Duke Power Company
Catawba Nuclear Station
P.O. Box 256
Clover, S.C. 29710

(803) 831-3000

DUKE POWER

March 12, 1990

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

Subject: Catawba Nuclear Station
Docket No. 50-413
LER 413/90-12

Gentlemen:

Attached is Licensee Event Report 413/90-12, concerning TECHNICAL SPECIFICATION 3.0.3 ENTERED FOR BOTH TRAINS OF ANNULUS VENTILATION SYSTEM INOPERABLE DUE TO A CONTROLLED ACCESS DOOR FOUND OPEN AS A RESULT OF AN INAPPROPRIATE ACTION.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

Tony B. Owen
Station Manager

keb\LER-NRC.TBO

xc: Mr. S. D. Ebneter
Regional Administrator, Region II
U. S. Nuclear Regulator Commission
101 Marietta Street, NW, Suite 2900
Atlanta, GA 30323

M & M Nuclear Consultants
1221 Avenues of the Americas
New York, NY 10020

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, GA 30339

American Nuclear Insurers
c/o Dottie Sherman, ANI Library
The Exchange, Suite 245
270 Farmington Avenue
Farmington, CT 06032

Mr. K. Jabbour
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

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TITLE (4) Technical Specification 3.0.3 Entered For Both Trains Of Annulus Ventilation System Inoperable Due To Inappropriate Action

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)
											N/A	0 5 0 0 0
0 1	2 7	9 0	9 0	-	0 1 2	-	0 0	0 3	1 3	9 0		0 5 0 0 0

OPERATING MODE (9)	3
POWER LEVEL (10)	0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	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)	
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
	AREA CODE
R.M. Glover, Compliance Manager	8 0 3 8 3 1 - 3 2 3 6

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 January 27, 1990, at 0730 hours, Unit 1 was in Mode 3, Hot Standby. Controlled Access Door (CAD) 311, Lower Containment Personnel Air Lock, had been placed on a continuous fire watch. At approximately 2205 hours, the Central Alarm Station (CAS) Operator noted that CAD 311 was not closed. The Security Lieutenant directed the Operator to immediately notify the Security Officer at the hatch area. An Operations (OPS) Control Room Operator (CRO) was notified and Technical Specification 3.0.3 was entered due to the inoperability of the Annulus Ventilation (VE) System. The door was closed at 2215 hours, and the OPS CRO exited Technical Specification 3.0.3 at that time. Several individuals were interviewed regarding the status of the door during their transits, and Security door alarm typers were reviewed. It was concluded that the door had been tied to the adjacent railing with a rope from approximately 2110 to 2130 hours, and again from approximately 2150 to 2215 hours. The cause of this incident is attributed to inappropriate action taken which was unauthorized. Personnel entering Containment were instructed not to leave the door open. A review of CAD doors critical to Ventilation System operability will be completed, as well as distribution of information to all station personnel emphasizing the importance of ventilation system operability.

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BACKGROUND

The Annulus Ventilation [EIIS:VD] (VE) System is designed to achieve a negative pressure of at least 0.5 inches water gauge (inwg) in the annulus, following a loss-of-coolant accident (LOCA). Following a LOCA event, the VE System minimizes the release of radioisotopes by filtering and recirculating a large amount of air relative to the volume discharged. It consists of two independent, 100 percent capacity trains. Upon receipt of a safety signal, recirculating and discharge dampers are automatically aligned to the Unit vent until negative pressure is greater than or equal to 0.5 inwg. These dampers then modulate to maintain the annulus at a negative pressure of 0.5 inwg.

In the initial design of the VE System and evaluation of various annulus conditions, Duke Power developed the CANVENT computer model. CANVENT was used to establish and evaluate various design parameters for the VE System. This program takes several factors into account, such as pre-LOCA temperature distributions, post-LOCA temperature distributions, post-LOCA annulus temperature and pressure, and the capability of the VE fans [EIIS:BLO] to achieve and maintain a vacuum in the annulus following a LOCA. Other factors included in this program are heat transfer from upper and lower Containment [EIIS:NH] into the annulus, effects of swelling of Containment, and changes in annulus air density during a LOCA.

Technical Specification 3.0.3 is required to be entered when the Unit is operating in a condition prohibited by Technical Specifications. This condition exists when a Limiting Condition for Operation is not met except as provided in the associated Action Requirements. It requires that within one hour action shall be initiated to place the Unit in a Mode in which the specification does not apply by placing it, as applicable, in:

a. At least HOT STANDBY within the next 6 hours,
b. At least HOT SHUTDOWN within the following 6 hours, and
c. At least COLD SHUTDOWN within the subsequent 24 hours.

Technical Specification 3.6.1.8 requires both trains of VE to be operable in Mode 1, Power Operation, Mode 2, Startup, Mode 3, Hot Standby, and Mode 4, Hot Shutdown. The Action Requirement is that with one train of VE inoperable, the train must be restored to operability or the Unit must be in at least Mode 3 within the next 6 hours, and in Mode 5, Cold Shutdown, within the following 30 hours. Surveillance Requirement 4.6.1.8.d.4 states that at least once per 18 months, it must be shown that each train of VE can produce a negative pressure of at least 0.5 inwg in the annulus within one minute after the start signal. This requirement is periodically met by the Annulus Ventilation System Performance Test, PT/1,2/A/4450/03C.

Technical Specification 3.6.1.3 requires that each Containment air lock be operable in Modes 1 through 4. Surveillance Requirement 4.6.1.3b requires an overall air lock leakage test at least once per 6 months. This test is performed in PT/1,2/A/4200/01F, Lower Containment Personnel Air Lock Leak Rate Test.

Technical Specification 3.7.11 states that all fire barrier penetrations [EIIS:PEN] separating safety related areas shall be operable at all times. With any of the required fire barrier penetrations or sealing devices inoperable, within one hour either establish a continuous fire watch on at least one side of the affected penetration, or verify the operability of fire detectors [EIIS:XT] on at least one side of the inoperable penetration and establish an hourly fire watch patrol.

The Fire Detection [EIIS:IC] (EFA) System monitors unattended areas of the plant for smoke or fire, and alerts personnel of the existence and location of a fire. The EFA System is equipped with a Central Fire Detection Panel that alerts Operators, via an alarm, for specific zones within the plant.

Station Directive 2.12.7, Fire Detection and Protection establishes the requirements and responsibilities to ensure that the fire protection standards comply with applicable Technical Specifications. Operations (OPS) assigns the responsibility of Fire Protection Console Operator (FPCO) the duties of maintenance of the Fire Watch Log and all other assignment of continuous and hourly fire watches by station personnel.

Station Directive 3.1.2, Access to Containment, requires that during periods of Reactor shutdown when frequent access to Containment is necessary, Security personnel shall be posted at the personnel air lock area to collect Security badges and to grant access. Also, when the Unit is in Mode 5, Cold Shutdown, or Mode 6, Refueling, the CADs may be propped open and remote card readers utilized to maintain Security documentation.

EVENT DESCRIPTION

On January 27, 1990, Unit 1 was in Mode 3, Hot Standby. Controlled Access Door (CAD) 311, Lower Containment Personnel Air Lock, had been placed in a continuous fire watch status at 0730 hours, due to the mechanical lock on the door being taped to facilitate entry into Containment. This action to the lock was taken by direction of Radiation Protection (RP) due to CAD 311 being a High Radiation Area Door. In addition to Security personnel being present at the hatch area, an RP Technician was also present maintaining the Controlled Area Access Log. Also, due to the increased flow of personnel through the door, Security had located a CAD key beside the CAD access box and the personnel entering were instructed to use the key for entry. At 0750 hours, the OPS FPCO had logged CAD 311 as being in "access" status due to the high personnel traffic flow and the

disabling of the door. In "access", a controlled access door's status will register on the typer printout in the CAS, but will not alarm at the CAS panel. All entries and exits are maintained on the alarm typer. An assigned Security Officer was stationed outside the door with a Vital Area Access Log. Each individual who was authorized access to Unit 1 Lower Containment was "badged into" Containment and "logged out" by surrendering their Security badge to the Security Officer. At 2205 hours, the Central Alarm Station (CAS) Operator noted that CAD 311 was opened (not completely closed) and was instructed by the Security Lieutenant to notify the Security Officer at the hatch area, outside CAD 311. OPS was notified by Security at 2210 hours that the door was found open. Technical Specification 3.0.3 was entered due to both trains of VE being declared inoperable. The door was closed at 2215 hours. Following this event, the door's mechanical lock was re-enabled. The OPS CRO exited Technical Specification 3.0.3 at 2215 hours.

Following the incident, interviews were held with seven workers who entered and exited via CAD 311. During the period from 2110 hours to 2130 hours on January 27, 1990, five workers had noted that the door was tied to the adjacent railing with a 1/4 inch nylon rope. Also, from approximately 2150 hours until 2215 hours, two workers interviewed stated that the door was tied open. One individual interviewed who entered Containment at 2130 hours, clearly recalled having difficulty opening the door and stated that CAD 311 was closed. It is concluded that CAD 311 was closed correctly prior to 2110 hours. A review of Security alarm typer door records indicated that CAD 311 was not fully closed from 1818 hours to 2215 hours, i.e. the electromagnetic pickup was not engaged. The review also indicated that no one transiting CAD 311 between 1825 hours and 2225 hours used the CAD key posted at the door in gaining entry, and no computer indications of CAD key use were recorded during this time.

CONCLUSION

The continuous fire watch on CAD 311 was initiated at 0730 hours, on January 27, 1990. The reason given for establishment of the fire watch was that the mechanical lock on CAD 311 was "taped back" to facilitate passage through the High Radiation Area Door. Therefore, personnel entrances and exits for Lower Containment were logged onto a Vital Area Access Log by the Security Officer on duty. At 0750 hours, the FPCO initiated the entry into the Fire Watch Log and noted that CAD 311 was in "access" per the Fire Watch Sign Out Sheet. Station Directive 3.1.2, Section 5.4.4 allows CAD doors to Containment to be propped open only in Modes 5 or 6. During the time period that CAD 311 was tied open, Unit 1 was in Mode 3. At the instruction of the Security Lieutenant, CAD 311 was closed and the mechanical lock was re-enabled to ensure that the door latched. In addition, the Security Officer at the hatch was instructed by the Security Lieutenant to ensure that the door was not left open. All required fire watch entries were completed by Security personnel. Following the interviews of personnel who entered and exited CAD 311 on January 27, 1990, no indication or identification was given as to the placement of the rope on the

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door. Also, during the period of this fire watch and of this incident, the Security Officers on duty were not able to see CAD 311 completely from their station. They were unable to see the point that the rope was tied, due to the material placed at the platform for contamination/ housekeeping control.

It is concluded from interviews and material reviewed that CAD 311 was tied open from approximately 2110 to 2130 hours, and again from approximately 2150 to 2215 hours. The person(s) responsible for tying the door open could not be determined. This incident is attributed to inappropriate action due to unauthorized actions taken.

Recent analyses by Design Engineering indicated that the VE System would not operate as described in FSAR or Technical Specifications if the "main door to the annulus or the CAD door to the upper or lower air locks is left open". Per the Intrastation Letter from T.B. Owen, dated July 5, 1989, all Station Supervisors were instructed to complete a Compensatory Action sheet, (Enclosure 3 of Station Directive 3.1.14, Operability Determination) which would result in the maintenance of the capabilities of the VE System with one or more of the described doors open. The form requires that a person be at the door(s) with communications established with the Control Room. This action would then allow the person to be told immediately to close the door(s) in the event of a LOCA. The individuals completing the Compensatory Action sheet must initial the sheet upon completion of the form and that they understand their responsibilities for the actions. Prior to this incident there was no Compensatory Action sheet completed. There were no specific communications capabilities arranged prior to the opening of the CAD 311, although a Security Officer was continually present.

As a result of this event, an Intrastation Letter will be issued to emphasize to all employees the importance of CAD position to ventilation system performance and the action to be taken when doors are repositioned. Alternative courses of action will be evaluated to achieve tighter control of CADs critical to ventilation system performance.

A review of the Operating Experience Program (OEP) Database for the previous 24 months identified one incident that involved VE System operability (see PIR O-C88-0266). This incident resulted in both trains of VE being unable to meet FSAR conditions due to removal of a bypass leakage enclosure plate. The root cause of this incident was attributed to a defective procedure. The tests performed as part of the investigation established the VE System operability limits noted above. These events are similar in nature, although they involve different causes. This reported incident is not considered to be a Recurring Event per the Nuclear Safety Assurance guidelines. Ventilation system performance and operability issues are receiving close scrutiny. A Task Force has been established to provide closer review of testing requirements; a thorough and systematic review of ventilation system design requirements is underway.

In addition to the OEP Database review for past VE System inoperability, a search was performed to identify fire watch or Technical Specification violations pertaining to fire watches and fire barrier integrity. A total of seven reports were identified. Five reports (see IIR C88-003-0, IIR C88-045-1, IIR C88-071-1, PIR 1-C89-0288, and PIR 2-C89-0184) resulted from missed hourly fire watches and two reports (see LER 413/89-02, and LER 413/89-024) resulted in Technical Specification violations for inoperability of a fire barrier. There were no violations of Technical Specifications pertaining to fire doors or fire barriers during this incident.

CORRECTIVE ACTION

IMMEDIATE

1) CAD 311 was closed following direction from the Security Lieutenant.

SUBSEQUENT

1) The mechanical lock on CAD 311 was re-enabled.

2) The Security Officer at the hatch was instructed by the Security Lieutenant to ensure that CAD 311 was not left open.

PLANNED

1) Distribute Intrastation Letter to all station personnel emphasizing the following:

   a. The requirements that shall be performed when a component such as CAD 311 and other doors critical to ventilation systems' operability are to be left open.

   b. Specific references to Station Directive 3.1.14, Operability Determination, as it pertains to completion of Enclosure 3 and specific requirements as mentioned in "a".

   c. In regards to the Units 1&2 Lower Containment Personnel Air Lock Doors, the Security officer on duty at the hatch would provide the required responsibility for communication to the Control Room when the door(s) are opened for personnel traffic, as during the initial stages of a Refueling outage, Modes 1-4.

2) Review CADs and ventilation system operation to identify those doors that can impair system performance. Evaluate alternatives for tighter control of these doors during plant modes when ventilation systems operabilities are required.

SAFETY ANALYSIS

The incident described by this LER affects operation of the VE System. The purpose of the VE System is to control the release of fission products that leak from Containment following a LOCA. During a LOCA, the VE System withdraws air from the annulus, filters it, and then exhausts it to the environment or recirculates it back into the annulus. Exhausting a portion of this air creates a negative pressure in the annulus. The negative pressure assures that fission products leaking from Containment will be collected and filtered before being released to the environment. Control Room and offsite doses are affected by the exhaust air flow rate. CAD 311 is part of the annulus pressure boundary. During a LOCA, having a pressure boundary door open will increase exhaust flow rate and, therefore, increase Control Room and offsite doses.

For the periods when the CAD was open, if the VE System had been required to operate, Control Room and offsite doses would have increased. However, according to Design Engineering, there are two possible mechanisms that may have closed the door in the event of an accident. Closing the door would decrease the dose consequences associated with this incident. One means of closing the door was a Security Officer stationed nearby and another means was by the individuals in the area. The Officer was stationed nearby to log persons entering and exiting this area. The Officer was given instructions to close the CAD in the event of a fire, but no specific guidance was given regarding other types of accidents. However, it is reasonable to assume that, if an accident had occurred and the Officer was notified, he would have checked the door and closed it before leaving the area. Another possible means of closing the door was by the individuals in the annulus that would exit through this door. If an accident had occurred and they were exiting the annulus, it is reasonable to assume that they would have closed the door as they were leaving. However, even if the door had been closed, it would not have sealed as designed because the latch was taped. A small increase in annulus inleakage would result from not properly latching the door. This amount of additional inleakage would not have significantly increased Control Room or offsite doses.

Even if the door was left completely open there is a possibility that it would have been closed in a timely manner. Emergency procedures (EPs) direct the Operators to check annulus pressure. With the CAD open, the annulus pressure may not reach its setpoint. The EPs would direct the Operators to check VE damper alignment, and if correct, to investigate further. It is reasonable to assume that station personnel would then have discovered the open CAD and closed it.

Because of the uncertainties associated with the above scenarios and the lack of specific directives regarding the closing of CAD 311, no credit can be taken for personnel actions during this incident. Therefore, Design Engineering has determined that the VE System was inoperable during the periods when CAD 311 was opened.

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It should be noted though that the safety significance of the event in the specific time frame involved was low. When the door was discovered open at 2210 hours, Technical Specification 3.0.3 was entered and the door was closed in five minutes. During the two periods when the door was open (2110-2130 hours and 2150-2215 hours) people were working in the area and returned the door to a closed position in a relatively short time. The significance of the event is further minimized by the fact that the Unit was in a cooldown for the end of cycle 4 refueling outage and was close to the point of entering Mode 4 (350 degrees F) at these times. Because of the reduced temperature and pressure in the primary system the mass and energy release in a LOCA event would have been less than a full power event.

No fires occurred in the areas surrounding the Unit 1 Lower Containment air lock or in any nearby zones during the period of this Fire Watch. All required hourly Fire Watch documentation was complete for the period. Had any fires occurred, operable fire detection instrumentation on both sides of the CAD 311 penetration would have alerted OPS personnel in the Control Room. The alarm would have been investigated and the fire extinguished.

The health and safety of the public were not affected by this incident.