U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
PLANT VOGTLE - UNIT 1	0 5 0 0 0 4 2 4	1 OF 0 6

TITLE (4)
CONTROL ROOM HVAC DESIGN VIOLATES SINGLE FAILURE CRITERIA

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 NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
0 7	0 2	8 7	8 7	0 4 4	0 1	0 9	1 8	8 7		0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
1 0 0	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	10 CFR 21
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
W. E. Burns, Nuclear Licensing Manager - Vogtle	AREA CODE 4 0 4 5 2 6 - 7 0 1 4

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 (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On July 2, and July 4, 1987, two conditions related to the essential control room (ECR) heating, ventilation, and air conditioning (HVAC) system were identified as not being adequately analyzed for operation in the emergency mode. These conditions could have potentially prevented the Control Room (CR) pressure from reaching the emergency mode design value since the introduction rate of outside air would have been lower than postulated in the analysis of the emergency mode of operation.

These conditions were caused by inadequate analysis of single failures and the effect of isolating Unit 1 from Unit 2 during construction, respectively.

Corrective actions taken included the addition of backdraft dampers to eliminate the potential for system backflow identified on July 2, 1987, and the deactivation of two air outside intake dampers to preclude the spurious damper actuation postulated on July 4, 1987.

IE22
1/1

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PLANT VOGTLE - UNIT 1	0 5 0 0 0 4 2 4	8 7	— 0 4 4	— 0 1	0 2 OF 0 6

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

A. REQUIREMENT FOR REPORT

This report is submitted pursuant to 10 CFR 50.73 (a)(2)(ii) and 10CFR.73(a)(2)(v). Additional review and evaluation has led to the conclusion that this event is also reportable per 10 CFR 21. The apparent design inadequacy could have resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

B. UNIT STATUS AT TIME OF EVENT

Unit 1 was in Mode 1 with the reactor operating at 100% rated thermal power.

C. DESCRIPTION OF EVENT

On July 2 1987, Plant Engineering identified a design problem related to the adequacy of the essential control room (ECR) heating, ventilation, and air conditioning (HVAC) system analysis for operation in the emergency mode. A single failure in one of the control room HVAC trains could have potentially impacted the operation of the redundant train, and could have, thereby, prevented the Control Room (CR) pressure from reaching the emergency mode design value. This failure is postulated based upon the possibility that, under certain plant conditions, the rate of introduction of outside air might be lower than that assumed in the analysis of the emergency mode of operation.

One scenario which illustrates this concern can be described as follows. If an emergency mode is actuated, both ECR HVAC units are started. Both trains (A & B) start and all associated dampers function properly providing the control room with cooled, filtered, recirculated air as designed. If at this time, one of the trains loses power, the other train will continue to operate. All dampers are motor operated and fail "as-is". Therefore, if a damper is open and power is lost, the damper remains open. In this situation the ECR HVAC system is degraded by two potential bypass flowpaths which result in a reduction in the amount of intake of filtered outside air used to pressurize the control room. Since all dampers are open, there potentially could be bypass flow established from the supply header back through the failed train unit to the suction of the running train. There could also be established another bypass flowpath from the return header through the failed train's recirculation duct to the suction of the running unit. The effect of the bypass flow would be to potentially reduce the control room pressure below the design (plus 1/8 inch) value.

Two sections of Technical Specifications were effected by this condition and Limiting Conditions for Operation (LCOs), 1-87-606 and 1-87-607, were entered at 1520 CDT, July 2, 1987.

A design change request (DCR) was initiated and approved on July 5, 1987. The DCR required the addition of backdraft dampers to each train. The backdraft dampers were installed in the HVAC ducting by July 19, 1987. The deficiency was thereby corrected and the LCOs were terminated.

On July 4, 1987 the second condition which could have caused a lower CR pressure was discovered. All ECR systems share common outside air supply ductwork. The common air supply ductwork has openings to the atmosphere associated with both Unit 1 and Unit 2. Redundant isolation dampers (positioned in series) are provided for both Unit 1 and Unit 2 duct openings to the atmosphere. During construction, the Unit 2 duct opening to atmosphere has been isolated by locking the dampers in the closed position. If one of the outside air intake isolation dampers in the Unit 1 ductwork were to close as the assumed single failure of an active component, no source of outside air would be available, and the expected CR positive design pressure could not be maintained. Since chlorine gas sources have been removed from the site, toxic gas is not currently a technical specification consideration. Therefore, the isolation capability for toxic gas is not needed, and the isolation dampers, 1-HV-12114 and 1-HV-12115, have been deactivated and tagged in the open position. The possibility of an active failure of one of those dampers is thereby removed. Upon operation of Unit 2, outside air will be available from the redundant intake. However, the intake associated with Unit 2 will remain isolated until Unit 2 construction is completed.

A temporary security partition (wall) has been installed to further separate the Unit 1 control room from the Unit 2 control room during the completion of construction.

D. CAUSE OF EVENT

The cause of the condition discovered on July 2, 1987, was the failure to perform an adequate failure modes and effects analysis of operation in the emergency mode.

The condition discovered on July 4, 1987, was caused by the failure to recognize the effect of Unit 2 construction upon the availability of the redundant intake. The analysis erroneously assumed outside air would be available from both the intake associated with Unit 1 and Unit 2, and did not, therefore, require a single failure-proof pathway from each intake.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PLANT VOGTLE - UNIT 1	0 5 0 0 0 4 2 4	8 7	— 0 1 4	— 0 1	0 4 OF 0 6

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

E. ANALYSIS OF EVENT

In summary, the postulated single failures did not occur. Therefore, neither the health and safety of the public, nor plant safety, were effected by these circumstances. A more complete analysis will be provided in the supplemental LER.

The control building essential control room (ECR) HVAC system consists of two redundant and physically separated 100 percent capacity HVAC units for each side of the control room, or four for the combined Unit 1 and Unit 2 control room. Each of the two redundant HVAC units belongs to a different safety train. However, portions of the outside air intake ductwork and the control room supply and return ductwork are common to each of the HVAC units.

To protect against high airborne radioactivity inside the control room, following receipt of a safety injection signal or a control room outside air intake high radiation signal, the control room HVAC is automatically transferred from the normal units to the ECR units in the emergency mode of operation. The associated dampers for the essential units are automatically opened and the normal units are automatically isolated. The essential units are designed to be capable of:

1) removing the sensible and latent heat loads from the control room,

2) recirculating the air within the control room through engineered safety feature filters to provide continuous purification capability, and

3) pressurizing the control room to 1/8 inch water guage (w.g.) pressure relative to the adjacent areas to minimize unfiltered inleakage (Technical Specification 3/4.7.6).

Insufficient data exists to perform a calculation to determine if a reduction in outside air makeup flow would have occurred. Consequently, the effect of this potential reduction of control room pressurization on the amount of air inleakage to the control room and increased dose to the operators in the event of an accident cannot be adequately determined. Therefore, this condition is considered reportable under Part 10CFR21.

An accurate analysis of the volume of air which would be transmitted by the various flowpaths through the failed HVAC ductwork would be difficult to perform without test data. However, in lieu of a test, GPC decided to develop hardware modifications to eliminate the potential for changes in the amount of outside air available to pressurize the control room. Accordingly, no analytical conclusion can be drawn regarding the effect on outside air flow resulting from the failure of an operating ECR HVAC train.

Based on the results of the above analysis, it cannot be determined if the required 1/8 inch w.g. positive pressure could have been maintained in the control room after a ECR HVAC train failure. The pressure differential limit is a technical specification requirement, and is used in the design basis for meeting General Design Criteria 19 contained in Appendix A to 10CFR50. Therefore, GPC has concluded that a reportable condition as defined by the criteria of Part 10CFR21 does exist.

F. CORRECTIVE ACTIONS

A Design Change Request (DCR) was written to add backdraft dampers to each train to prevent the backflow paths which would decrease the desired intake flow rate of filtered outside air. Further details of the modifications will be provided in the supplemental LER.

To resolve the postulated failure of the outside air intake isolation damper for the interim period while chlorine gas is removed from the site, the damper actuators for 1-HV-12114 and 1-HV-12115 were deactivated and the dampers tagged open. Further details of the required modification will be provided in the supplemental LER.

A Design Change Request (DCR), DCR no. 87-VIE0245, rev. 0 was written to add two (2) backdraft dampers to each train to prevent the backflow paths which would decrease the outside air flow. For train "B" (train "A") a damper would be added downstream of the outside air supply damper, 1-HV-12119 (1-HV-12118), and another damper was added between the discharge side of the ECR HVAC unit fan and the isolation damper, 1-HV-12129 (1-HV-12130).

The backdraft damper installation was made to the ECR train "" HVAC system. Train "B" was tested on July 11, 1987, and the design positive pressure (1/8 inch) in the control room was achieved, but the outside air flow was higher than expected through the recirculation line of the failed train.

As a result of the test and the postulated failure of the recirculation isolation damper, 1-HV-12129 (1-HV-12130), a revision (rev.) was made to the DCR. DCR 87-VIE0245, rev. 1, addressed a relocation of one (1) of the backdraft dampers for train "A" only. The location of the backdraft damper on the discharge of the unit fan was changed to the recirculation line downstream of isolation damper 1-HV-12131. The DCR 87-VIE0245, rev. 1, installation for train "A" only, was completed and tested on July 19, 1987. Tests were completed on July 19, 1987, and positive control room pressure and outside air flow requirements were achieved.

Until the backdraft dampers in train "B" are in the locations as specified in rev. 1 to DCR 87-VIE0245, operator action will be necessary in the event an ECR HVAC system actuation occurs. Standing order 1-87-032 was issued requiring the necessary operator action(s) to occur within thirty (30) minutes after the actuation occurs.

Relocation of the backdraft damper in train "B" will be addressed in DCR 7-VIE0245, rev. 2, which will be issued and scheduled for installation at a later date.

G. ADDITIONAL INFORMATION

1. Previous Similar Events
   None

2. Energy Industry Identification System Codes
   Control Room HVAC -VI

3. Failed Components
   None

4 Design Organization
   Bechtel Power Corporation
   Western Power Division
   Norwalk, California

Georgia Power Company
333 Piedmont Avenue
Atlanta, Georgia 30308
Telephone 404 526-6526

Mailing Address:
Post Office Box 4545
Atlanta, Georgia 30302

L. T. Gucwa
Manager Nuclear Safety
and Licensing

Georgia Power
the southern electric system

SL-3226
0515m
X7GJ17-V310

September 18, 1987

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

PLANT VOGTLE - UNIT 1
NRC DOCKET 50-424
OPERATING LICENSE NPF-68
LICENSEE EVENT REPORT
CONTROL ROOM HVAC DESIGN FAILED
TO MEET SINGLE FAILURE CRITERIA

Gentlemen:

On August 3, 1987, Georgia Power Company submitted a Licensee Event Report (LER) concerning the control room essential HVAC system design at Plant Vogtle. In this LER, we stated that the NRC could expect to receive a supplemental LER on or about September 15, 1987. Enclosed is a copy of our supplemental LER.

Sincerely,

William E. Burn / for

L. T. Gucwa

WEB/lm

Enclosure: LER 50-424/1987-044-01

c: (see next page)

IE22
1/1

Georgia Power

c: Georgia Power Company
Mr. R. E. Conway
Mr. J. P. O'Reilly
Mr. G. Bockhold, Jr.
Mr. J. F. D'Amico
Mr. C. W. Hayes
GO-NORMS

Southern Company Services
Mr. R. A. Thomas
Mr. J. A. Bailey

Shaw, Pittman, Potts & Trowbridge
Mr. B. W. Churchill, Attorney-at-Law

Troutman, Sanders, Lockerman & Ashmore
Mr. A. H. Domby, Attorney-at-Law

U. S. Nuclear Regulatory Commission
Dr. J. N. Grace, Regional Administrator
Ms. M. A. Miller, Licensing Project Manager, NRR (2 copies)
Mr. J. F. Rogge, Senior Resident Inspector-Operations, Vogtle

Georgians Against Nuclear Energy
Mr. D. Feig
Ms. C. Stangler

0515m