



Thomas P. McCool
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CP-202200008
TXN-22003
February 28, 2022

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

Ref 10 CFR 50.73

Subject: Comanche Peak Nuclear Power Plant (CPNPP)
Docket No. 50-446
Reactor Trip Due To Fault On Main Transformer 2MT1
Licensee Event Report 446/21-001-01

Dear Sir or Madam:

Enclosed is Licensee Event Report (LER) 2-21-001-01, "Reactor Trip Due To Fault On Main Transformer 2MT1" for Comanche Peak Nuclear Power Plant (CPNPP), Unit 2.

This letter contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Gary Merka at (254) 897-6613 or gary.merka@luminant.com.

Sincerely,

A handwritten signature in black ink, appearing to read 'T. McCool', written over a horizontal line.

Thomas P. McCool

Attachment

c (email) - Scott Morris, Region IV [Scott.Morris@nrc.gov]
Dennis Galvin, NRR [Dennis.Galvin@nrc.gov]
John Ellegood, Senior Resident Inspector, CPNPP [John.Ellegood@nrc.gov]
Neil Day, Resident Inspector, CPNPP [Neil.Day@nrc.gov]



LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

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, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollections.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Comanche Peak Nuclear Power Plant	2. Docket Number 05000 446	3. Page 1 OF 4
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4. Title
Reactor Trip Due To Fault On Main Transformer 2MT1

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
06	07	2021	21	- 001 -	01	02	28	2022	Facility Name	Docket Number
										05000
									Facility Name	Docket Number
										05000

9. Operating Mode Mode 1	10. Power Level 100 Percent
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11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

<input checked="" type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
<input type="checkbox"/> OTHER (Specify here, in abstract, or NRC 366A).				

12. Licensee Contact for this LER

Licensee Contact Gary Merka	Phone Number (Include area code) 254-897-6613
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
B	EL	XFMR	ABB	Y					

14. Supplemental Report Expected		15. Expected Submission Date		Month	Day	Year
<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)					

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 07, 2021, Unit 2 was operating at approximately 100% power. At 1527, a fault occurred in Unit 2 Main Transformer Number 1 (2MT1) which resulted in a generator lockout relay automatic trip of the Unit 2 Main Turbine and reactor. Arcing between the "B" phase high voltage bushing and adjacent components on the top of the main transformer ignited the remaining bushing dielectric material and bushing oil. Automatic fire suppression was initiated and the fire was extinguished in 19 minutes. Entry into the Emergency Plan was not required. Operators responded to the event in accordance with approved procedures and safely placed the plant in Mode 3.

The cause of this event was failure of the 2MT1 "B" phase high voltage bushing. A failure analysis was performed, the failure cause remains indeterminate. Corrective actions include repair or replacement of the damaged 2MT1 transformer components, post-work electrical diagnostic testing, oil sample testing, and an extent of condition review.

All times are in Central Daylight Time (CDT).

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Comanche Peak Nuclear Power Plant	05000-446	YEAR 21	SEQUENTIAL NUMBER 001	REV NO. 01

NARRATIVE**I. DESCRIPTION OF REPORTABLE EVENT**

On June 07, 2021, Unit 2 was operating at approximately 100% power. At 1527, a fault occurred in Unit 2 Main Transformer Number 1 (2MT1) which resulted in a generator lockout relay automatic trip of the Unit 2 Main Turbine and reactor. The Auxiliary Feedwater System automatically started as expected.

A. REPORTABLE EVENT CLASSIFICATION

The event is reportable under 10 CFR 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 Reactor Protection System (RPS) automatically actuated and the Auxiliary Feedwater System (AFW) started as designed due to low-low steam generator water level following the trip.

B. PLANT CONDITION PRIOR TO EVENT

On June 07, 2021, Unit 2 was operating in Mode 1 at approximately 100% power.

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

There were no structures, systems, or components which were inoperable prior to the event which contributed to the event. Prior to the main turbine trip, the main turbine and generator were performing their design functions.

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

On June 07, 2021, Unit 2 was operating at approximately 100% power. At 1527, a fault occurred in 2MT1 [EIS:(EL) (XFMR)] which resulted in a generator lockout relay automatic trip of the Unit 2 Main Turbine. Because reactor power at the time of the turbine trip was approximately 100% power, the Westinghouse permissive P-9 signal was unblocked (power > 50%) as designed and when the turbine tripped an automatic reactor trip was actuated.

Witnesses reported arcing around the 2MT1 "B" phase high voltage bushing followed by a failure of the bushing which ejected debris from the bushing more than 50 feet. Arcing between the "B" phase high voltage bushing and adjacent components on the top of the main transformer ignited the remaining bushing dielectric material and bushing oil. Automatic fire suppression was initiated and the fire was extinguished in 19 minutes. Entry into the Emergency Plan was not required. Operators responded to the event in accordance with approved procedures and safely placed Unit 2 in Mode 3.

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

Operators (Utility, Licensed) in the Unit 2 Control Room received a "RX> 50% PWR TRB TRIP" alarm and confirmed automatic Unit 2 reactor and turbine trips.

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

The cause of this event was failure of the 2MT1 "B" phase high voltage bushing. A failure analysis was performed, the failure cause remains indeterminate.

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CONTINUATION SHEET**

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		21	001	01

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

Arcing was observed around the 2MT1 "B" phase high voltage bushing followed by a failure of the bushing which ejected debris from the bushing more than 50 feet. Arcing between the "B" phase high voltage bushing and adjacent components on the top of the main transformer ignited the remaining bushing dielectric material and bushing oil. Automatic fire suppression was initiated and the fire was extinguished in 19 minutes.

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

This event did not involve systems or secondary functions which were affected by the 2MT1 "B" phase high voltage bushing failure.

D. FAILED COMPONENT INFORMATION

The 2MT1 "B" phase high voltage bushing is an ABB Type O Plus CTM Model T362W2000UZ used in a 345kV application. The bushing has an anticipated service life of approximately 25 years. At the time of the failure, the bushing had been in service approximately 12 years.

III. ANALYSIS OF THE EVENT**A. SAFETY SYSTEM RESPONSES THAT OCCURRED**

The Reactor Protection System responded as designed to the automatic turbine trip by initiating an automatic reactor trip. The Auxiliary Feedwater System started as designed due to low-low steam generator water level following the trip.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

This event did not involve the inoperability of any safety component or system.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

A turbine trip is an ANS Condition II event (Faults of Moderate Frequency). When the main turbine tripped the reactor was automatically tripped and the Auxiliary Feedwater System automatically started to provide feedwater to the steam generators.

Automatic turbine trip and automatic reactor trip were exercised and the Auxiliary Feedwater System started automatically as expected and all plant safety systems responded as designed during the resultant transient. This event had no impact on nuclear safety, reactor safety, radiological safety, environmental safety or the safety of the public. This event has been evaluated as not meeting the definition of a safety system functional failure per 10 CFR 50.73(a)(2)(v).

IV. CAUSE OF THE EVENT

The cause of this event was failure of the 2MT1 "B" phase high voltage bushing. A failure analysis was performed, the failure cause remains indeterminate.

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CONTINUATION SHEET**

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Comanche Peak Nuclear Power Plant	05000-446	21	001	01

NARRATIVE**V. CORRECTIVE ACTIONS**

An inspection of 2MT1 was performed, and damaged components were repaired or replaced. All three high side bushings, the high side neutral bushing and the surge arresters were replaced on 2MT1. An internal inspection, post-work electrical diagnostic testing, and oil sample testing were performed on 2MT1 to validate overall integrity of the windings, internal electrical connections, mechanical connections, insulation systems, and post-testing oil quality. Tests included insulation resistance, core ground, winding excitation, overall winding power factor and capacitance, bushing power factor and capacitance, transformer turns ratio, winding resistance, and sweep frequency response analysis. The test scope and all report results were validated to be acceptable by CPNPP, Vistra, and ABB engineering.

Post-work thermography verified that there were no abnormal heating or hot spots on 2MT1. Adjacent Unit 2 Main Transformer Number 2 (2MT2) was inspected for damage from debris expelled by the 2MT1 bushing failure, and the results showed no adverse degradation had occurred and the continued operation of 2MT2 was acceptable. An extent of condition review was performed. Similar bushings, for which failure could cause a unit trip, are used for high voltage phases (A, B, C) on the Unit 1 Main Transformers, Unit 1 Auxiliary Transformer, the Unit 2 Auxiliary Transformer, the Unit 1 Station Service Transformer, and the Unit 2 Station Service Transformer. The likelihood of recurrence is improbable since a similar event has not occurred at CPNPP for the life of the plant. A failure analysis of the failed bushing was performed.

VI. PREVIOUS SIMILAR EVENTS

There have been no previous similar reportable events at CPNPP in the past three years.