(c)(1)(i)(A)			<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
10. POWER LEVEL			<input type="checkbox"/> 20.2203(a)(2)(ii)			<input type="checkbox"/> 50.36(c)(1)(ii)(A)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)	
			<input type="checkbox"/> 20.2203(a)(2)(iii)			<input type="checkbox"/> 50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(v)(A)		<input type="checkbox"/> 73.71(a)(4)	
			<input type="checkbox"/> 20.2203(a)(2)(iv)			<input type="checkbox"/> 50.46(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(5)	
			<input type="checkbox"/> 20.2203(a)(2)(v)			<input type="checkbox"/> 50.73(a)(2)(i)(A)			<input type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> OTHER	
			<input type="checkbox"/> 20.2203(a)(2)(vi)			<input type="checkbox"/> 50.73(a)(2)(i)(B)			<input type="checkbox"/> 50.73(a)(2)(v)(D)		Specify in Abstract below or in NRC Form 366A	

**12. LICENSEE CONTACT FOR THIS LER**

## LICENSEE CONTACT

Timothy A. Hope, Manager, Regulatory Affairs

## TELEPHONE NUMBER (Include Area Code)

(254) 897-6370

**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 0840 hours, on January 18, 2014, Unit 1 was operating at approximately 100% power when an automatic reactor trip occurred due to a generator lock out relay trip and turbine trip. The plant responded as expected to the transient. The cause of this event was a Unit 1 Generator Current Transformer (CT) cable shorting to ground. Vibration of the cable and contact of the cable with the free end of the conduit resulted in physical wear of the cable jacket and insulation that over the period of more than 12 years (from 2002 to 2014) cut through the jacket and insulation and allowed the conductor to contact the metal of the conduit. The corrective actions included reworking the grounded cable. The Unit 1 and Unit 2 Generator CT cables will be inspected, insulated, retrained, and/or replaced at each unit's next refueling outage. The Unit 1 and Unit 2 Generator CT conduits will have insulated bushings installed at the conduit exits where the conduit is not connected to a device or panel within a hub. No component or system failures occurred. All times in this report are approximate and Central Standard Time unless noted otherwise.

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

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollects.Resource@nrc.gov](mailto: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.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Comanche Peak Nuclear Power Plant Unit 1	05000 445	14	- 001	- 00	2 OF 4

**NARRATIVE****I. DESCRIPTION OF THE REPORTABLE EVENT****A. REPORTABLE EVENT CLASSIFICATION**

This is reportable under 50.73(a)(2)(iv)(A) "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section.

The systems actuated included "10CRF50.73(a)(2)(iv)(B)(1), Reactor protection system including reactor scram or reactor trip" and "10CFR50.73(a)(2)(iv)(B)(6), PWR auxiliary or emergency feedwater system."

**B. PLANT CONDITION PRIOR TO EVENT**

On January 18, 2014, Comanche Peak Nuclear Power Plant (CPNPP) Unit 1 was in MODE 1 operating at approximately 100% power.

**C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT**

There were no inoperable structures, systems or components that contributed to the event.

**D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES**

At 0840 hours, on January 18, 2014, Unit 1 was operating at approximately 100% power when an automatic reactor trip occurred due to a Generator Current Transformer (CT) lockout relay trip and turbine trip. All control rods inserted. A Generator Negative Sequence Current High Alarm was received immediately prior to the turbine trip.

The plant responded as expected to the transient. Both Motor Driven Auxiliary Feed Water Pumps and the Turbine Driven Auxiliary Feed Water Pump started in response to Steam Generator Lo-Lo Levels.

Decay heat was rejected to the Main Condensor via Steam Dump Valves (Turbine Bypass Valves).

There was no impact to CPNPP Unit 2 and offsite power remained available.

Megger testing performed for the generator identified a hard ground condition on the A phase of the Generator CT [EIS: (TB)(XCT)]. Upon further inspection, damaged insulation was observed on the Generator CT cable NK129494. The cable was manipulated to isolate it from its conduit, and the Megger was successfully performed, indicating the cause of the ground condition.

The generator and excitation systems were evaluated for potential damage by data review, and it was concluded there was no consequential damage.

**E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL PERSONNEL ERROR**

Operators (utility, licensed) in the Unit 1 Control Room received alarms indicating an automatic reactor trip.

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**NARRATIVE**

**II. COMPONENT OR SYSTEM FAILURES**

**A. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE**

Not Applicable – There were no component or system failures.

**B. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT**

Not Applicable – There were no component or system failures.

**C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS**

Not Applicable – There were no component or system failures.

**D. FAILED COMPONENT INFORMATION**

Not Applicable – There were no component or system failures.

**III. ANALYSIS OF THE EVENT**

**A. SAFETY SYSTEM RESPONSES THAT OCCURRED**

An automatic reactor trip occurred as a result of a generator trip and turbine trip. The auxiliary feed water system responded as expected as a result of the reactor trip.

**B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY**

Not applicable – no safety system trains were inoperable as a result of this event.

**C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT**

This event is bounded by the CPNPP Final Safety Analysis Report (FSAR) accident analysis which assumes conservative initial conditions which bound the plant operating range and other assumptions which could reduce the capability of safety systems to mitigate the consequences of the transient.

This event is also bounded by the analysis of the turbine trip presented in Section 15.2.3 of the CPNPP FSAR. The analysis uses conservative assumptions to demonstrate the capability of pressure relieving devices and to demonstrate core protection margins. The event of January 18, 2014, occurred at approximately 100% reactor power, and required systems and components functioned as designed.

Based on the above, it is concluded that the health and safety of the public were unaffected by this condition and this event has been evaluated to not meet the definition of a safety system functional failure per 10CFR50.73(a)(2)(v).

LICENSEE EVENT REPORT (LER)  
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## NARRATIVE

## IV. CAUSE OF THE EVENT

The cause of the trip was an actuation of the Generator CT lockout relay which actuated as a result of the Differential Relay Phase A Generator 1 actuation. The Differential Relay Phase A Generator 1 actuated due to the Generator CT cable (NK129494) shorting to ground. The Negative Sequence Relay also actuated the negative sequence alarm due to the cable NK129494 shorting to ground.

The manner in which the flexible conduit is installed, without securing attachments at the Generator CT, allowed the flexible conduit to be moved by vibration and high ventilation air flows. Where the NK129494 cable exited the flexible conduit, it was in contact with the edge of the flexible conduit. An insulated bushing was not installed on the end of the flexible conduit. These conditions resulted in physical wear of the cable jacket and insulation that, over the period of more than 12 years (from 2002 to 2014), cut through the jacket and insulation and allowed the conductor to contact the metal of the conduit.

The 2002 design configuration allowed some motion of the flexible conduit that contributed to wear through of the cable jacket and insulation.

## V. CORRECTIVE ACTIONS

The corrective actions included reworking the grounded cable (NK129494) and inspecting and insulating the remaining Unit 1 Generator CT cables.

As part of the CPNPP Corrective Action Program the Unit 1 and Unit 2 Generator CT cables will be inspected, insulated, retrained, and / or replaced at the unit's next refueling outage. The Unit 1 and Unit 2 Generator CT conduits will have insulated bushings installed at the conduit exits where the conduit is not connected to a device or panel within a hub.

Unit 1 and Unit 2 preventive maintenance procedures will be revised to inspect for cable damage, connection integrity, and Meggering of the CT leads.

## VI. PREVIOUS SIMILAR EVENTS

There were no previous similar events in the last three years.

On June 27, 1994, a Unit 2 reactor trip occurred due to an actuation of the Main Generator Differential Relay (CPNPP Unit 2 Licensee Event Report 94-010-00). This resulted from insulation damage to the Generator CT wiring due to heating of the conduit by induced magnetic fields. The damage to the insulation allowed the wire to short to the conduit. This issue was addressed in the Corrective Action Program.

The details /causes of the June 27, 1994 event are sufficiently different from the event described in this LER such that the previous corrective actions could not have prevented the January 18, 2014 event.