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AUTH.NAME AUTHOR AFFILIATION
STARKEY,R.B. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
Region 2, Atlanta, Office of the Director

SUBJECT: LER 80-014/01T-0:on 800702,determined no certification of qualification available for PVC electric cable pigtails per IE Bulletin 79-01B.Cause not stated.Test to be conducted assuring "pigtails" ability.

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	NRC PDR	02	1	1	OP EX EVAL BR		3	3
	OR ASSESS BR		1	1	POWER SYS BR		1	1
	PROC/TST REV BR		1	1	QA BR		1	1
	RAD ASSESS BR		1	1	REACT SYS BR		1	1
	REG FILE	01	1	1	REL & RISK A BR		1	1
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EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 On July 2, 1980, as a result of review of information obtained by Carolina Power
0 3 and Light Company from the manufacturer of Robinson Plant Containment electrical
0 4 penetrations, it was determined that no certification of qualification is available
0 5 for the apparent PVC electric cable "pigtails" used on eight penetrations, Catalog No. 0100759, as required by IE Bulletin 79-01B. This type penetration is used for
0 6 instrumentation on safety related equipment. Although these pigtails appear to be PVC insulated, they should not be degraded by post accident radiation conditions
0 7 before the instrumentation involved perform their intended safety functions. No noncompliance with plant Technical Specifications is known to have resulted from this
0 8 event. This finding is being reported consistent with NRC guidelines contained in IE Bulletin 79-01B.

	SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
0 9	I B (11)	B (12)	A (13)	P E N E T R (14)	D (15)	Z (16)

(17) LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8 0	—	0 1 4	/	0 1	T	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
X (18)	X (19)	Z (20)	Z (21)	0 0 0 0	Y (23)	Y (24)	A (25)	C 7 2 0 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 The cable pigtails of these penetrations meet the design specifications for
1 1 their construction. However, without specific qualification data for the type
1 2 PVC used, the ability of these pigtails to perform their functions following an
1 3 accident cannot be assured. Therefore, a program is being implemented to test
1 4 and qualify samples of these penetration pigtails by an independent test lab.

	FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
1 5	E (28)	0 9 3 (29)	NA	D (31)	Document Review - IEB 79-01B

	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
1 6	Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION (39)
1 7	0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

	NUMBER	DESCRIPTION (41)
1 8	0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

	TYPE	DESCRIPTION
1 9	Z (42)	NA

PUBLICITY

	ISSUED	DESCRIPTION (45)	NRC USE ONLY
2 0	N (44)	NA	

8007220445

NAME OF PREPARER R. B. Starkey, Jr. PHONE: (803) 383-4524

GPO 917-926

Supplemental Information
For
License Event Report 80-014

1. Cause Description and Analysis

On July 2, 1980, as a result of information obtained by Carolina Power and Light Company from Crouse Hinds (manufacturer of Robinson-2 Containment Vessel (CV) electrical penetrations) it was determined that no certification of qualification is available for the electric cable "pigtails" used in the manufacture of CV penetrations (C.H. Catalog No. 0100759). This type penetration contains two (2) and four (4) conductor AWG No. 16 shielded cable and is used for instrumentation on safety related equipment. The instruments involved which would be required in the event of a design basis accident and their required operating times following the accident are as follows:

Pressurizer Pressure	30 Minutes
Pressurizer Level (No ESF Function)	30 Minutes
Steam Generator Level	24 Hours
Steam Line Flow	24 Hours

Further information on these instruments is available on enclosed table. (Table 1.3.3 is part of the 90-day response to IE Bulletin 79-01B from Mr. L. W. Eury to Mr. J. P. O'Reilly, dated July 7, 1980.) It shall be noted that the time of required operation presented in the Bulletin response is incorrect for the Pressurizer Pressure and Level instruments and will be corrected in a forthcoming revision to the Bulletin response.

Current documentation indicates that these cables are insulated with PVC. The cable pigtails of these penetrations meet the design specifications for their construction. However, without specific qualification data for the type PVC used, the ability of these pigtails to perform their functions following an accident cannot be assured. Based on telephone inquiries it has been determined that the most limiting type of PVC insulation manufactured at the time the Robinson Plant was built under worse case conditions would begin to degrade at approximately 10^6 Rad exposure and degradation would be severe by approximately 10^7 Rads.

Analysis for the expected accumulated radiation for a forty year life and accident exposure for one hour in the area of the electrical penetrations is 10^6 Rad (Refer to Table 1.3.3). The 24 hour exposure as indicated in Table 1.3.3 for instruments in the same area as the penetrations is 3.8×10^6 Rads. However, due to the low voltage carried by the affected cables (maximum 45 volts), failure due to degraded insulation should not occur until the conductors actually make physical contact. This is not expected to occur until approximately 10^7 Rads.

Therefore with an expected maximum exposure to the pigtails of 3.8×10^6 Rads and an applied maximum potential of 45 volts, the probability of failure during the required operating time of 24 hours is considered minimal, even assuming the worse case conditions and the most limiting type of PVC.

2. Corrective Action

A program is being implemented to test and qualify samples of the penetration pigtails by an independent test lab.

In addition, information from Crouse Hinds revealed that material documentation could not be located on one of two penetrations built for Robinson as Catalog No. 0100747. This type penetration has three conductor cables of AWG No. 9 and is used primarily to power small 480 volt motors. One of these penetrations is in train A and the other in train B. One penetration is fully documented and qualified and there is no reason to suspect that the other would be constructed differently. However, this will be confirmed during the 1980 refueling outage. If confirmation cannot be obtained, appropriate corrective action (testing and qualifying a sample of the pigtails) will follow.

3. Corrective Action To Prevent Further Occurrence

Since it was a thorough review of the environmental qualifications of electrical equipment at Robinson Plant which resulted in this report, further additional corrective action to that previously stated is not considered necessary at this time.

TABLE 1.3.3

EQUIPMENT TOTAL RADIATION ACCUMULATION BY LOCATION AND LOCA OPERATING TIME

Component	Location	Level(ft) (Approx.)	Time Of Operation	Radiation Exp. (40 yrs)[1]	Accident[3] Radiation Exp.	Margin (10%)	Total Anticipated Radiation Exposure
TRANSMITTERS							
PT-444[2]	CV	231.5	~~30~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
PT-445[2]	CV	231.5	~~30~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
PT-456[2]	CV	231.5	~~30~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
PT-457[2]	CV	231.5	~~30~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
PT-455	CV	231.5	~~30~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
LT-474	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-475	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-476	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-477	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-484	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-485	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-486	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-487	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-494	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-495	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-496	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-497	CV	233	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
LT-459[2]	CV	230	30 ~~DAYS~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5 ~~1.4×10^7~~ [5]
LT-460[2]	CV	230	30 ~~DAYS~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5 ~~1.4×10^7~~ [5]
LT-461[2]	CV	230	30 ~~DAYS~~ MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5 ~~1.4×10^7~~ [5]
FT-474	CV	231.5	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
FT-475	CV	231.5	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
FT-484	CV	231.5	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
FT-485	CV	231.5	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
FT-494	CV	231.5	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
FT-495	CV	231.5	1 DAY	2.3×10^3	3.5×10^6	3.5×10^5	3.8×10^6
FT-940	RAB	230	30 DAYS	-	1.0×10^6[6]	1.0×10^5	1.1×10^6
FT-943	RAB	230	30 DAYS	-	1.0×10^6[6]	1.0×10^5	1.1×10^6
PT-934	RAB	230	30 DAYS	-	1.0×10^6[6]	1.0×10^5	1.1×10^6
PT-940	RAB	230	30 DAYS	-	1.0×10^6[6]	1.0×10^5	1.1×10^6
PT-943	RAB	230	30 DAYS	-	1.0×10^6[6]	1.0×10^5	1.1×10^6
MOV							
V-866A	CV	241	1 HR.	2.3×10^3	9.5×10^5	9.5×10^4	1.0×10^6
V-866B	CV	241	1 HR.	2.3×10^3	9.5×10^5	9.5×10^4	1.0×10^6
V869	RAB	241	30 DAYS	-	1.0×10^6	1.0×10^5	1.1×10^6
V-744A	CV	240	5 MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
V-744B	CV	240	5 MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5

TABLE 1.3.3 (Continued)

EQUIPMENT TOTAL RADIATION ACCUMULATION BY LOCATION AND LOCA OPERATING TIME

Component	Location	Level(ft) (Approx.)	Time Of Operation	Radiation Exp. (40 yrs)[1]	Accident[3] Radiation Exp.	Margin (10%)	Total Anticipated Radiation Exposure
V-860A	RAB	212	30 DAYS	-	1.0×10^6	1.0×10^5	1.1×10^6
V-860B	RAB	212	30 DAYS	-	1.0×10^6	1.0×10^5	1.1×10^6
V-861A	RAB	212	30 DAYS	-	1.0×10^6	1.1×10^5	1.1×10^6
V-861B	RAB	212	30 DAYS	-	1.0×10^6	1.1×10^5	1.1×10^6
V-863A	RAB	212	30 DAYS	-	1.0×10^6	1.1×10^5	1.1×10^6
V-863B	RAB	212	30 DAYS	-	1.0×10^6	1.1×10^5	1.1×10^6
CVC-381	RAB	240	30 DAYS	-	1.0×10^6	1.1×10^5	1.1×10^6
SOLENOIDS							
V12-7	CV	233	5 MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
V12-9	CV	233	5 MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
V12-11	CV	233	5 MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
V12-13	CV	233	5 MIN.[4]	2.3×10^3	9.5×10^5	-	9.5×10^5
MOTORS							
HVH-1	CV	275	3 HRS.	1.9×10^2	3.1×10^6	3.1×10^5	3.4×10^6
HVH-2	CV	275	3 HRS.	1.9×10^2	3.1×10^6	3.1×10^5	3.4×10^6
HVH-3	CV	275	3 HRS.	1.9×10^2	3.1×10^6	3.1×10^5	3.4×10^6
HVH-4	CV	275	3 HRS.	1.9×10^2	3.1×10^6	3.1×10^5	3.4×10^6
ELECTRICAL PENETRATIONS							
Type 2	CV	234 -246	30 DAYS	2.3×10^3	-	-	1.4×10^7[5]
TEMPERATURE ELEMENTS							
TE-412B	CV	243	(7)	1.1×10^6	-	-	1.5×10^7[5]
TE-412D	CV	243	(7)	1.1×10^6	-	-	1.5×10^7[5]
TE-422B	CV	243	(7)	1.1×10^6	-	-	1.5×10^7[5]
TE-422D	CV	243	(7)	1.1×10^6	-	-	1.5×10^7[5]
TE-432B	CV	243	(7)	1.1×10^6	-	-	1.5×10^7[5]
TE-432D	CV	243	(7)	1.1×10^6	-	-	1.5×10^7[5]

(1) Extrapolated from plant data (See Table 1.3.1)

(2) Equipment located in instrument cabinets.

(3) Calculation based on IE Bulletin 79-01B, Appendix B. CHARTS/GRAPHS, Procedures for Evaluating Gamma Radiation Service Conditions.

(4) Charts/Graphs per IE Bulletin 79-01B, Appendix B allow calculation to a minimum of 1 hour exposure. This figure is conservative--no margin required.

(5) Total Integrated Radiation for accident condition (30 days) per IE Bulletin 79-01B, Appendix B. CHARTS/GRAPHS.

(6) Calculation based on Accident Radiation figure - 2×10^7 RADS.

(7) Not required for DBE--used only for outside containment MSLB protection.