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May 2, 2014
GO2-14-072

10 CFR 50.73

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

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397**
LICENSEE EVENT REPORT NO. 2014-002-00

Dear Sir or Madam:

Transmitted herewith is Licensee Event Report No. 2014-002-00 for Columbia Generating Station. This report is submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B).

There are no commitments being made to the NRC by this letter. If you have any questions or require additional information, please contact Mr. J. R. Trautvetter, Regulatory Compliance Supervisor, at (509) 377-4337.

Respectfully,

W. G. Hettel
Vice President, Operations

Enclosure: Licensee Event Report 2014-002-00

cc: NRC Region IV Administrator
NRC NRR Project Manager
NRC Senior Resident Inspector/988C
M.A. Jones – BPA/1399
W.A. Horin – Winston & Strawn

IE22
NRR

NRC FORM 366 (01-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES 01/31//2017

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, 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 Page 2 for required number of digits/characters for each block).

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE

Unnanalyzed Condition Resulting from Direct Current (DC) Ammeter Circuits Without Overcurrent Protection

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	11	2014	2014	- 002 -	00	05	02	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	☐ 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)
10. POWER LEVEL	☐ 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)
100	☐ 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)*
Diego Suarez	509-377-8652

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	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On March 11, 2014, with the plant operating in Mode 1 at 100 percent power, an extent of condition evaluation, resulting from a review of nuclear industry operational experience, identified areas in the plant that may be susceptible to secondary fires due to hot shorts from unfused ammeters in the Direct Current distribution system. In the postulated event, a fire in the station cable raceway, cable spreading room, or Control Room could cause a ground loop through unprotected ammeter wiring or control circuit wiring and potentially result in excessive current flow and heating to the point of causing a secondary fire. The postulated secondary fire could affect the availability of equipment needed to place the plant in a safe shutdown condition. This scenario has not been analyzed in accordance with 10 CFR 50 Appendix R commitments. Compensatory hourly fire watch measures have been put in place and will remain in place for the affected areas of the plant until analyses are completed and modifications are put in place to eliminate the concern. The condition affects 14 Class 1E DC ammeters and 2 non-Class 1E DC ammeters in 3 plant divisions. The cause of the unfused DC ammeter circuits is that the original plant design did not include overcurrent protection features to isolate fault current in the current flow path from the shunts for each direct current battery or charger to the remote ammeter circuits in the Control Room. The corrective action plant modification will provide fuses to the unprotected ammeters.

NARRATIVE

Background Information

Operational experience available from INPO on December 10, 2013 through report IER-L4-13-54, "Unprotected Direct Current Ammeters Result in Unanalyzed Conditions," involved Control Room direct current (DC) ammeters [II] lacking overcurrent protection in their original plant wiring designs, which significantly degraded plant safety. Specifically, wiring designs for the DC ammeter circuits in the Control Room often included a shunt [17] in the current flow path from each DC battery [BTRY] or charger [BYC]. Overcurrent protective devices were not used to isolate fault current in the ammeter wiring attached to the shunts at stations that reported this condition. A postulated fire in the station cable raceway, cable spreading room, or Control Room could cause an ammeter wire short to ground. If another DC wire from the opposite polarity on the same DC source shorted to ground, fault current would flow through the unprotected ammeter cable with the potential for overheating and initiating a secondary fire. Either the secondary fire or the ground condition could adversely affect safe shutdown equipment and hinder the ability of the plant to safely shut down as committed to 10 CFR 50 Appendix R.

Identification of Occurrence and Plant Conditions Prior to Occurrence

The identification of specific applicability to Columbia of the unfused DC ammeters condition occurred on February 27, 2014 after issuance of an extent of condition report; however, analysis to determine impact to safety systems was not completed until March 11, 2014. The NRC was notified through Event Notification 49898 on the same date, in accordance with 10 CFR 50.72(b)(3)(ii)(B) reporting requirements for the unanalyzed condition. The plant was operating in Mode 1 at 100 percent power, within design temperature and pressure conditions, and there were no structures, systems, or components that were inoperable at the start of the event and that contributed to the event.

Event Analysis and Extent of Condition

Plant wiring design drawings for the DC Electrical System ammeter circuits that utilize a shunt in the current flow path for each DC battery or charger were analyzed to determine affected components.

The extent of condition analysis identified the following Columbia components that provide remote monitoring or Control Room indication associated with 24 VDC, 125 VDC, or 250 VDC circuits as being vulnerable to the condition:

- Division 1: a total of six ammeters that provide operator indication for associated battery or battery charger current output, and remote monitoring of current flow.
- Division 2: a total of six ammeters that provide operator indication for associated battery or battery charger current output, and remote monitoring of current flow.

NARRATIVE

- Division 3: a total of two ammeters that provide operator indication for associated battery or battery charger current output, and remote monitoring of current flow.

DC ammeter circuitry cables for two of the Division 2 ammeters are non-safety related feeding their corresponding non-safety related DC ammeter. All other DC ammeter circuitry divisional cables referenced above are safety-related in class 1E raceways feeding their respective safety-related DC ammeters.

Failures and Errors

There were no safety system or safety component failures or errors resulting from this condition.

Safety System Responses

The plant's safety systems that could have been affected by this condition have not experienced a condition-related abnormal response. The condition has not resulted in declarations of system inoperabilities at the plant.

Cause of Occurrence

This condition occurred because the original plant wiring design did not include overcurrent protection features to isolate fault current in the current flow path from the shunts for each DC station battery and/or charger to the remote ammeter circuits in the Control Room. The postulated event requires two concurrent extremely low resistance (hard) grounds; one on the positive side of the battery through the ammeter circuit wiring routed to the Control Room and one on the negative side of the battery. Because this is a very low probability event, it was likely not considered in the original design.

Assessment of Safety Consequences

The discovered condition is being reported under criterion in 10 CFR 50.73(a)(2)(ii)(B) – Any event or condition that results in the nuclear plant being in an unanalyzed condition that significantly degraded plant safety.

There have been no actual adverse nuclear, radiological, or industrial safety consequences resulting from the reported condition. The administrative controls of the Fire Protection Program, the availability of fire detection and suppression systems, the established compensatory measures, and a trained on-site fire brigade all combine to mitigate the event postulated in the scenario until permanent corrective actions described below are implemented.

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Corrective Actions

Due to the complexity of the engineering review that is being conducted towards mitigation of this condition, a conservative decision was made to establish hourly fire tours for the fire areas of concern. Barrier Impairment measures have been implemented per established station procedures.

In addition to the immediate compensatory action consisting of hourly fire watches and establishment of barrier impairments in the affected areas, an engineering change is being developed to modify the affected DC electrical circuits to comply with the commitments of 10 CFR 50 Appendix R. Specifically, the scope of the engineering change will modify the existing DC ammeter circuits to include fuses, credited as overcurrent protective devices, to ensure that the postulated fire scenario does not impact the plant safety systems. Ensuing corrective action implementation work orders will include design changes, analysis updates, and physical work orders to bring affected DC circuits in full compliance with Columbia commitments to10 CFR 50 Appendix R.

Previous Occurrences

Columbia has not experienced similar occurrences in the past, based on a review of LER historical records.