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CP-201301362
TXX-13176

Ref. # 10CFR50.73

December 9, 2013

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

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT
DOCKET NOS. 50-445 AND 50-446
UNANALYZED CONDITION UNDER 10CFR50 APPENDIX R,
SECONDARY FIRES FROM UNPROTECTED AMMETER WIRING
LICENSEE EVENT REPORT 445/13-002-00

Dear Sir or Madam:

Pursuant to 10CFR50.73(a)(2)(ii)(B), Luminant Generation Company LLC (Luminant Power) hereby submits enclosed Licensee Event Report (LER) 445/13-002-00, "Unanalyzed Condition Under 10CFR50 Appendix R, Secondary Fires From Unprotected Ammeter Wiring," for Comanche Peak Nuclear Power Plant (CPNPP) Units 1 and 2.

This communication contains no new commitments regarding Comanche Peak Units 1 and 2.

Should you have any questions, please contact Mr. Jack Hicks at (254) 897-6725.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: _____
Thomas P. McCool
Vice President, Station Support

IE22
ADD6
NRR

Enclosure

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

Enclosure to TXX-13176

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

APPROVED BY OMB NO. 3150-0104
EXPIRES:10/31/2013

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 Records and FOIA/Privacy Service Branch (T-5 F53), 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 (3150-0104), 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
Comanche Peak Nuclear Power Plant (CPNPP) Units 1 & 2	05000445	1 OF 5

4. TITLE
UNANALYZED CONDITION UNDER 10CFR50 APPENDIX R, SECONDARY FIRES FROM UNPROTECTED AMMETER WIRING

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	DOCUMENT NUMBER
									CPNPP UNIT 2	05000446
10	08	2013	13	002	00	12	09	2013	FACILITY NAME	DOCUMENT NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100

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)	VOLUNTARY LER

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (*Include Area Code*)
Timothy A. Hope, Manager, Regulatory Affairs	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)*

On October 8, 2013, during a review of industry operating experience OE 305419 regarding the impact of non-fused, Direct Current (DC) ammeter circuits in the control room, it was determined that the described condition was applicable to Comanche Peak Nuclear Power Plant. This resulted in a potentially unanalyzed condition with respect to 10CFR50 Appendix R analysis requirements. The original plant wiring and associated analysis for the Class 1E batteries control room ampere indications do not include overcurrent protection features to limit the fault current. Comanche Peak Nuclear Power Plant (CPNPP) Units 1 and 2 were in Mode 1 operating at 100% power.

The cause of this event was the original design of the DC ammeter circuits did not adequately address fire protection program requirements.

Immediate corrective actions were to develop and implement compensatory measures to maintain requirements of 10CFR50 Appendix R. As a part of the CPNPP Corrective Action Program, a design change to include circuit protection for the cables routed from the Safety Related batteries to the control room DC ammeters will be developed and implemented.

All times in this report are approximate and Central Time unless noted otherwise.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Comanche Peak Nuclear Power Plant Units 1 & 2	05000 - 445	2013	001	00	2 OF 5

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

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION:

10CFR50.73(a)(2)(ii)(B), "The nuclear power plant being in an unanalyzed condition that significantly degraded plant safety."

B. PLANT CONDITION PRIOR TO EVENT:

On October 8, 2013, CPNPP Units 1 and 2 were in Mode 1 operating at 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 at the start of the event that contributed to the event.

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

On October 8, 2013, during a review of industry operating experience OE 305419 regarding the impact of non-fused, Direct Current (DC) ammeter circuits [EIIS: (EJ)(II)] in the control room of Comanche Peak Nuclear Power Plant (CPNPP), it was determined that the described condition was applicable to Comanche Peak Nuclear Power Plant. This resulted in a potentially unanalyzed condition with respect to 10CFR50 Appendix R analysis requirements. The original plant wiring and associated analysis for the Class 1E batteries control room ampere indications do not include overcurrent protection features to limit the fault current. CPNPP Units 1 and 2 were in Mode 1 operating at 100% power.

During the Nuclear Energy Institute Fire Protection Information Forum held on September 15-18, 2013, an issue was raised both at the breakout session on Regulatory issues and the breakout session on Inspection Trends by the NRC Region III Branch Chief. The issue of concern was contained in the Davis-Besse, NRC Triennial Fire Protection Inspection Report dated May 10, 2013 and is as follows:

> Introduction: The following finding that affects 10 CFR 50.48 was identified by the NRC and was a violation of NRC requirements. This finding has been screened and determined to warrant enforcement discretion per the Interim Enforcement Policy Regarding Enforcement Discretion for Certain Fire Protection Issues. The inspectors identified a violation of 10 CFR 50.48(b) and 10 CFR Part 50, Appendix R, Section III.G.3 for the licensee's failure to provide electrical protection for common enclosure associated circuits to ensure that one train of systems and components is free of fire damage during a fire. Specifically, the licensee failed to provide electrical protection (i.e., fuses) for the control room ammeter circuits associated with the batteries and battery chargers to prevent secondary fire due to thermal and/or arcing affects from damaged ammeter cables outside the fire area.

It was recommended at the Information Forum that all plants should decide if the non-fused DC ammeter issue identified at Davis-Besse was applicable at their plants. The representatives from Comanche Peak at the Information Forum discussed the concern with the Fire Protection Consulting Engineer and Electrical Design Engineering, to confirm if this condition existed at Comanche Peak. The Electrical Design Engineer did confirm that Comanche Peak in fact does have "shunt" driven, DC ammeters that are non-fused; routed to the control room. Based on this information, Condition Report (CR), CR-2013-010297, was initiated and Event Notification (EN) EN# 49419 was submitted on 10/08/13, by Comanche Peak Nuclear Power Plant (CPNPP), notifying the NRC of a potentially unanalyzed condition with respect to 10CFR50 Appendix R, Section III.G.3 electrical protection requirements. In conjunction with the Event Notification, compensatory measures (fire watches) were implemented for the plant affected areas.

Additional reviews/evaluations were conducted associated with this Condition Report identifying that the exact condition reported by Davis-Besse does not exist at Comanche Peak Nuclear Power Plant (CPNPP). The plant design at Comanche Peak is such that the remote reading DC ammeters in the control room are supplied only by the negative (-) battery bus and are "un-fused", or a non-protected portion of the circuit. The only identified portion of the DC circuit that originates from the positive (+) side of the battery are local shunt driven meters for the battery chargers and DC switchboards. This physical arrangement, which was incorporated as part of the original design received from vendor documentation, prevents the identical scenario of a fire in the control room spreading via the "un-fused" DC cables to a secondary location outside of the control room at Comanche Peak. The Apparent Cause Analysis team looked at the possibility that the condition reported by Davis-Besse might exist in other Fire Areas and concluded the following:

The cables of concern from the shunts on the battery feed to each of the train A and train B switchboards of both Unit 1 and Unit 2 are not routed directly from the rooms containing the switchboards to the control room.

It can be seen that both units and trains of cables follow similar routes. Both trains of cables have the same fire area routing outside the inverter rooms with the exception of train A is routed through the chiller rooms and train B is not. Review of the loads on the various DC switchboards with remote ammeters indicates that there are either "un-fused" circuits or circuits with > 30 amp protective devices in the following Fire Zones (FZ) 50, 51, 52, 53, 54, 57, 63, 64.

Per electrical engineering, low current (<30 amp) source cables do not have sufficient energy to jeopardize the cables of concern and allow fire propagation to adjacent fire areas. However there are locations that either have high energy source conductors or "un-fused" source conductors. This confirms that we can potentially have a fire event and the consequential events can potentially spread the fire to unaffected fire areas.

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

The unanalyzed condition was discovered by Engineering (Utility, Non Licensed) personnel during a review of industry operating experience OE 305419 regarding the impact of non-fused, Direct Current (DC) ammeter circuits in the control room.

II. COMPONENT OR SYSTEM FAILURES

A. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

Not applicable – No component or system failures were identified during this event.

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

Not applicable – No component or system failures were identified during this event.

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

Not applicable – No component or system failures were identified during this event.

D. FAILED COMPONENT INFORMATION

Not applicable – No component or system failures were identified during this event.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

Not applicable –No safety system responses occurred as a result of this event.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable –No safety system was rendered inoperable as a result of this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

Unfused Direct Current (DC) ammeter circuits in the control room is an issue that is reportable in accordance with 10CFR50.72 (b)(3)(ii)(B) as an unanalyzed condition with respect to 10CFR50 Appendix R analysis requirements. The original plant wiring design and associated analysis for the Class 1E batteries control room ampere indications did not include overcurrent protection features to limit the fault current.

In the postulated event, a fire outside the control room could cause one of the ammeter wires to hot short to the ground plane. Simultaneously, the fire causes another DC wire from the opposite polarity on the same battery to also hot short to the ground plane. This could cause a ground loop through the unprotected ammeter wiring. This event could result in excessive current flow (heating) in the ammeter wiring to the point of causing a secondary fire in the raceway system. The secondary fire could adversely affect safe shutdown equipment and potentially cause the loss of the ability to conduct a safe shutdown as required by 10CFR50 Appendix R.

The cables of concern run from the shunts on the battery feed to each of the Train A and Train B switchboards to the control room. Both units and trains of cables follow similar routes through the same fire areas routing outside the inverter rooms with the exception of Train A going through the chiller rooms. There are locations in the cable routing where there are either high energy source conductors or unfused source conductors. A fire event and the consequential events could potentially spread the fire to unaffected fire areas. Should this fire propagate from one fire area to another via the cables of concern, Fire Safe Shutdown could be jeopardized.

There were no actual safety consequences for this event. This is a postulated event and as such did not result in challenges to fission product barriers, control of radioactive materials, or the health and safety of the public. This event has been evaluated to not meet the definition of a safety system functional failure per 10CFR50.73(a)(2)(v).

IV. CAUSE OF THE EVENT

The cause of this event was the original design of the DC ammeter circuits did not adequately address fire protection program requirements. The uniqueness of the design application was not apparent and is different from standard design convention. This resulted in "un-fused" DC ammeter circuits being utilized in applications related to Fire Safe Shutdown (Associated Circuits by Common Enclosure) not being identified as needing specific analysis or resolution.

The original issue of the Comanche Peak Nuclear Power Plant Fire Protection Report for Units 1 and 2 on September 22, 1987, stated there was compliance with common enclosure circuits based on proper cable protection. The design and use of "unfused" DC ammeter circuits for both local and remote reading are not discussed in this document as they were incorporated as part of the original design documents received from the vendor.

The Design Basis was not adequately considered when applying the basis to the DC shunt driven ammeters used in remote locations such as the control room due to assumptions that were made in the Fire Safe Shutdown Analysis that all DC circuits had protective devices that adequately protected the cables in the event of a circuit fault. The design convention to utilize "un-fused" circuits for remote reading DC ammeters is an accepted practice. In the case of the Safety Related and Fire Protection Related DC circuits, the common enclosure associated circuits, if analyzed with the appropriate rigor could have provided enough reason to deviate from standard convention.

V. CORRECTIVE ACTIONS

Immediate corrective actions were to develop and implement compensatory measures to maintain the requirements of 10CFR50 Appendix R. Roving fire watch patrols were implemented for the affected fire areas. Lifting the leads on the remote reading ammeters was also identified as an option to the compensatory measures currently in place. This was not considered a viable option due to the fact that plant indication circuits are powered from this circuit as well and would not be functional. As a part of the CPNPP Corrective Action Program, a design change to include circuit protection for the cables routed from the Safety Related batteries to the control room DC ammeters will be developed and implemented.

VI. PREVIOUS SIMILAR EVENTS

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