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February 27, 2004

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

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
LICENSEE EVENT REPORT (LER 2003-003-01)
CONTROL ROOM VENTILATION BOUNDARY BREACHED DURING MAINTENANCE, SUPPLEMENTAL INFORMATION

Attached is Licensee Event Report (LER) No. 2003-003-01, for the Virgil C. Summer Nuclear Station (VCSNS). The report describes an event in which the VCSNS control room ventilation boundary was breached during HVAC system maintenance for greater than the allowable time in the facility Technical Specifications. This LER is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(B).

Should you have any questions, please call Mr. Ronald B. Clary at (803) 345-4757.

Very truly yours,

Stephen A. Byrne JEFF ARCHIE PER DIRECTION OF SAB. 2/27/04

PAR/SAB/dr
Attachment

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DMS (RC-04-0044)

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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.

# 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 | 05000395 | 1 OF 6 |

**4. TITLE**

Control Room Ventilation Boundary Breached During Maintenance

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---|---|---|---|---|---|---|---|---|---|---|
| MO | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV | MO | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000395 |
| 09 | 08 | 2003 | 2003 | - 003 - | 01 | 02 | 27 | 2004 | FACILITY NAME | DOCKET 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)(ii) | | 50.73(a)(2)(ii)(B) | | 50.73(a)(2)(ix)(A) |
| | 20.2201(d) | | 20.2203(a)(4) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) |
| | 20.2203(a)(1) | | 50.36(c)(1)(i)(A) | | 50.73(a)(2)(iv)(A) | | 73.71(a)(4) |
| | 20.2203(a)(2)(i) | | 50.36(c)(1)(ii)(A) | | 50.73(a)(2)(v)(A) | | 73.71(a)(5) |
| | 20.2203(a)(2)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(v)(B) | | OTHER |
| | 20.2203(a)(2)(iii) | | 50.46(a)(3)(ii) | | 50.73(a)(2)(v)(C) | | Specify in Abstract below or in NRC Form 366A |
| | 20.2203(a)(2)(iv) | | 50.73(a)(2)(i)(A) | X | 50.73(a)(2)(v)(D) | | |
| | 20.2203(a)(2)(v) | X | 50.73(a)(2)(i)(B) | X | 50.73(a)(2)(vii) | | |
| | 20.2203(a)(2)(vi) | | 50.73(a)(2)(i)(C) | | 50.73(a)(2)(viii)(A) | | |
| | 20.2203(a)(3)(i) | | 50.73(a)(2)(ii)(A) | | 50.73(a)(2)(viii)(B) | | |

**12. LICENSEE CONTACT FOR THIS LER**

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| R. B. Clary, Mgr., Nuclear Licensing | (803) 345-4757 |

**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 | AH | | | N | | | | | |

| 14. SUPPLEMENTAL REPORT EXPECTED | | | | 15. EXPECTED SUBMISSION DATE | MONTH | DAY | YEAR |
|---|---|---|---|---|---|---|---|
| | YES (If yes, complete EXPECTED SUBMISSION DATE). | X | NO | | | | |


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

On September 8, 2003, at 1530 hours maintenance personnel opened the "A" train Control Room charcoal filter plenum to replace a charcoal filter that failed surveillance testing. On September 9, at 0730 hours, the shift supervisor asked if the system could perform its design function during an accident in the current configuration. At approximately the same time (0805 hours), maintenance was directed to close up the system (reinstall the plenum covers and gag the isolation dampers closed).

Engineering stated that the tag-out of the "A" train ventilation system inadvertently repositioned the isolation dampers for the emergency charcoal filter plenum and fan XFN 0030A open. The configuration would not allow maintaining the required positive 0.125 inch water column as specified in TS (3.7.6) and as verified by the intermittent control room low pressure alarms. This maintenance activity effectively breached the control room boundary and rendered the two emergency trains inoperable. This activity unknowingly placed the plant into Technical Specification Limiting Condition for Operability (LCO) 3.0.3, which requires 1 hour to prepare for plant shutdown and 6 hours to Hot Standby. This is being reported under 50.73(a)(2)(i)(B), a condition prohibited by Technical Specifications as the condition was undetected for 16 hours. Additionally, the event is reportable under 50.73 (a)(2)(v)(D) and 50.73(a)(2)(vii).

Replacement of the charcoal was suspended and the filter plenum was closed and isolated by manually gagging the isolation dampers while a plan was developed that would not degrade the ventilation system (charcoal replacement was completed on September 10, 2003). The NRC Emergency Operations Center was notified at approximately 1130 hours; event number EN# 40142.

A root cause evaluation has been completed and is attached to the corrective action document (CER 03-2819).

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

## PLANT IDENTIFICATION

Westinghouse - Pressurized Water Reactor

## EQUIPMENT IDENTIFICATION

Control Room Ventilation system emergency filter plenum XAA 0029A-AH

## IDENTIFICATION OF EVENT

The oncoming shift supervisor (9/09/03, 0730 hours) questioned why the intermittent control building alarm was acceptable and if the system would perform its design function following an accident.

## EVENT DATE

09/08/03

## REPORT DATE

02/27/04

## CONDITIONS PRIOR TO EVENT

Mode 1, 100% Power

## DESCRIPTION OF EVENT

On September 8, 2003, maintenance personnel opened the "A" train Control Room charcoal filter plenum (XAA-0029A-AH) to replace a charcoal filter that failed surveillance testing. The tag-out process for the work included de-energizing the plenum fan (XFN0030A–AH), which failed the isolation dampers open due to a loss of control power. At 1530 hours, maintenance began to disassemble the

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

**DESCRIPTION OF EVENT (Cont'd)**

plenum to allow for access to replace the charcoal filter. Intermittent alarms for the control room pressure were received but considered an expected alarm by the operating shift due to the maintenance on the system. The annunciator response procedures were reviewed in response to the alarm but did not provide adequate information to assist in evaluating the cause of the alarm.

On September 9, at 0730 hours, the shift supervisor asked if the system could perform its design function during an accident in the current configuration. The plant staff was unclear as to whether the 0.125 inch TS surveillance requirement was applicable in the normal ventilation mode. At approximately the same time (0805 hours), maintenance was directed to close up the system (reinstall the plenum covers and gag the isolation dampers closed).

Engineering review determined that the tag-out of the "A" train ventilation system inadvertently repositioned the isolation dampers for the emergency charcoal filter plenum and its associated fan XFN 0030A open. The configuration would not allow maintaining the required positive 0.125-inch water column as specified in TS (3.7.6) and as verified by the intermittent control room low pressure alarms. This maintenance activity effectively breached the control room boundary and rendered the two emergency trains inoperable. This activity unknowingly placed the plant into Technical Specification Limiting Condition for Operability (LCO) 3.0.3, which requires 1 hour to prepare for plant shutdown and 6 hours to Hot Standby.

**CAUSE OF EVENT**

Multiple barriers should have prevented this event. Procedures did not contain the warning that the activity would breach the system, a lack of knowledge that this activity would violate TS, the planning process did not detect the potential for the breach, and a lack of understanding by the operators that considered the intermittent alarm an expected response were all instrumental in allowing this event to occur.

The root cause evaluation has identified eleven causal factors associated with human performance difficulties that provide for the root cause of the event.

## ANALYSIS OF EVENT

The Control Room ventilation envelope is designed to provide the Control Room and specific vital areas in the Control Building with a minimum flow of air to assure habitability for personnel and operability of equipment during normal operations and to provide filtered air during accidents, fires, or radiation/chemical releases onsite. During normal operations, a maximum of 1000 scfm of outside air is brought in to maintain a minimum positive pressure of 0.125 inches water column. This positive pressure is required for accident conditions to prevent intrusion of airborne contaminants.

Engineering investigation determined that by having the isolation dampers for the "A" train emergency filter plenum open, a path existed for some percentage of the "B" train air flow to back feed into the "A" train. The opening of the plenum provided an opening, which allowed the reduction in positive pressure. Additionally, the potential increase in the outside air flow rate may have exceeded design analysis assumption limits. This potential negates the design function during an accident, which is to protect the operators from unacceptable levels of airborne contaminants.

During the time period that the "A" train was tagged out, no releases of airborne contaminants occurred and there were no undesired exposures to personnel. Equipment temperatures remained within acceptable bands.

The change out of a charcoal filter is not a common activity but has been performed previously on the Control Room emergency ventilation system as well as other ventilation systems through out the plant. The last time this activity was performed was in 2000 on the opposite train. The procedure does contain some compensatory measures, such as using sheet plastic to provide a temporary boundary, but the plastic sheeting was not used on the Control Room emergency ventilation system on September 8, 2003 due to not understanding the need to protect the boundary. The lack of understanding of what constitutes a breach of the Control Room Boundary was across all disciplines involved in the activity.

## CORRECTIVE ACTIONS

The Station took the following immediate corrective actions:

- The filter plenum was closed to prevent unfiltered air from being drawn into the ductwork.
- The isolation dampers for the emergency charcoal filter plenum and fan were gagged closed to prevent any back flow through fan XFN0030A.

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

Corrective actions were established during the root cause evaluation performed for this event, which will be tracked under the corrective action program (CER 03-2819).

1. Review and modify existing plant work control and tagging procedures to enhance the ability to control work evolutions involving the Control Room Pressure Boundary.

2. Revise the OPS Scheduling Tagout Checklist to include a check-off for "CR Pressure Boundary affected-Evaluation per GMP100.017 required."

3. Revise the electrical feeder list to include information that de-energizing the CR Emergency Filter Fan (XFN0030A & B) will result in not only the inlet and outlet dampers failing open but also that subsequent opening of the filter plenum will result in breach of the Control Room Envelope.

4. Place placards on the HVAC access doors for the ductwork in the Control Room Boundary per GMP 113.001 and the Maintenance Aid Program. These placards will caution the plant staff not to breach the CR Boundary without the proper evaluation.

5. Require training for the applicable groups on the configuration of the Control Room Ventilation. Update annual Employee Training to make the plant staff aware of the boundaries of the CR Envelope.

6. ECR 70436, 70437, and 70438 have been generated to change the setpoint, DP switch, and time delay associated with the HI/LO CR Pressure Switches.

7. Revise the annunciator response procedure (XCP-6210-LCB5 3-4) to instruct the Control Room Staff to notify the HVAC group of any alarm condition and verify the HVAC panel alarm is valid by observing the local CR differential pressure indicators.

8. Place a "TS" sticker on the HVAC alarm panel located adjacent to these annunciators to denote that this alarm is associated with a Tech Spec required value.

9. Revise MMP 460.020 (Activated Carbon Replacement In HVAC Systems) to require the use GMP 100.017 (Controlling the Breach of System Integrity, Attachment I) for breach of HVAC systems, provide directions for proper isolation for the tasks involved, and proper verification of CR Pressure during plenum disassembly.

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| V. C. Summer Nuclear Station | 05000395 | 2003 | -- 003 -- | 01 | 6 of 6 |

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

10. Revise GMP 100.017 to add a step that documents the results of an engineering evaluation, if one is requested, as well as a step to document any actions requested have been implemented and breach of the system is approved.

## PRIOR OCCURRENCES

None