

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station - Unit 1										DOCKET NUMBER (2) 0 5 0 0 0 4 1 3				PAGE (3) 1 OF 03										
TITLE (4) Reactor Building Penetration Radiation Streaming																								
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 Catawba - Unit 2				DOCKET NUMBER(S) 0 5 0 0 0 4 1 4											
0	9	2	4	8	5	8	5	0	5	6	0	0	1	0	2	4	8	5	0	5	0	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)				20.406(c)				50.73(a)(2)(iv)				73.71(b)										
POWER LEVEL (10)		20.406(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)				73.71(c)										
1 0 0		20.406(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vi)				<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)										
		20.406(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(vii)(A)				Voluntary										
		20.406(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)														
		20.406(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)														
LICENSEE CONTACT FOR THIS LER (12)																								
NAME Roger W. Ouellette, Associate Engineer - Licensing										TELEPHONE NUMBER AREA CODE 7 0 4 3 7 3 - 7 5 3 0														
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																								
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS														
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR								
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO												

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

During the Health Physics Biological Shield Survey radiation streaming was discovered to be coming through numerous electrical penetrations in the Reactor Building.

This streaming had potential impact upon the post-LOCA radiation analysis for eight electrical cabinets containing safety related equipment.

A more detailed analysis has been performed and it has been determined that the total integrated dose to these cabinets is not beyond their qualification doses.

This information is being submitted as a voluntary LER.

8511010138 851024
PDR ADOCK 05000413
S PDR

IE22
11

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Catawba Nuclear Station - Unit 1	0 5 0 0 0 4 1 3	8 5	- 0 5 6	- 0 0	0 2	OF	0 3

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

On March 19, 1985 a meeting between the Catawba Health Physics Section and representatives of Design Engineering - Radiation Analysis Group was held to discuss radiation streaming problems discovered during the Health Physics Biological Shield Survey on Unit 1. The primary problem discussed was that during incore instrument tube pull operations there is gamma streaming through numerous electrical penetrations in the Reactor Building concrete wall located at 60° to 120° azimuths near the 585' elevation. The effects of normal operating dose on personnel access in the Auxiliary Building penetration rooms were discussed. Design Engineering personnel in the Electrical Division were contacted on March 20, 1985 to help determine the extent of the problem and to solicit their comments on type of fill material installed in penetrations and subsequent course of action. After further discussions with Electrical and Fire Protection personnel a Station Problem Report was initiated on 5-1-85 to study the feasibility of the following two options to rectify the streaming problem: a) fill the penetrations with a high density shielding material or b) requalify existing equipment to the higher normal operating radiation doses. A Design Study was initiated on 5-17-85. During the design study it was determined that these penetrations were also a post-accident streaming path not analyzed in the post-accident shielding analysis. Preliminary analysis associated with the scoping study indicated integrated radiation dose one year post-LOCA exceeded previously published information by two orders of magnitude from less than 1×10^3 R to a maximum line-of-sight dose of approximately 1×10^5 R. This preliminary data was analyzed by equipment personnel to determine the impact on equipment qualification. The Design Study was completed on 8-15-85. It was concluded that the penetrations should be filled to eliminate the impact of radiation streaming post-LOCA on safety related equipment. A Design Nonconformance was initiated on 8-26-85 for Unit 1 and Unit 2 at Catawba based upon a review of the effected equipment that indicated eight (8) electrical enclosures might be adversely affected by post-LOCA radiation streaming within one year following an accident. These enclosures contain many pieces of electrical equipment including digital optical isolators and relays. Test reports of these components indicate potential failure for post-LOCA function when exposed to radiation doses above 2×10^4 R.

Subsequent to the above report date, additional, detailed, analysis has been performed to more accurately describe the radiation source penetrations and affected components. A finer source mesh was described around those penetrations of greatest influence on the detector locations. The detector locations were adjusted to more accurately represent the effected electrical components. The same TID-14844 radioisotopic release was assumed as in the previous analysis. No credit was taken for transport time into the Reactor Building annulus. The penetrations were assumed to be composed of air; however, realistically these are filled with 30 lbs/ft³ high density fire-retardant foam and varying amounts of armored cable, which will reduce the direct dose rate by approximately 20%-30%. The armored cable was ignored due to complexities in the computer modeling. The result of this more detailed analysis reduced the maximum Total Integrated Dose (TID) to less than 1×10^4 R one-year post-LOCA. This value is lower than the minimum equipment qualified dose of 2×10^4 R.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104
EXPIRES 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Catawba Nuclear Station - Unit 1	0 5 0 0 0 4 1 3 8 5	—	0 5 6	—	0 0 0	3 OF	0 3

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

CORRECTIVE ACTION:

A Nuclear Station Modification (NSM) was initiated in late September. The scope of the project includes design of a typical lead brick and steel frame plug in most of the penetrations. Penetrations with many electrical cables require shadow shielding hung in the annulus and centered on the penetration opening. Although it has now been shown that the TID's are less than the equipment qualified dose, this recommendation is still justified based on problems associated with administrative controls on personnel access during normal and post-accident operation. Implementation of the proposed NSM will reduce radiation levels during normal and post-accident operation to those values previously published.

SAFETY ANALYSIS:

The results of the final, detailed radiation analysis showed no adverse affect of the penetration streaming post-LOCA on safety-related equipment due to TID being below 1×10^4 R. However, administrative controls are being implemented to control personnel access in the penetration area during incore instruments movement until shielding modifications are complete.

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

DUKE POWER COMPANY

P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

October 24, 1985

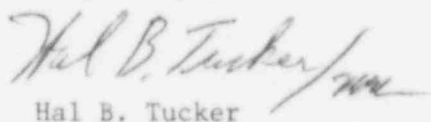
Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Catawba Nuclear Station
Docket No. 50-413

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a)(1) and (d), attached is Licensee Event Report 413/85-56 concerning Reactor Building penetration radiation streaming. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,


Hal B. Tucker

RWO/hrp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Palmetto Alliance
2135 1/2 Devine Street
Columbia, South Carolina 29205

Mr. Jesse L. Riley
Carolina Environmental Study Group
854 Henley Place
Charlotte, North Carolina 28207

Robert Guild, Esq.
P. O. Box 12097
Charleston, South Carolina 29412

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

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

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

NRC Resident Inspector
Catawba Nuclear Station

IE 22
11