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February 11, 2010

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

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
LICENSE EVENT REPORT (LER 2009-004-00)
MANUAL REACTOR TRIP DUE TO MAIN STEAM DUMP SYSTEM FAULT

Attached is Licensee Event Report (LER) No. 2009-004-00 for the Virgil C. Summer Nuclear Station Unit 1. This report describes a manual reactor trip during a planned turbine shutdown to repair a faulty turbine control valve. After trip of the main turbine, a fault in the main steam dump system necessitated a manual reactor trip. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

Should you have any questions, please call Bruce Thompson at (803) 931-5042.

Very truly yours,

Dan Gatlin

Thomas D. Gatlin

WCM/TDG/gr
Attachment

c: K. B. Marsh
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RTS (CR-09-05566)
File (818.07)
PRSF (RC-10-0024)

IE22
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NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

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 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, (3150-0104), 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
Virgil C. Summer Nuclear Station Unit 1	05000 395	1 OF 3

4. TITLE

Manual reactor trip due to main steam dump system fault

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
12	16	2009	2009	- 4 -	0	02	11	2010	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE

Mode 1

10. POWER LEVEL

46%

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)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Virgil C. Summer Nuclear Station Unit 1	(803) 931-5042

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
X	SB	CBD	W120	Yes					

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 December 16, 2009, VC Summer Nuclear Station (VCSNS) was undergoing a planned downpower to repair main turbine control valve #4. As power was being reduced, the main turbine was manually tripped at approximately 46% reactor power due to elevated turbine vibration. Following the turbine trip, the main steam (MS) dump system failed to operate resulting in actuation of MS power operated relief valves (PORVs) and MS safety valves. Due to increased reactor coolant system (RCS) and main steam pressures, a manual reactor trip was initiated at 1415 hours. The plant was stabilized in Mode 3 and remained in Mode 3 until repairs were completed.

The cause of the fault in the MS dump system was determined to be a failed circuit card. Upon replacement of the failed circuit card and repair of the main turbine control valve, the plant returned to power operation on December 17, 2009 at 2002 hours.

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NARRATIVE

PLANT IDENTIFICATION

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION

ITY00408E, Delta T-Tavg Control Summing Amplifier

IDENTIFICATION OF EVENT

On December 16, 2009, VCSNS was performing a downpower to repair a faulty main turbine control valve when high vibration was observed on the #2 turbine bearing. The main turbine was manually tripped at 1414 hours with reactor power at approximately 46%. Following trip of the main turbine, the main steam dump system failed to operate. With increasing RCS and main steam pressures, operators initiated a manual reactor trip at approximately 1415 hours.

EVENT DATE

December 16, 2009

Condition Report CR-09-05566 was written to address event.

REPORT DATE

February 11, 2010

CONDITIONS PRIOR TO EVENT

Mode 1, 46% Power

DESCRIPTION OF EVENT

On December 16, 2009, while VCSNS was performing a downpower to repair faulty main turbine control valve #4, main turbine vibration was observed increasing on the #2 bearing. Some vibration was expected due to faulty main turbine control valve #4 being open when it is normally closed at less than 90% power. At the prejob brief, the shift supervisor had determined that if vibrations reached 9 mils, the turbine would be tripped. At approximately 1414 hours with the reactor at 46% power and turbine vibration approaching 9 mils on bearing #2, the main turbine was manually tripped. Following the trip of the turbine, the main steam (MS) dump system failed to operate. MS pressures increased resulting in actuation of MS power operated relief valves (PORVs) and MS safety valves. At 1415 hours, operators manually tripped the reactor. Main turbine vibrations increased to greater than 15 mils on the #1 and #2 turbine bearings necessitating breaking of main condenser vacuum per station operating procedure. Both motor driven emergency feedwater pumps were manually started at 40% steam generator level. During the event, pressurizer pressure exceeded 2300 psig resulting in opening of a pressurizer PORV for a short period of time. Pressurizer level decreased below the low level setpoint due to the plant cooldown which resulted in a letdown isolation. Operators promptly restored letdown per plant procedures. Operators entered the reactor trip recovery procedure, stabilized the plant in Mode 3, and remained in Mode 3 until repairs of the MS dump system circuit card and main turbine control valve #4 were made.

CAUSE OF EVENT

A malfunction of MS dump system circuit card ITY00408E, Delta T - Tavg Control Summing Amplifier, was determined to be the cause of the event. Troubleshooting by maintenance and engineering personnel revealed the output of the circuit card had failed low.

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NARRATIVE

ANALYSIS OF EVENT

The main steam (MS) dump system is designed to dump main steam to the main condenser, or atmosphere, to remove decay heat and facilitate pressure control of the RCS during plant trips, transients, and turbine load rejections. Failure of the MS dump system to actuate could result in unplanned reactor trips. The MS power operated relief valves (PORVs), MS safety valves and pressurizer PORVs responded to system pressures as designed. The MS PORVs and safety valves dumped steam to the atmosphere to control plant cooldown when the MS dump system failed. The reactor protection system (RPS) responded as designed when reactor trip breakers opened reducing reactor power. There were no automatic engineered safeguard feature (ESF) system actuations. Both motor driven emergency feedwater pumps were manually started at 40% steam generator level prior to reaching their automatic setpoint. All safety systems responded as required to protect the plant and public and there were no safety consequences resulting from this event.

Actual vibration levels on main turbine bearings #1 and #2 during the coastdown were reviewed and were found to be consistent with expected vibration levels for a coastdown with a rub. Vibration levels were normal throughout startup and loading confirming no deleterious effect on turbine components.

From a probabilistic risk assessment (PRA) perspective, this event was not risk significant. The MS dump system is modeled for failure to close on an ATWS (Anticipated Transient Without Scram) event, but is not modeled for failure to open. The reactor trip initiating event frequency is based on industry experience as well as plant specific events and therefore includes the potential for steam dump system failure to cause a reactor trip. Since all PRA credited functions were successful, there is no calculated increase in Core Damage Frequency (CDF) or Large Early Release Frequency (LERF).

CORRECTIVE ACTIONS

The cause of the event was determined to be the failed circuit card ITY00408E, Delta T-Tavg Control Summing Amplifier. The card's output had failed low. The card was replaced. Post maintenance testing was performed satisfactory and the MS dump system was returned to service. The card has been placed in the station's preventive maintenance program and is scheduled for refurbishment at an 8 year frequency.

PRIOR OCCURRENCES

None. There were no prior failures of circuit card ITY00408E identified for the MS dump system during the past three years.