CP&L
Carolina Power & Light Company

SERIAL: NLS-85-054

FEB 2 1 1985

Director of Nuclear Reactor Regulation
Attention: Mr. D. B. Vassallo, Chief
Operating Reactors Branch No. 2
Division of Licensing
United States Nuclear Regulatory Commission
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62
CONTROL ROOM HABITABILITY

Dear Mr. Vassallo:

In your letter of January 16, 1985 you identified that Technical Specification 3/4.3.5.5 did not agree with the Final Safety Analysis Report (FSAR) or our NUREG-0737, Item III.D.3.4 responses submitted on December 15, 1980 and March 2, 1983. Technical Specification 3/4.3.5.5 indicates that there are two chlorine detectors which isolate the Control Room upon detection of high chlorine concentration, whereas the FSAR and the III.D.3.4 responses indicate that four detectors will isolate the Control Room.

Carolina Power & Light Company (CP&L) has reviewed this concern to determine what actions are required to resolve the discrepancies. This review included evaluating the following possible corrective actions:

1. Add the additional two detectors as identified in the FSAR and III.D.3.4 responses and submit a Technical Specification change request to reflect these additional detectors.

2. Relocate the chlorine car to a location outside the protected area where the need for the additional two detectors would not be required.

3. Installation of a system, utilizing non-gaseous biocide, to replace the chlorine system currently installed.

4. Modify, as required, the current design to assure that the air transport time from the chlorine detector to the isolation damper is greater than the isolation time from detection to isolation as allowed by Regulatory Guide 1.95.

Based on these evaluations, CP&L has decided to pursue Item No. 4, modification of the current design to ensure air transport time is greater than the isolation time. Final engineering, scheduling, and budgeting of this item is currently in progress.

411 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

A046

The final schedule for completion of the chlorine detection system modification will be provided in our response for the control rooom 1/8-inch positive pressure concern to be submitted by April 15, 1985. The justification for continued operation until these modifications can be performed was addressed in LER 1-84-33 dated December 19, 1984 and in a response to I&E Inspection Report 50-325/84-31 and 50-324/84-31 dated January 30, 1985 (Attachment 1).

In addition to the requested information on the chlorine detector design, CP&L believes that further explanation of our January 16, 1985 response on the 1/8-inch Control Room positive pressure is necessary and is provided in Attachment 2.

Should you have any questions concerning this matter, please contact Mr. Sherwood R. Zimmerman at (919) 836-6242.

Yours very truly,

AB Cutter/ja

A. B. Cutter - Vice President
Nuclear Engineering & Licensing

ABC/MAT/mf (1170NLU)
Attachments

cc: Dr. J. Nelson Grace (NRC-RII)
Mr. D. O. Myers (NRC-BNP)
Mr. M. Grotenhuis (NRC)

ATTACHMENT 1

TO NLS-85-054

(1170NLU/mf)

FORM 22

CP&L

Carolina Power & Light Company

COPY

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461-0429

December 19, 1984

FILE: B09-13510C
SERIAL: BSEP/84-2729

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

BRUNSWICK STEAM ELECTRIC PLANT UNIT 1
DOCKET NO. 50-325
LICENSE NO. DPR-71
LICENSEE EVENT REPORT 1-84-33

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence and is in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,
ORIGINAL SIGNED BY:
C. R. DIETZ

C. R. Dietz, General Manager
Brunswick Steam Electric Plant

MJP/sdl/LETSDL

Enclosure

cc: Mr. J. P. O'Reilly

NRC Form 366
(9-83)

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)
Brunswick Steam Electric Plant Unit 1	0 5 0 0 0 3 2 5	1 OF 0 3

TITLE (4) Failure of Units 1 and 2 Common Chlorine Detection System to Meet FSAR/Technical Specifications Design 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)
										Brunswick Unit 2	0 5 0 0 0 3 2 4
1 1	1 0	8 4	8 4	-	0 1 3	-	0 0	1 2	1 9	8 4	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)			
4	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 1 0	20.405(a)(1)(i)	50.36(c)(1)	X 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)	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. Poulk, Regulatory Technician	9 1 9 4 5 7 - 9 5 2 1

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)

While performing a design review of the Control Building Emergency Ventilation System (CB HVAC) following discussions with the Resident NRC Inspector's office, it was determined that the chlorine isolation portion of the system did not satisfy the design criteria est blished in the FSAR or the basis to technical specifications. The basis to Technical Specification 3/4 3.5.5 (Chlorine Detection System) states that the Chlorine Detection System is consistent with Regulatory Guide 1.95. Regulatory Guide 1.95 and the FSAR (Section 6.4.2.2) both indicate that the CB HVAC will be isolated by either a high chlorine signal at the Control Building air intake plenum or by a high chlorine signal at the chlorine storage location. Contrary to these requirements, the CB HVAC will only isolate on a high chlorine signal in the Control Building air intake plenum.

To correct this problem, a plant modification will be implemented to bring the Chlorine Detection System into conformance with the required design criteria. Until the plant modification is completed and made operational, additional surveillance requirements have been imposed on the existing system by the Plant Nuclear Safety Committee (PNSC) to assure adequate chlorine protection for the Operations personnel in the Control Room.

NRC Form 366
(9-83)

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Brunswick Steam Electric Plant Unit 1	0 5 0 0 0 3 2 5	8 4	— 0 3 3	— 0 0	0 2 OF 0 3

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

While performing a design review of the Control Building Emergency Ventilation System (CB HVAC) following discussions with the Resident NRC Inspector's office, it was determined that the chlorine isolation portion of the system did not satisfy the design criteria established in the FSAR or the basis to technical specifications. The basis to Technical Specification 3/4 3.5.5 (Chlorine Detection System) states that the Chlorine Detection System is consistent with Regulatory Guide 1.95. Regulatory Guide 1.95 and the FSAR (Section 6.4.2.2) both indicate that the CB HVAC will be isolated by either a high chlorine signal at the Control Building air intake plenum or by a high chlorine signal at the chlorine storage location. Contrary to these requirements, the CB HVAC will only isolate on a high chlorine signal in the Control Building air intake plenum.

Upon realization that the Chlorine Detection System did not meet the design criteria of the FSAR or the basis of technical specifications, a detailed review into the history of the Chlorine Isolation System was conducted. The following is a synopsis of that review:

1. March 1973: Response to FSAR Comment M14.5 commits Brunswick to install local and remote detectors having the capability of isolating the CB HVAC.

2. June 1974: Plant Piping & Instrument Diagram (P&ID) drawings are revised showing logic for detectors 1(2)- X-AT-2979 (at the chlorine storage location) having isolation capability for the CB HVAC.

3. July 1974: Chlorine detectors 1(2)-X-AT-2977 (CB air intake plenum) are added to plant P&ID drawings. Logic shows that the 1(2)-X-AT-2977 and the 1(2)-X-AT-2979 detectors have isolation capabilities.

4. August 1976: Preoperational test of the CB HVAC System approved. Isolation capability of the 1(2)-X-AT-2977 and the 1(2)-X-AT-2979 detectors was not verified. No design deficiencies were identified.

5. February 1982: A routine system review identifies a design deficiency with the Chlorine Isolation System--the system will not isolate if the Emergency Filtration System control switch is in the "ON" position. No other design deficiencies identified (LER 2-82-24).

6. August 1982: A design deficiency is identified in the Chlorine Isolation System which prevents both makeup dampers from closing on a high chlorine signal. The architect/engineer determined that this was a design inadequacy during initial design (LER 2-82-84).

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Brunswick Steam Electric Plant Unit 1	0 5 0 0 0 3 2 5	8 4	— 0 3 3	— 0 0	0 3 OF 0 3

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

During the course of this investigation, it could not be determined if the isolation logic from the 1(2)-X-AT-2979 detectors had ever been installed; although, as noted, the logic does appear on some plant drawings. The architect/engineer for Brunswick, United Engineers & Constructors (UE&C), is being requested to investigate their in-house documentation in an attempt to determine the cause for the isolation design omission.

To correct this problem, Carolina Power & Light Company is undertaking the following actions:

1. As indicated above, UE&C is being requested to investigate the cause of the design omission.

2. A plant modification will be written and implemented to bring the Chlorine Detection System into compliance with design commitments.

3. A thorough design review of the Chlorine Detection System and its associated isolation logic will be performed and any required action taken.

4. Until the Chlorine Detection System can be restored to the design commitments by a plant modification(s), the following actions have been or will be implemented to assure adequate chlorine protection for Operations personnel in the Control Room:

   a. Required surveillance on the Control Building air intake plenum detectors (1(2)-X-AT-2977) will be performed weekly vice monthly.

   b. Power to these detectors will be verified on at least a once per shift schedule (eight hours).

   c. Standing instructions have been established to require the isolation of the CB HVAC upon the receipt of a high chlorine annunciation from the 1(2)-X-AT-2978 chlorine detectors. These detectors are located in an area adjacent to the 1(2)-X-AT-2979 detectors and have an alarm function only. This isolation will be maintained until the alarm clears and the integrity of the Chlorine System is verified. In addition, the weekly surveillance identified in 4.a above will also be performed on the 1(2)-X-AT-2978 detectors.

It should also be noted that the current design of the 1(2)-X-AT-2977 detector isolation capability causes the Chlorine Detection System to not meet signal-failure criteria in that the two operable isolation detectors share a common power supply. Engineering evaluation has determined that this does not cause a safety problem as these instruments will cause an isolation on a loss of power (fails safe) which has been verified by an operational test.

Excerpt from CP&L's Response to

I&E Inspection Report 50-325/84-31 and 50-324/84-31

(Serial: BSEP/85-0143 Dated January 30, 1985)

DEVIATION

Based on the results of the NRC inspection conducted on October 15-November 30, 1984, certain of your activities appear to deviate from your commitments to the Commission as indicated below:

Appendix M, Response M14.5, of the pre-1983 FSAR and Section 6.4.2.2 of the updated FSAR state that four chlorine detectors will cause a Control Room isolation upon sensing a high chlorine condition.

Contrary to the above, plant design is such that only two chlorine detectors will cause an isolation. This condition appears to have been the original plant design and not upgraded per the commitments.

RESPONSE

A. Corrective Actions Regarding this Deviation

To correct this event, Carolina Power & Light Company has taken or is taking the following actions:

1. Complete

Until the Chlorine Detection System can be restored to design commitments, the following actions have been implemented to assure adequate chlorine protection for Operations personnel in the Control Room:

a. Required surveillance on the Control Building air intake plenum detectors (1[2]-X-AT-2977) is being performed weekly vice monthly.

b. Standing instructions have been established to require the isolation of the CB HVAC upon the receipt of a high chlorine annunciation from the 1(2)-X-AT-2978 chlorine detectors. These detectors are located in the building adjacent to the chlorine storage tank car and have an alarm function only. This isolation will be maintained until the integrity of the Chlorine System is verified. In addition, the weekly surveillance identified in 1.a above will also be performed on the 1(2)-X-AT-2978 detectors.

c. An investigation as to why the plant design did not reflect the commitment as made in the FSAR was performed by Carolina Power & Light Company with assistance from the Brunswick AE, United Engineers & Constructors (UE&C). This investigation revealed that the design of the Chlorine Detection System and its installation was directed by the mechanical discipline of UE&C. This design and installation was predicated on an analysis which did not require remote isolation requirements. The commitment as identified in the FSAR was apparently generated by the electrical discipline of UE&C following their review of a draft Regulatory Guide (later to be Regulatory Guide 1.95). Inadequate communication between the two disciplines led to the system being designed to one specification and a commitment to design it to a different specification.

d. A thorough review of the Chlorine Detection System has been performed. This was conducted by plant Engineering with the assistance of the chlorine detector vendor as required. No additional design problems were identified which were in conflict with the FSAR.

2. In Progress

a. Plant modifications are currently in progress on the Control Building intake plenum detectors to improve the reliability of these chlorine detectors. These include rerouting the detector suctions and changing the suction piping per vendor recommendations.

b. Plant Engineering is developing a project plan to ensure that the design of the Chlorine Detection System meets applicable codes, regulations, and commitments. This plan will define the final work scope required to correct the design deviation and a schedule for completion. This plan will incorporate outside engineering and vendor assistance as required.

B. Actions Taken to Avoid Further Deviations

1. The FSAR update in 1982 placed the question and answer section (Appendix M) in the appropriate chapters of the FSAR. This action assures that when a system is to be modified and the FSAR is reviewed for design requirements, those requirements can be readily located in the appropriate chapter and not hidden in an appendix.

2. Plant operating procedures and 10CFR50.59 require that design changes to the facility must be reviewed against the FSAR and appropriate evaluations made as to design changes. Based on these required evaluations on plant modifications and the improved reformatted/updated FSAR, future plant design changes should not deviate from the FSAR, except as allowed by regulations.

C. Dates When Actions Were or Will be Completed

1. The items identified in A.1 were completed on January 25, 1985. Items A.1.a and b were completed by December 19, 1984.

2. Item A.2.a is expected to be completed by February 4, 1985.

3. Item A.2.b is expected to be completed by February 22, 1985. This date is dependent on additional input to be received from UE&C.

Additonal information on this event can be found in LER 1-84-33 for the Brunswick facility.

ATTACHMENT 2

TO NLS-85-054

1/8-INCH CONTROL ROOM POSITIVE PRESSURE

(1170NLU/mf)

INTRODUCTION

By letter dated March 2, 1983 addressing NUREG-0737, Item III.D.3.4, Control Room Habitability, CP&L committed to revise the existing periodic test acceptance criteria to quantify the positive pressure in the control room during operation of the Control Room Emergency Ventilation system. This procedure was revised as required. However, during performance of the periodic test on June 15, 1984, the acceptance criteria of 1/8-inch water gauge positive pressure could not be achieved. This is the first such periodic test to be performed since the test acceptance criteria was revised to address the control room positive pressure. The NRC was notified of this in a letter dated October 3, 1984.

Although unable to achieve the 1/8-inch water gauge positive pressure, the system did demonstrate a positive pressure as required by the Brunswick Technical Specifications. Additionally, a review of the Brunswick Control Room Habitability Evaluation indicated that no credit was taken for the 1/8-inch pressure (i.e., the habitability evaluation and its conclusions are still valid), thus the control room ventilation system is considered operable in accordance with existing Technical Specification requirements.

An assessment of the inability to achieve 1/8-inch water gauge positive pressure was conducted by Brunswick Technical Support personnel. Using the services of the original HVAC vendor, the Bahnson Company, the following major areas of air exfiltration were identified:

1. Floor penetrations
2. Access doors
3. Duct work outside the control room envelope
4. Cinderblock walls
5. Duct work penetrations
6. The Shift Operating Supervisor's office

In addition, minor air exfiltration was noted at light switches and receptacles, damper blade gaskets, HVAC system instrument and control penetrations, and structural steel beam penetrations. These findings were consistent with problems noted at other utilities inspected by the Bahnson Company.

INVESTIGATION

Additional testing was conducted in an effort to: 1) quantify the amount of make-up air required to achieve a 1/8-inch positive pressure, and 2) identify the major areas of exfiltration. The quantity of make-up air was determined to be approximately 6000 CFM using the method described in Regulatory Guide 1.95, Revision 1, Regulatory Position 5. Additional make-up air was provided by throttling open a supply duct access door to the atmosphere until the 1/8-inch positive pressure was maintained. This indicated an exfiltration rate six times greater than the 1000 CFM make-up provided during periods of Emergency Filtration System operation.

To identify the major area of exfiltration, the access doors and the elevator shaft were sealed with fire-retardant plastic and duct tape. The increase in pressurization was minimal, indicating that the cable penetrations were the primary contributor of air exfiltration. The control room HVAC system was then balanced and no significant change was noted in pressurization.

CORRECTIVE ACTION

1. Floor Penetrations

   It was determined that the majority of the air exfiltration could be attributed to [illegible] cable penetrations beneath the control room back panel enclosures and the [illegible]ntrol room computers. Discussions were held with the Engineering Staff and other utilities to resolve the issue.

   The Bisco Company was contacted to provide technical direction on the issue. (Bisco has completed retrofit work on similar cable penetrations at 16 different nuclear generating stations since 1974.) The technical representative inspected the barriers and determined that air exfiltration did exist. It was recommended that a sealant be placed over the existing penetrations to provide a leak tight seal. This practice has been conducted at several other plants.

2. Access Doors

   The access doors were inspected and noted as leaking around the gaskets. The gaskets were readjusted and the leakage was reduced, but not eliminated.

3. Ductwork Outside the Control Room Envelope

   Inspections showed areas of exfiltration at duct work joints and along damper blade gaskets. Repairs were completed by Bahnson personnel to the extent possible, limited by the fact that a major percentage of the work would require shutdown of the control room HVAC system. This can only be accomplished during a dual unit shutdown.

4. Cinderblock Walls

   Air exfiltration occurs through cinderblock walls that are not sealed with a waterproof coating. An area of major concern is the elevator shaft. Painting of these walls should be conducted during conditions such that paint fumes do not communicate with the Emergency Filtration System's charcoal beds.

5. Shift Operating Supervisor's (SOS) Office

The SOS's office communicates directly with the control room. The access door leading to the stairwell (outside the control room envelope) has a gap beneath the door that adds to the air exfiltration.

RECOMMENDATIONS

The following encompasses the recommendations associated with corrective action such that an 1/8-inch water gauge positive pressure can be obtained in the control room envelope:

1. Floor Penetrations

   Seal the existing cable penetrations beneath the back panels and computer with a sealant. Access to the vital NSSS back panels and computer should be obtained during unit shutdown since a potential for inducing scram conditions will exist.

2. Access Doors

A plant modification should be developed to either: 1) modify the existing door seals or 2) change the three control room doors to an airtight type. This work can be completed without an outage.

3. Duct Work Outside the Control Room Envelope

Access must be gained to the interior of the duct work to provide an adequate repair. As such, a partial shutdown of the control room HVAC system is required resulting in an 8-hour LCO on both units. A dual unit outage is recommended for this work. Repair will consist of sealing or replacement of duct work and replacement of fan flex connectors.

4. Cinderblock Walls

Cinderblock walls should be coated with a water-proof sealant. In order to prevent paint fume contamination of the Emergency Ventilation System, it is recommended that this task be performed during a dual unit outage.

5. Duct Work Penetrations

Sealant with RTV or equivalent material is recommended. Access to some areas may require partial shutdown of the control room HVAC System. A dual unit outage is recommended for completion of this work.

6. Shift Operating Supervisor's Office

It is recommended that the door to the SOS's office be replaced with an airtight type. This is a non-outage item.

7. Other

Those areas associated with minor air exfiltration (light switches, receptacles, etc.) can be sealed as a non-outage item.

SUMMARY

The recommendations and corrective actions identified are currently in the planning and scheduling stages. As identified in our letter of January 16, 1985, a firm completion schedule and a progress report will be submitted by April 15, 1985. In addition to those actions currently being reviewed and evaluated, CP&L is also evaluating the need and requirement to maintain an 1/8-inch positive pressure in the control room. Based on the results of this evaluation, CP&L may be able to justify maintaining a lower positive pressure in the control room, thus potentially reducing the scope of work to resolve this item.