



# **Thermo-Lag Resolution Meeting USNRC – NRR Agenda**

- **Existing Configurations and Resolutions**
- **ACP Room**
- **Cable Spread Room**
- **Fire Tests**
- **Deviation Submittal**

## **Existing Configuration**

- **Cable Spread Room**
  - **Tunnel Running Along Outside Walls At Ceiling Of A CSR**
  - **Partial Full Height Section On North Wall**
  - **Small Bridge Tunnel In B CSR**
  - **Full Height Section Has Doors And Is Accessible By Plant Personnel**
  - **Suppression & Detection Outside Of Enclosure**
  - **Detection Inside Of Enclosure**
  - **Existing Deviation For 1-Hour Enclosure On Raceway**

## **ACP Room**

- **Seal Wall Between B SWGR And ACP**
- **3-Hour Barrier Including Door And Penetrations**
- **Separate Fire Area And SSD Analysis**
- **Room Will Be in Compliance with Regulations**

## **Cable Spread Room**

- **Qualify Barriers As Raceway Enclosure**
- **Extend the Existing Deviation**
- **Full Height Portion, Modify For No Personnel Access**
- **1-Hour Passage Through Full Height Section**

## **Fire Tests**

- **Qualify Barriers To GL 86-10, Supplement 1 Criteria**
- **Tunnels Tested Per Enclosure 1, Section V**
- **Full Height Wall Per Enclosure 1, Section IV**
- **Most Likely At Omega Point Labs**
- **Contractor Test Coordinator**
  - **Test Plan**
  - **Construction And QA**
  - **Coordinate Reports**
- **NRC Witness**

## **Fire Tests**

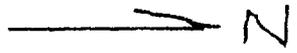
- **L Shaped Tunnels**
  - **GL 86-10, Supp. 1 Section V**
  - **Small Enclosure – Thermal Challenge**
  - **Larger Enclosure – Panel Sizes And Max Spans**
- **Full Height Wall**
  - **GL 86-10, Supp 1 Section IV**
  - **Large Panels And Spans**
  - **Penetrations – Full Size Sleeved Penetration With Seal Material (Block Out With No Commodities)**
  - **Typical To Bound Conduits, Cable Trays, Etc.**

## **Path Forward And Approvals**

- **ACP Modification In Progress Through Site Change Process – No Approvals Required**
- **NRC Approval for CSR Deviation Extension**
- **Submittal Planned for May 2002**
  
- **Questions, Comments, and Discussion**

## **Fire Tests**

- **3-Hour Test Of Full Height Wall**
  - **GL 86-10, Supp. 1 Section Iv**
  - **Test 3-Hour With Hose Stream Test**
  - **Second Duplicate Test For Hose Stream If Fails During 3-Hour**
  - **Full Spans**
  - **Bounding Penetration Configuration**



CLOUDED AREA IS T-L ENCLOSURE

T-LACP<sub>2</sub>  
FULL HEIGHT BARRIER

CSRB

CSRA

CSRB

F<sub>w</sub>

F

E

CSRA T-L TUNNEL

SKETCH 1

CABLE SPREADING ROOMS  
Elev. 286

A

T-L BRIDGE TUNNEL

A

CSRB

D

CLOUDED AREA IS T-L ENCLOSURE

CSRA

C

FULL HEIGHT T-L WALL

B

T-L TUNNEL

C

B

39 41

42

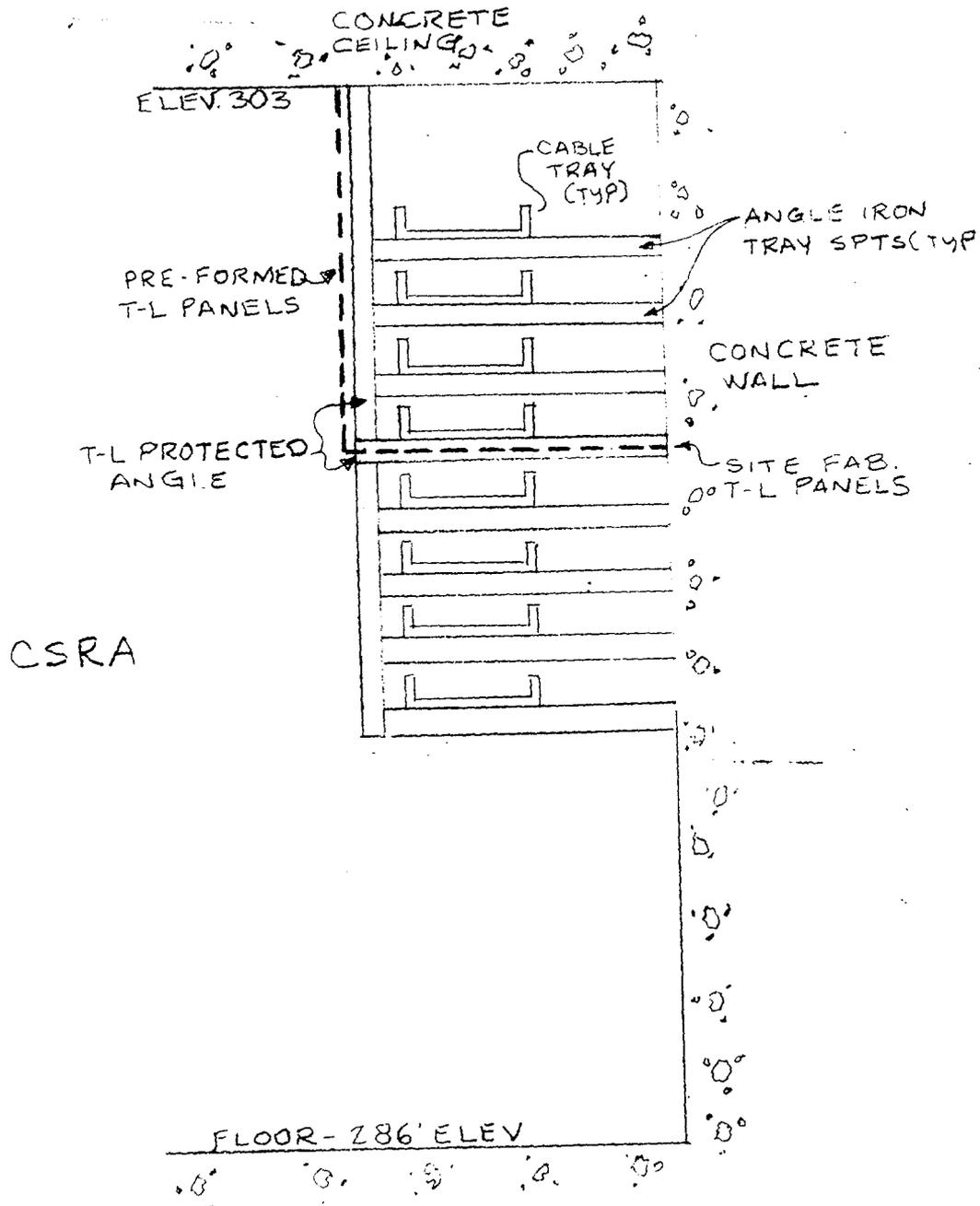
43

B



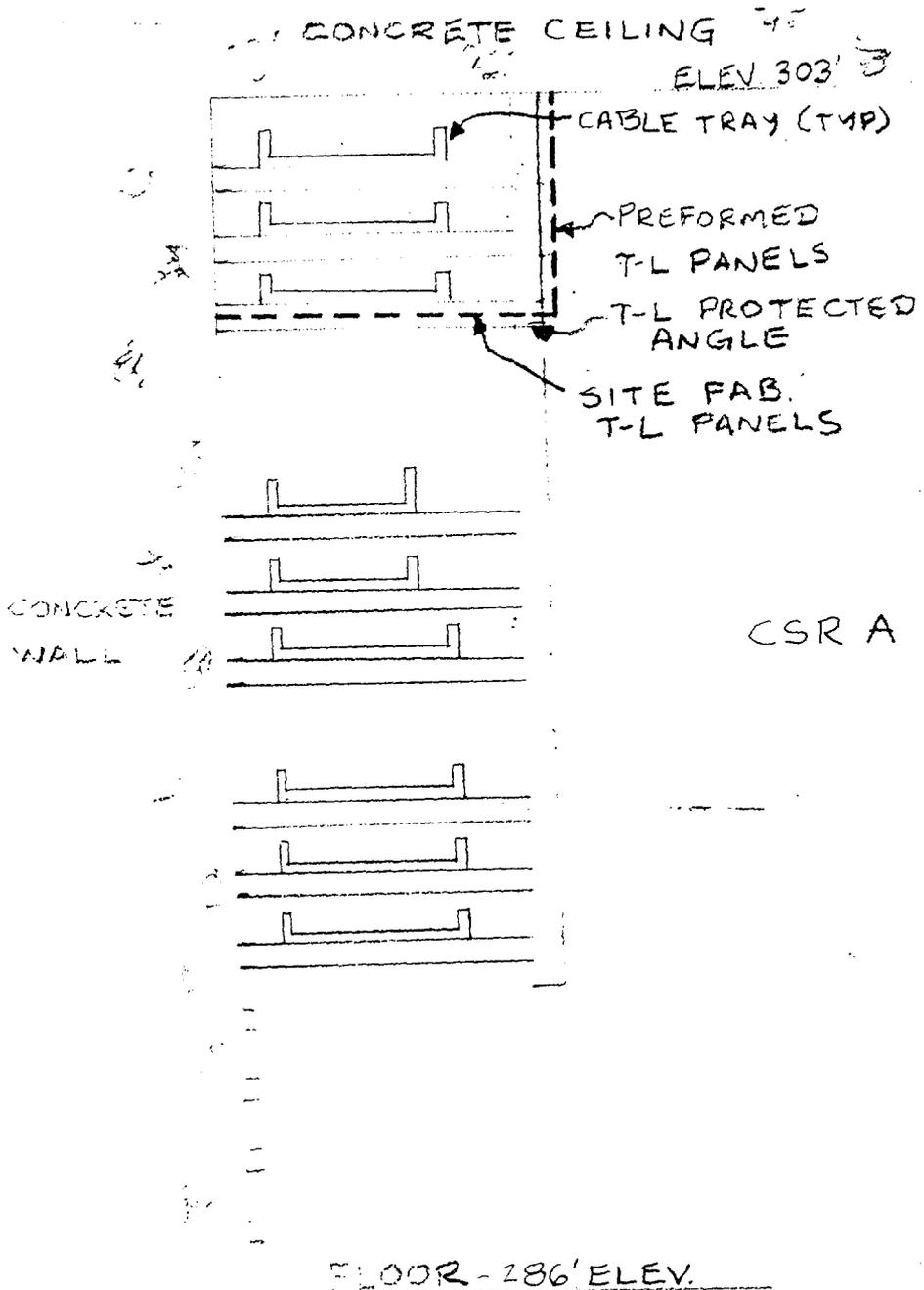
Computed by: _____ Date: _____	CAROLINA POWER & LIGHT COMPANY	Calculation ID: _____	
Checked by: _____ Date: _____		Pg. _____ of _____	Rev. _____
Tar / PID No.: _____		File: _____	
Project Title: _____			
Calculation Title: _____			
Status: Prelim. <input type="checkbox"/> Final <input type="checkbox"/> Void <input type="checkbox"/>			

43



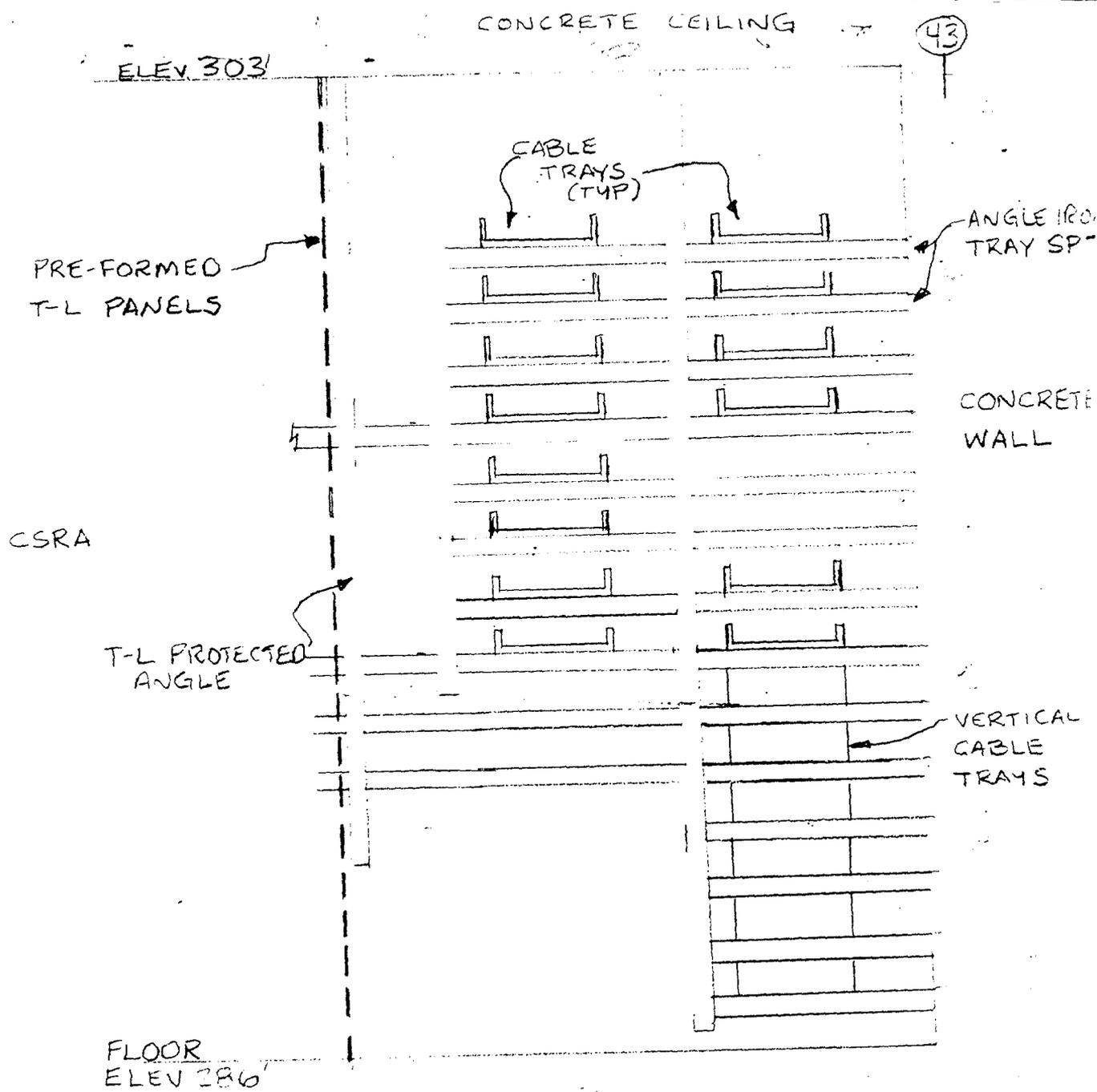
SECTION A - A  
CSRA ENCLOSURE ELEVATION  
ALONG COLUMN LINE 43  
LOOKING WEST

Computed by: _____	Date: _____	CAROLINA POWER & LIGHT COMPANY	Calculation ID: _____	
Checked by: _____	Date: _____		Pg. _____ of _____	Rev. _____
Tar / PID No.: _____			File: _____	
Project Title: _____				
Calculation Title: _____				
Status: Prelim. <input type="checkbox"/> Final <input type="checkbox"/> Void <input type="checkbox"/>				



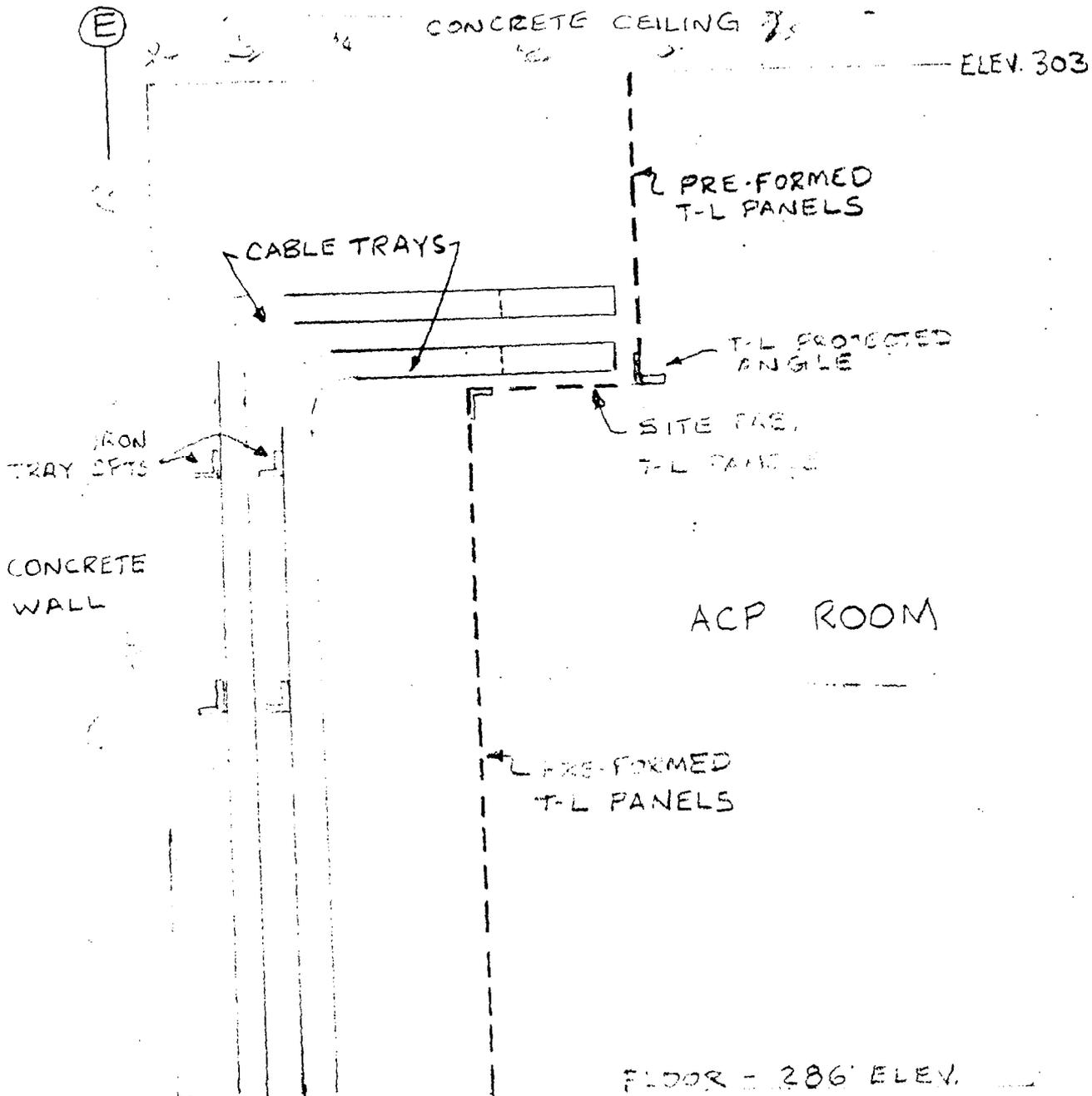
SECTION C - C  
 CSRA ENCLOSURE ELEVATION  
 ALONG COLUMN LINE B  
 ORIENTED SOUTH

Computed by: _____	Date: _____	CAROLINA POWER & LIGHT COMPANY	Calculation ID: _____	
Checked by: _____	Date: _____		Pg. _____ of _____	Rev. _____
Tac / PID No.: _____			File: _____	
Project Title: _____				
Calculation Title: _____				
Status: Prelim. <input type="checkbox"/> Final <input type="checkbox"/> Void <input type="checkbox"/>				



SECTION B - B  
CSRA FULL HEIGHT ENCLOSURE ELEVATION  
AT NORTHEAST CORNER CSRA  
LOOKING WEST

Computed by:	Date:	CAROLINA POWER & LIGHT COMPANY	Calculation ID:	
Checked by:	Date:		Pg. of	Rev.
Tar / PID No.:			File:	
Project Title:				
Calculation Title:				
Status: Prelim. <input type="checkbox"/> Final <input type="checkbox"/> Void <input type="checkbox"/>				



SECTION D-D  
ACP ENCLOSURE ELEVATION

COPY

**CP&L**

Carolina Power & Light Company

SERIAL: LAP-83-479

OCT 14 1983

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
United States Nuclear Regulatory Commission  
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT  
UNIT NOS. 1 AND 2  
DOCKET NOS. 50-400 AND 50-401  
FIRE PROTECTION

Dear Mr. Denton:

Carolina Power & Light Company hereby transmits one original and forty copies of additional information requested by the NRC as part of the safety review of the Shearon Harris Nuclear Power Plant. This information was requested during the fire protection meetings held September 26-27, 1983 in Bethesda. The enclosures to the letter are delineated in the attached Summary of Enclosures. The attachments include all of the additional information requested on Fire Protection.

We will be providing responses to other requests for additional information shortly.

Yours very truly,

ORIGINAL SIGNED BY,  
M. A. McDUFFIE

M. A. McDuffie  
Senior Vice President  
Nuclear Generation

MAM/pgp (8185NLU)  
Enclosures

cc: Mr. B. C. Buckley (NRC)	Mr. Wells Eddleman
Mr. C. F. Maxwell (NRC-SHNPP)	Dr. Phyllis Lotchin
Mr. J. P. O'Reilly (NRC-RII)	Mr. John D. Runkle
Mr. Travis Payne (KUDZU)	Dr. Richard D. Wilson
Mr. Daniel F. Read (CHANGE/ELP)	Mr. G. O. Bright (ASLB)
Mr. R. P. Gruber (NCUC)	Dr. J. H. Carpenter (ASLB)
Chapel Hill Public Library	Mr. J. L. Kelley (ASLB)
Wake County Public Library	

unless all cable is run in 4-inch or smaller steel conduit or the cables are in fully enclosed raceways internally protected by automatic fire suppression.

There should be no carpeting in the control room.

PROJECT CONFORMANCE: C. POSITION (Cont'd)

C.7.b Control Room Fire Area (Cont'd)

As stated in FSAR Section 9.5.1.2.4 all cables entering the control room terminate there. No cables are routed through the control room from one area to another. There are no raised floors in the control room. There is a trench under the HVAC Control which is about 11 feet long x 2 feet wide x 8 inches deep which contains only Train B cable, safety and nonsafety. The fire loading is low, less than 2000 BTU/sq. ft. No suppression system is provided. There are redundant safety related radiation monitoring cables, installed in conduits and in accordance with Regulatory Guide 1.75, located above the suspended ceiling. As stated in the Fire Hazards Analysis, Section 9.5A of the FSAR, the combustible loading in the Control Room is considered negligible. The 24 hour occupancy of the Control Room combined with the availability of fire extinguishers and hose stations mitigate the effects of an exposure fire.

The Control Room suspended ceiling is aluminum luminous louver type, egg crate construction. A perforated duct located above the hung ceiling introduces air into the control room. The space above the hung ceiling does not contain any cable tray, only conduits.

Conduits 4 inch and smaller in diameter run through this space. Smoke detectors will be provided on the south side of the Control Room reinforced concrete ceiling, as well as below the hung ceiling. The conduit will be sealed in accordance with NUREG-0800 criteria. Automatic suppression will not be provided, as there is no fire loading in the space between the hung ceiling and the concrete ceiling.

There is no carpeting in the control room.

NRC GUIDELINES: C. POSITION (Cont'd)

C.7.c. Cable Spreading Room

The primary fire suppression in the cable spreading room should be an automatic water system such as closed-head sprinklers, open-head deluge system, or open directional water spray system. Deluge and open spray systems should have provisions for manual operation at a remote station; however, there should be provisions to preclude inadvertent operation. Location of sprinkler heads or spray nozzles should consider cable tray arrangements and possible transient combustibles to ensure adequate water coverage for areas that could present exposure hazards to the cable system. Cables should be designed to allow wetting down with water supplied by the fire suppression system without electrical faulting.

Open-head deluge and open directional spray systems should be zoned.

The use of foam is acceptable.

Cable spreading rooms should have:

- (1) At least two remote and separate entrances for access by fire brigade personnel;
- (2) An aisle separation between tray stacks at least 3 feet wide and 8 feet high;
- (3) Hose stations and portable extinguishers installed immediately outside the room;
- (4) Area smoke detection; and
- (5) Continuous line-type heat detectors for cable trays inside the cable spreading room.

Drains to remove firefighting water should be provided. When gas systems are installed, drains should have adequate seals or the gas extinguishing systems should be sized to compensate for losses through the drains.

A separate cable spreading room should be provided for each redundant division. Cable spreading rooms should not be shared between reactors. Each cable spreading room should be separated from the others and from other areas of the plant by barriers with a minimum fire rating of 3 hours. If this is not possible, a dedicated system should be provided.

The ventilation system to each cable spreading room should be designed to isolate the area upon actuation of any gas extinguishing system in the area. Separate manually actuated smoke venting that is operable from outside the room should be provided for the cable spreading room.

PROJECT CONFORMANCE: C. POSITION (Cont'd)

#### C.7.c. Cable Spreading Room

The primary fire suppression system in the cable spreading rooms are automatic pre-action sprinkler systems actuated by thermal detection systems employing closed sprinkler heads, installed at the ceiling level. Cable tray arrangements were considered in the location of sprinkler heads to insure adequate water coverage. Since there are only cables in this room, the Fire Hazards Analysis postulates that transients such as oil, grease, rags or solvents normally associated with equipment maintenance or repair will not be brought into the area. The pre-action valve can be tripped mechanically at the valve or operation of pull stations located inside or outside the room located at elevation 286' and 305'. Inadvertent operation is precluded by the two step discharge cycle of the pre-action system which requires both the operation of the pre-action valve and fusing of the sprinkler head. Cables are designed to allow wetting down by water from the fire protection system. Ionization type smoke detection

is provided for early warning of a fire condition and a visual display of the detectors location, as well as "first actuated" detector is provided at the local control panel.

Foam is not being used.

The cable spreading rooms have:

- (1) More than two remote and separate entrances;
- (2) Aisles to facilitate access in the cable spreading rooms have been provided, however, due to redesign to provide redundant cable spreading rooms, the aisles have been reduced in dimensions. Depending upon their location, they vary from 3 feet wide by 8 feet high to a minimum of 1-1/2 to 2 feet wide by 5 feet high. A number of access doors exist. A trained fire fighter can access the area with his equipment, provided that he is familiar with the layout through training.

A visual display of smoke detectors is provided at the local control panel. The fire fighter will be cognizant of the location of the fire and will use the proper aisle to facilitate fire attack strategy.

- (3) Portable extinguishers located inside and outside the room and hoses located immediately outside each room;
- (4) Area smoke detection; and
- (5) Ionization detectors are used to provide early warning of incipient fires and permit early attack by manual means. Thermal detectors located at the ceiling actuate the automatic suppression system. The dual detection system provides supplementary means of fire detection in lieu of solely depending upon line-type temperature detection.

The flow drainage system is designed to handle the design sprinkler discharge. There is no gas system in the cable spreading rooms.

A separate cable spreading room is provided for each redundant division, except Cable Spreading Room 1A-SA, where, as detailed in the Safe Shutdown Analysis in Case of Fire, Sketch CAR-SH-SK-668S18, redundant B cables which run in the cable tray CC0078-SB and conduits 16020G-SR2-2, 16020T-SR4-2, 10988B-SR4-2, 16106E-SR4-1, 10632H-SR4-1, 16020R-SR2-1. They will be enclosed in one hour fire resistance rating enclosure due to sprinkler system already present in this fire area. Cable spreading rooms are not shared between reactors. Each cable spreading room is separated from the others and from other areas of the plant by barriers with a minimum fire rating of 3 hours, except as explained above.

There is no gas extinguishing system for the cable spreading rooms, therefore, ventilation system isolation is not required. Smoke venting is accomplished using the normal partially recirculating ventilation system, which is capable of once through purge operation.

---

---

# **Safety Evaluation Report**

related to the operation of  
**Shearon Harris Nuclear Power Plant,**  
**Units 1 and 2**

Docket Nos. STN 50-400 and STN 50-401

Carolina Power and Light Company  
North Carolina Eastern Municipal Power Agency

---

---

**U.S. Nuclear Regulatory  
Commission**

**Office of Nuclear Reactor Regulation**

November 1983



## Control Room

The control room complex is separated from all other areas of the plant by 3-hour-rated assemblies. Peripheral rooms in the control room complex are offices. Each room is separated from the control room by 1-hour-fire-rated barriers. Smoke detectors that alarm and annunciate in the control room panel are provided in each room.

All cables entering the control room terminate there. No cables are routed through the control room from one area to another. There are no raised floors in the control room. There is a trench under the HVAC control, which is about 11 feet x 2 feet x 8 inches. The fire loading is low, less than 2000 Btu/ft<sup>2</sup>. A suppression system is not provided. There are redundant safety-related radiation monitoring cables installed in conduits above the suspended ceiling.

The control room suspended ceiling is the aluminum luminous louver type, egg-crate construction. A perforated duct located above the hung ceiling introduces air into the control room. The space above the hung ceiling does not contain any cable tray, only conduits.

Smoke detectors will be provided on the south side of the control room reinforced concrete ceiling, as well as below the hung ceiling.

Because of the low fuel loading and the small size of the trench, combined with the installed early warning smoke detection and continuous manning of the control room, the staff finds the installation of conduits in the control room ceiling, the omission of a suppression system in the trench, and the omission of a sprinkler system in the peripheral rooms acceptable deviations from Section C.7.b of BTP CMEB 9.5-1.

Ionization smoke detectors have been installed in the control room, but not inside the individual cabinets and consoles within the control room. The staff will require the applicant to provide cabinet detectors in accordance with Section C.7.b of BTP CMEB 9.5-1.

## Cable Spreading Room

The cable spreading room is separated from the balance of the plant by 3-hour-fire-rated walls and floor/ceiling assemblies. All penetrations through fire-rated barriers are fitted with 3-hour-fire-rated dampers and/or 3-hour-fire-rated penetration seals.

Separate cable spreading rooms have been provided for each division of redundant safe shutdown system circuits.

There are several redundant train B cables in the train A cable spreading room. The train B cables are enclosed in a 1-hour-rated barrier. Because a detection and suppression system has been installed in the area, the staff finds this an acceptable deviation from its guidelines.

The primary fire suppression system in the cable spreading rooms is an automatic pre-action sprinkler system with fusible-type sprinkler heads. Electrical cabling is designed to allow wetting down without electrical faulting.

Based on its review, the staff concludes that the fire protection provided for the cable spreading rooms, with the acceptable deviation, meets Section C.7.f of BTP CMEB 9.5-1 and is, therefore, acceptable.

### Switchgear Rooms

The Division A and Division B switchgear rooms are separated from each other and from other plant areas by 3-hour-fire-rated walls and floor/ceiling assemblies.

Automatic fire detection is provided by ionization smoke detectors. Manual protection is provided by standpipe hose stations and portable extinguishers. Floor drains have been provided in the switchgear rooms.

Based on the above evaluation, the staff concludes that the protection of the switchgear rooms is in accordance with Section C.5.a of BTP CMEB 9.5-1 and is therefore, acceptable.

### Remote Safety-Related Panels

Areas remote from the control room that contain safety-related panels are provided with detectors that alarm locally and in the control room. Panels providing remote shutdown capability are located in the auxiliary control panel room, which is separated from other plant areas by barriers having a fire-resistance rating of 3 hours. Panels providing remote shutdown in the auxiliary control panel room are electrically isolated and are connected to redundant transfer panels, each of which is located in a separate fire area. Ionization detectors in the auxiliary control panel room alarm locally and in the control room. Portable extinguishers and manual hose stations are available in the area. Redundant safety-related panels required for safe shutdown are sep.

Based on its review, the staff concludes the fire protection for remote safety-related panels meets Section C.7.f of BTP CMEB 9.5-1 and is, therefore, acceptable.

### Safety-Related Battery Rooms

The battery rooms are separated from each other and from the balance of the plant by 3-hour-fire-rated barriers. Ionization smoke detection systems are provided in each battery room. Hose stations and portable fire extinguishers are available in the areas for manual fire suppression. The ventilation system is designed to maintain the hydrogen levels below 2%. Loss of ventilation alarms have been provided for each battery room.

Based on the above evaluation, the staff finds that the protection provided for the battery rooms is in accordance with Section C.7.g and is, therefore, acceptable.

### Emergency Diesel Generator Rooms

Each diesel generator and its day tank are separated by 3-hour-fire-rated barriers. Each diesel fuel oil day tank room is protected by an automatic multi-cycle sprinkler system. The system is activated by heat detectors. Addit

early warning detection is provided by ionization smoke detectors and flame detectors.

The day tanks are sized to hold 3000 gallons of diesel fuel instead of the maximum of 1100 gallons recommended by the staff guidelines. Because each 3000-gallon diesel fuel oil day tank is located in a separate enclosure that is designed with walls, floor, and ceiling that have a 3-hour-fire-resistive rating and is sized to contain 110% of the total contents of the tank, the staff finds this an acceptable deviation. The staff concludes that with the acceptable deviation, the protection provided for the diesel generator rooms meets Section C.7.i and is, therefore, acceptable.

#### Other Plant Areas

The applicant's fire hazards analysis addressed other plant areas not specifically discussed in this report. The staff finds that the fire protection for these areas is in accordance with BTP CMEB 9.5-1 and is, therefore, acceptable.

#### 9.5.1.7 Summary of Deviations from CMEB 9.5-1

The technical requirements of Appendix R to 10 CFR 50 and Appendix A to BTP ASB 9.5-1 have been included in BTP CMEB 9.5-1. The following deviations from the guidelines of BTP CMEB 9.5-1 have been approved:

- |   |                              |
|---|------------------------------|
| (1) non-IEEE 383-rated cables for lighting and communications systems                                   | BTP CMEB 9.5-1 Section C.5.e |
| (2) fixed emergency lighting  | BTP CMEB 9.5-1 Section C.5.g |
| (3) 3000-gallon capacity diesel generator day tanks   | BTP CMEB 9.5-1 Section C.7.i |
| (4) conduits in the control room ceiling  | BTP CMEB 9.5-1 Section C.7.b |
| (5) lack of automatic sprinklers in the control room peripheral rooms                                   | BTP CMEB 9.5-1 Section C.7.b |
| (6) lack of automatic suppression in control room trench  | BTP CMEB 9.5-1 Section C.7.b |
| (7) separation of redundant cables in the switchgear room by 1-hour barriers, sprinklers, and detectors | BTP CMEB 9.5-1 Section C.7.c |

The following are the open fire protection items:

- |  |                              |
|--|------------------------------|
| (1) fire doors                         | BTP CMEB 9.5-1 Section C.5.a |
| (2) safe shutdown                      | BTP CMEB 9.5-1 Section C.5.b |
| (3) alternate shutdown                 | BTP CMEB 9.5-1 Section C.5.c |
| (4) hydrogen line piping               | BTP CMEB 9.5-1 Section C.5.d |
| (5) detection in control room cabinets | BTP CMEB 9.5-1 Section C.7.b |

---

---

# **Safety Evaluation Report**

related to the operation of  
**Shearon Harris Nuclear Power Plant,  
Unit No. 1**

Docket No. STN 50-400

Carolina Power and Light Company  
North Carolina Eastern Municipal Power Agency

---

---

**U.S. Nuclear Regulatory  
Commission**

Office of Nuclear Reactor Regulation

May 1986



### 9.5.1.6 Fire Protection of Specific Plant Areas

#### Containment

In the SER, the staff stated that automatic sprinkler systems are provided in the electrical cable trays, the electrical penetration areas, and over the charcoal filter housings. In fact, the sprinkler systems are installed over the electrical cable trays in the penetration areas. This correction does not change the staff's evaluation of the fire protection for containment.

#### Control Room

In the SER, the staff stated that peripheral rooms in the control room complex are separated from the control room by 1-hour-fire-rated barriers. In fact, the peripheral rooms are neither separated by a fire barrier nor protected by an automatic sprinkler system as prescribed in Section C.7.b of BTP CMEB 9.5-1. The staff was concerned that, in the event of a fire in the office/kitchen area, smoke and hot gases would propagate into the main terminal cabinet and control room. By letter dated April 4, 1986, the applicants proposed to install an automatic sprinkler head in the office/kitchen area. The details concerning the installation of this sprinkler are included in the above referenced letter. This modification provides reasonable assurance that the effects of a fire will be confined to the office/kitchen area. The staff considers the proposed protection an acceptable deviation from Section C.7.b of BTP CMEB 9.5-1.

#### Safety-Related Battery Rooms

In the SER, the staff stated that hose stations and portable fire extinguishers are available in the safety-related battery rooms. In fact, manual fire fighting equipment is positioned outside these rooms. The location of this equipment meets staff fire protection guidelines and is, therefore, acceptable.

### 9.5.1.7 Summary of Deviations From CMEB 9.5-1

In Supplement No. 2, the staff listed the previously approved deviations from staff fire protection guidelines. The staff incorrectly identified one deviation (No. 7) as pertaining to the switchgear room. In fact, the approved deviation was for the cable spreading room, relative to the guidelines for 1-hour barriers, sprinklers, and detectors.

On the basis of its evaluation of the applicants' February 13 and April 4, 1986, letters, the staff has concluded that the following deviations are also acceptable:

- (1) fire protection for redundant shutdown systems as described in Section 9.5.1.4
- (2) lack of 8-hour battery-powered lighting units in certain plant locations as described in Section 9.5.1.4
- (3) fire protection for the control room peripheral areas as described in Section 9.5.1.6