

**Virginia Electric and Power Company**  
North Anna Power Station  
P. O. Box 402  
Mineral, Virginia 23117

June 12, 1997

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

NAPS:MPW  
Docket Nos. 50-338  
50-339  
License Nos. NPF-4  
NPF-7

Dear Sirs:

Pursuant to North Anna Technical Specifications, Virginia Electric and Power Company hereby submits the following Supplemental Licensee Event Report applicable to North Anna Units 1 & 2.

Report No. 50-338/96-004-02

This Report has been reviewed by the Station Nuclear Safety Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

*D. H. H. for*  
W. R. Matthews  
Station Manager

Commitments contained in this report:

1. Submittal of UFSAR Change to clarify operation of the containment gaseous and particulate radiation monitors.

Enclosure:

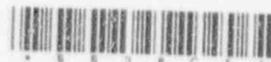
cc: U. S. Nuclear Regulatory Commission  
Region II  
Atlanta Federal Center  
61 Forsyth Street, SW, Suite 23T85  
Atlanta, Georgia 30303

Mr. M. J. Morgan  
NRC Senior Resident Inspector  
North Anna Power Station

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**LICENSEE EVENT REPORT (LER)**

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (1-8-6-F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) North Anna Power Station, Units 1 & 2		DOCKET NUMBER (2) 05000338	PAGE (3) 1 OF 6
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TITLE (4)  
SEISMIC CONCERNS REGARDING THE CONTAINMENT PARTICULATE AND GASEOUS RADIATION MONITORS

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCUMENT NUMBER
09	10	96	96	004	02	06	12	97	North Anna Unit 2	05000339

OPERATING MODE (9) 1  POWER LEVEL (10) 100 %	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)										
	20.2201(b)			20.2203(a)(2)(v)			x		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)			20.2203(a)(3)(i)					50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)			20.2203(a)(3)(ii)					50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)			20.2203(a)(4)					50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)			50.36(c)(1)					50.73(a)(2)(v)		Specify in Abstract below
	20.2203(a)(2)(iv)			50.36(c)(2)					50.73(a)(2)(vii)		or in NRC Form 365A

LICENSEE CONTACT FOR THIS LER (12)	
NAME W. R. Matthews, Station Manager	TELEPHONE NUMBER (Include Area Code) (540) 894-2101

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)		NO						

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)  
 On June 11, 1996, at 1215 hours, with Units 1 & 2 in Mode 1 at 100 percent power and subsequently on September 10, 1996, with Unit 1 at 100 percent power and Unit 2 shutdown for refueling, it was determined that the containment gaseous and particulate radiation monitors (RM) may not have been capable of performing their intended function following a Safe Shutdown Earthquake (SSE). Concerns were identified regarding the RM piping seismic qualifications and the non-emergency power supply to the RM sample pumps. Subsequent concerns were identified that the loss of non-seismic instrument air piping could render the RM system inoperable. Technical Specification (TS) Bases 3/4.4.6.1 stated that reactor coolant leakage detection systems are generally consistent with the recommendations of RG 1.45 which requires continued RM operation following a seismic event. Since these RMs may not have detected increased RCS leakage following a SSE, this event is reportable pursuant to 10CFR50.73 (a)(2)(i)(B) for a condition prohibited by the plant TS. Subsequently, a TS Bases 3/4.4.6.1 change was submitted to the NRC on March 18, 1997, clarifying operation of the particulate and gaseous radiation monitors.

The cause of the events has been determined to be personnel error in understanding the regulatory requirements during original installation and subsequent plant design changes.

These events posed no significant safety implications because the RM system will be verified operable following a SSE or the affected unit(s) will be shut down and cooled to Cold Shutdown. Therefore, the health and safety of the public were not affected during these events.

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

FACILITY NAME (1) North Anna Power Station Units 1 & 2	DOCKET 05000338	LER NUMBER (6)			PAGE (3) 2 OF 6
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		96	004	02	

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

1.0 Description of the Event

On June 11, 1996, at 1215 hours, with Units 1 & 2 in Mode 1 at 100 percent power and subsequently on September 10, 1996, at 1257 hours, with Unit 1 in Mode 1 at 100 percent power and Unit 2 shutdown for refueling, it was determined that the containment gaseous and particulate radiation monitors (RM) (EISS System IL, Component MON) may not have been capable of performing their intended function following a Safe Shutdown Earthquake (SSE). Initial concerns were identified regarding the RM piping seismic qualifications and the non-emergency power supply (EISS System EA) to the RM sample pumps (EISS System IL, Component P). Subsequent concerns were identified with the loss of non-seismic instrument air piping (EISS System LD) causing closure of the containment air recirculation fans (EISS System iL, Component FAN) discharge dampers (EISS System IL, Component DMP), and the isolation of the containment trip valves to and from the radiation monitors. Additional portions of the containment ventilation system were determined to be non-seismic. Technical Specification (TS) Bases 3/4.4.6.1 stated that reactor coolant leakage detection systems are generally consistent with the recommendations of RG 1.45 which requires unit shutdown as an result of a seismic event with a leak in the Reactor Coolant System.

UFSAR Section 5.2.4.1.1, states that the containment particulate and gaseous RMs will continue to operate following a seismic event. In order to satisfy this requirement, the original piping connected to the RMs was designed and installed as safety related (SR) Class 3 (Q3) piping. The RMs were furnished by Westinghouse as seismically qualified units per NAS-234, Specification for Radiation Monitoring System.

In 1987 a design change, DCP 83-19A, was implemented to provide electrical power separation between the RM pumps on Unit 1. In addition, one of the RM sample pumps was relocated from inside the Unit 1 RM cabinet (EISS Component CAB) to an outside adjacent location without properly evaluating the seismic qualification requirements. The design change process failed to identify that the RM sample pump power supply should have been powered from an emergency bus (EISS System EB, Component BU) to meet seismic requirements. The power supplies to the RM sample pumps originated from the station service buses (EISS System EA, Component BU) which are not designed to supply power after a SSE. A similar modification was performed on Unit 2 by DCP 83-19B regarding electrical power separation between the RM pumps.

In 1988, the safety classification of the piping connected to the RMs was incorrectly downgraded by Engineering Work Request No. 88-065. The piping for the RMs was originally designed as Q3 but was subsequently declassified to Non Safety Related (NSQ) with Special Quality or Regulatory Requirements (i.e. equipment used to meet the requirements of the Seismic Verification program which is not evaluated to be safety related). No physical work was performed under this change. The EWR incorrectly downgraded the RM piping to be consistent with other systems that have containment isolation trip valves (EISS System JM, Component ISV), but which are not required to operate following a seismic event.

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

FACILITY NAME (1) North Anna Power Station Units 1 & 2	DOCKET 05000338	LER NUMBER (6)			PAGE (3) 3 OF 6
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		96	004	02	

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

During the upgrade of the Radiation Monitors in accordance with Design Change Packages 96-182 and 96-187, the loss of non-seismic instrument air piping and non-seismic portions of the containment ventilation system were not considered on the performance of these radiation monitors and supporting systems. The loss of instrument air to the radiation monitoring system's valves results in the isolation of the trip valves to and from the radiation monitors. Additionally, the loss of instrument air results in the closure of the containment air recirculation fan's discharge dampers. With the fans isolated, the containment radiation monitoring system cannot obtain a representative sample of the containment atmosphere. These conditions would not support operation of the containment radiation monitors in Modes 1-4 following a seismic event.

On March 18, 1997, a change was submitted to the NRC for TS Bases 3/4.4.6.1. The change modified our commitment on how we meet the intent of RG 1.45 to monitor the reactor coolant system (RCS) pressure boundary for leakage during normal operations and after a seismic event in order to provide the operator with information to determine whether to shutdown the unit.

UFSAR Section 5.2.4.1.1, will be changed to be consistent with our TS Bases change to clarify the operation of the containment gaseous and particulate RM System after a seismic event. Specifically, for plant operation after a seismic event, the containment gaseous and particulate RM System will be verified to be operational or the affected unit(s) will be shut down and cooled to Cold Shutdown.

2.0 Significant Safety Consequences and Implications

These events posed no significant safety implications because the RM system is functional and other methods are available to monitor RCS leakage following a SSE. The TS Bases change is more conservative because it requires immediate action to shut down the unit(s) following a seismic event if the containment RM system is rendered inoperable. The previous TS Bases permitted continued operation for 30 days while relying on other leakage detection systems. Therefore, the health and safety of the public were not affected at any time during these events.

Since these RMs may not have operated following a SSE these events were reported pursuant to 10CFR50.73(a)(2)(i)(B) for a condition prohibited by the plant Technical Specifications.

3.0 Cause of the Event

The cause of the events has been determined to be personnel error in understanding the regulatory requirements during original design and installation as well as subsequent plant design changes.

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

FACILITY NAME (1) North Anna Power Station Units 1 & 2	DOCKET 05000338	LER NUMBER (6)			PAGE (3) 4 OF 6
		YEAR 96	SEQUENTIAL NUMBER 004	REVISION NUMBER 02	

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

4.0 Immediate Corrective Actions

Upon identification of the concerns, the RMs were declared inoperable and RCS leak rate calculations were initiated to be performed at least once every twenty four hours in accordance with TS 3.4.6.1. A review was performed of the design changes which may have occurred to the piping since declassification to ensure no other portions of SR piping were replaced or modified.

5.0 Additional Corrective Actions

The non seismic piping associated with the RMs was upgraded to seismic. The RM piping previously downgraded on Units 1 & 2 was re-classified as seismic. One of the power supplies to each RM pump was modified to allow the normal supply from the H emergency bus. The power supply cables were routed through raceways that will withstand a SSE. The additional electrical equipment installed in the RMs since original installation has been determined to be capable of withstanding a SSE. It has also been determined that the existing instrumentation cables are routed through raceways capable of withstanding a SSE. The RMs were declared operable and returned to service on June 28, 1996.

A systematic review of the components of the Containment Gaseous and Particulate Radiation Monitors and supporting equipment was performed to ensure that these radiation monitors continue to operate following a seismic event.

Following the identification of the instrument air concerns, design changes were initiated to resolve items identified from the systematic review and to install a seismically qualified air accumulator/check valve assembly to the instrument air supply to the radiation monitoring sample line trip valves and to the containment air recirculation fan air operated dampers. This would allow them to remain open after a loss of instrument air. These changes were completed for Unit 2 during a refueling outage. However, the Unit 1 modifications to the containment air recirculation fan (CARF) dampers and one RM trip valve were not completed at this time due to radiological and personnel safety concerns.

Containment air recirculation fan damper 1-HV-AOD-157B and the manual ventilation dampers were thought to be secured in the open position. This allowed the dampers to remain open, following a loss of instrument air, to ensure a pathway for CARF flow and to provide a positive means that ensures that the sampling point for the containment gaseous and particulate radiation monitors is representative of the containment atmosphere. A Justification for Continued Operation, JCO 1-96-01, for Unit 1 was prepared to support the continued operation of Unit 1 without the design changes being installed. Operation with the CARF "B" dampers secured open, the manual ventilation dampers secured open, and the changes to abnormal procedure 0-AP-36 would meet the intent of RG 1.45 since Unit 1 was assumed to have primary pressure boundary

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

FACILITY NAME (1) North Anna Power Station Units 1 & 2	DOCKET 05000338	LER NUMBER (6)			PAGE (3) 5 OF 6
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		96	004	02	

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

failure and immediately shutdown if the RM detection system is rendered inoperable by a seismic event. Therefore, the safety function of being able to shutdown the unit in the event of RCS leakage following a seismic event is maintained.

The action statement on the containment gaseous and particulate radiation monitors for seismic concerns was cleared at 1832 hours on October 8, 1996 following the implementation of JCO 1-96-01.

Justification for Continued Operation, JCO 1-96-01 Rev. 0 for Unit 1 was revised and subsequently closed based on the TS Bases change submitted to the NRC. The revised bases provides clarification of how the intent of RG 1.45 is met and reads as follows:

The RCS leakage detection systems required by this specification ~~are provided to~~ monitor and detect leakage from the reactor coolant pressure boundary **during normal operations and after seismic events to provide prompt and quantitative information to the operators to permit immediate corrective actions should the reactor coolant pressure boundary leak be detrimental to the safety of the facility**

These detection systems are generally consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973. **The containment atmospheric particulate and gaseous radioactivity monitoring system is not fully seismically qualified. Consistent with RG 1.45 these monitors can perform their intended function during normal plant operations. To ensure the safety function of detecting reactor coolant pressure boundary leakage is maintained after a seismic event the operability of these monitors is required to be verified immediately following a seismic event or the affected unit(s) will be shutdown and cooled to Cold Shutdown.**

The following actions were completed during the Unit 1 1997 refueling outage:

An inspection of the containment ventilation system was performed during the 1997 Unit 1 refueling outage. The manual damper, 1-HV-CDMP-2A-3, between the ring duct and the isokinetic sample point to the radiation monitors was found unsecured in the open position which conflicted with the assumptions made to support JCO 1-96-01 for Unit 1. Subsequently, the damper internals for 1-HV-CDMP-2A-3 were removed. This ensures that as long as a CARF is operating there will be air flow past the sample nozzle for the radiation monitor.

The abnormal procedure has been revised to include specific indicators which will assist operators in determining operability of the containment gaseous and particulate radiation monitors after a seismic event.

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

FACILITY NAME (1) North Anna Power Station Units 1 & 2	DOCKET 05000338	LER NUMBER (6)			PAGE (3) 6 OF 6
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		96	004	02	

TEXT (if more space is required, use additional copies of NRC Form 366A) (17)

6.0 Actions to Prevent Recurrence

Personnel involved in these events have been coached on the importance of compliance with the licensing design basis, including statements in the UFSAR. It was as a result of this heightened awareness that a System Engineer discovered the initial event while conducting a detailed review of the system to determine the basis of a flow setpoint. The initial event was discussed with station personnel during a Human Performance Stand-Down day.

Changes made to TS Bases 3/4 4.6.1 and Abnormal Procedure 0-AP-36, Seismic Event - Rev. 6, along with proposed changes to UFSAR are sufficient to preclude recurrence. The design changes and associated corrective actions identified in LER N1-96-004-01, dated October 9, 1996, are no longer required and will not be performed.

7.0 Similar Events

LER N1-88-028-00, Diesel Driven fire pump batteries not seismic. Inadequate review of EWR for seismic qualification requirements.

LER N1-89-013-00, A walkdown in the Incore Instrumentation Drive Room discovered that the Incore Flux Mapping Frame Assembly was unrestrained. Potential damage during seismic event with frame damaging the incore flux mapping tubes. Inadequate installation.

8.0 Additional Information

None