CP&L

Carolina Power & Light Company
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William R. Campbell
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Brunswick Nuclear Plant

FEB 07 1997

SERIAL: BSEP 97-0039

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

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RELATED
TO BULLETIN 96-02, "MOVEMENT OF HEAVY LOADS OVER SPENT FUEL, OVER FUEL IN THE REACTOR CORE, OR OVER SAFETY-RELATED EQUIPMENT"
(TAC NOS. M95562 AND M95563)

Gentlemen:

On April 11, 1996, the U.S. Nuclear Regulatory Commission (NRC) issued Bulletin 96-02, "Movement Of Heavy Loads Over Spent Fuel, Over Fuel In The Reactor Core, Or Over Safety-Related Equipment." Carolina Power & Light Company's (CP&L) response for the Brunswick Steam Electric Plant was provided in a letter dated May 10, 1996 (Serial: BSEP 96-0181).

Subsequently, by letter dated December 6, 1996, the NRC staff requested that CP&L provide an evaluation of the Brunswick Plant crane design, load path, and cask loading and unloading processes that support a determination that the scenario described in the December 6, 1996 letter is not credible at the Brunswick Plant. If the scenario described in the letter should be determined to be credible, the NRC staff requested that CP&L also provide responses to several additional questions. The Company has reviewed the potential cask drop scenario described in the December 6, 1996 letter for applicability to the Brunswick Plant and determined that the scenario is not credible for the Brunswick Plant. This determination is based on an evaluation of the Brunswick crane design, load path, and cask loading and unloading processes. Additional information pertaining to the Company's evaluation is provided in Enclosure 1.

Please refer any questions regarding this submittal to Mr. Mark A. Turkal at (910) 457-3066.

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Sincerely,

William R. Campbell

William R. Campbell

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WRM/wrm

Enclosures:
1. Response To Request For Additional Information
2. List of Regulatory Commitments

William R. Campbell, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, and agents of Carolina Power & Light Company.

Dean S. Mason
Notary (Seal)

My commission expires:

My Commission Expires August 21, 1999

pc: U. S. Nuclear Regulatory Commission
ATTN.: Mr. Luis A. Reyes, Regional Administrator
101 Marietta Street, N.W., Suite 2900
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Mr. C. A. Patterson
NRC Senior Resident Inspector - Brunswick Units 1 and 2

U.S. Nuclear Regulatory Commission
ATTN.: Mr. David C. Trimble, Jr. (Mail Stop OWFN 14H22)
11555 Rockville Pike
Rockville, MD 20852-2738

The Honorable J. A. Sanford
Chairman - North Carolina Utilities Commission
P.O. Box 29510
Raleigh, NC 27626-0510

ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
NRC DOCKET NOS. 50-325 AND 50-324
OPERATING LICENSE NOS. DPR-71 AND DPR-62
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RELATED
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(TAC NOS. M95562 AND M95563)

SUMMARY

In a letter dated December 6, 1996, the NRC staff requested that Carolina Power & Light Company (CP&L) provide an evaluation of the Brunswick Steam Electric Plant (BSEP) crane design, load path, and cask loading and unloading processes that support a determination that the scenario described in the letter is not credible at the Brunswick Plant. If the event is determined to be credible, the NRC staff requested that CP&L provide the following:

(a) An analysis of a possible drop of a spent fuel storage or transportation cask involving a drop that results in the tipping over of the spent fuel cask, loss of the cask lid, or loss of the cask lid and ejection of the spent fuel from the cask into the spent fuel pool or areas adjacent to the pool. This load drop/consequence analysis should include a dose analysis to personnel involved in the cask movement for the time immediately following the accident. Also, the analysis should address personnel exposure resulting from required entry into plant areas affected by the event and the impact of elevated dose fields on the ability to reach safe shutdown or continue normal plant operation.

(b) An evaluation addressing the potential for criticality resulting from the postulated cask drop accident scenario described above.

(c) An evaluation that addresses possible means of recovering from the postulated cask drop accident scenario described above.

(d) An evaluation that addresses whether the potential impact of the scenario described above on other parts of the facility (e.g., the spent fuel pool) is bounded by previous load drop analyses.

DISCUSSION

Crane Design

The Brunswick Plant's Reactor Building cranes are designed to be single failure-proof. CP&L responded to the NRC staff in a letter dated November 16, 1982 indicating how the Brunswick Plant crane design compared to the requirements of NUREG-0612, Control of Heavy Loads (Reference 2). CP&L's response referenced letters previously provided to the NRC staff dated

June 18, 1976 and June 26, 1976 as providing details of the Brunswick crane design. The Technical Evaluation Report/Safety Evaluation issued by the NRC 's letter dated May 18, 1984 (Reference 3) on this issue evaluated CP&L's response in relation to Section 5.1.1 of NUREG-0612 and acknowledged that Brunswick Plant has an approved single failure-proof crane design.

Load Path

In the November 16, 1982 response to the NRC regarding Control of Heavy Loads, CP&L submitted a safe load path (Dwg. 81020-M-001, Sht. 3 of 3) for the handling of spent fuel shipping cask in the Reactor Building. This safe load path was developed to meet the requirements of NUREG-0612, Section 5.1.1(1). This load path was reviewed and accepted by the NRC staff's Technical Evaluation Report/Safety Evaluation contained in the May 18, 1984 letter. Site Procedures 0E&RC-0582, "Handling the IF-300 Cask" (Reference 4) and 0MMM-015, "Operation and Inspection of Cranes and Material Handling Equipment" (Reference 5) provide the current Brunswick Plant safe load paths. The current Brunswick Plant safe load paths for the spent fuel pool shipping cask are the same as the original safe load paths provided to the NRC staff. Copies of the three load paths are attached for reference (see Exhibit 1).

The Brunswick safe load path and the crane design are consistent with Updated Final Safety Analysis Report section 9.1.4.2.2, which states:

> In traversing the path from the access hatch to its resting position in the pool, the cask at no time passes over any other part of the fuel pool. As a backup to operator action, limiting stops in the crane control system prevent unwanted travel over spent fuel, as recommended in Regulatory Guide 1.13, Fuel Storage Facility Design Basis.

Cask Loading And Unloading Process

Updated Final Safety Analysis Report Section 9.1.4.2.2 also provides a description of the spent fuel shipping and handling activities. The following are the major steps in this process that could potentially involve cask dropping or cask tipping:

a. Cask raised to a vertical position from the horizontal position. Redundant yoke installed. (At Elevation 20' - ground level)

b. Cask hoisted from Elevation 20' to Elevation 117' (refuel floor).

c. Cask positioned in the decontamination area, top portion of yoke assembly removed, loosening and removal of head bolts.

d. After reattaching top portion of yoke assembly and cask head lift cables - Cask positioned in the fuel pool, the top portion of yoke assembly and cask head are removed, and cask is left free standing in readiness for cask loading.

e. Cask head and top portion of yoke are installed after cask loaded with spent fuel bundles.

f. Cask raised partially with redundant yoke to allow installation of four cask head sleeve nuts in the fuel pool.

g. Cask positioned in the decontamination area, the top portion of yoke is removed, completion of the installation of the cask head sleeve nuts, and re-installation of the redundant yoke.

h. Cask returned to the transport vehicle reversing steps a and b.

Discussion and Conclusion:

For movements involving the cask on the refuel floor and during the hoisting (step b above) to the refuel floor, the redundant yoke is attached to the cask in addition to the primary yoke. Therefore, a cask drop is not credible.

During the process of installing the redundant yoke (described in step a above), the cask is raised from a horizontal position to a vertical position. The cask is held suspended with only the primary yoke for a short period of time before being set down on the cask cradle which forms the lower part of the redundant yoke. The upper part of the redundant yoke is then mated to the lower part completing the installation of the redundant yoke. During unloading, the process is reversed. These activities take place in the equipment hatch area of Reactor Building (elevation 20'). The portion of the activity when the cask is held with only the primary yoke is not single failure-proof in accordance with Section 5.1.6 of NUREG-0612. A walk down of the area adjacent to the equipment hatch and immediately below the floor (elevation -17') has determined that there are components needed for unit shutdown which could be impacted by a cask drop. However, CP&L has determined that damage to these components would not preclude the operation of sufficient equipment to achieve a safe shutdown due to redundancy. In such circumstances, an existing plant procedure (Alternate Safe Shutdown Procedure ASSD-05) can be used to safely shut down the reactor. The equipment needed for ASSD-05 is located in areas that will not be affected by the cask drop. The effect of the drop on the cask itself is bounded by the 30 foot drop used in the IF-300 Shipping Cask Safety Analysis Report (Reference 8).

When the cask is standing in the decontamination area on the refuel floor and when the cask is left in the fuel pool with the head removed, it is not tied down nor are any restraints applied. United Engineers & Constructors performed a tipping analysis (Reference 6) with the cask free-standing in the decontamination area and in the fuel pool. This analysis concluded that with the cradle assembly of the redundant yoke attached to the bottom of the cask, the cask will not overturn during a seismic event.

During the transport of the cask between the spent fuel pool and the decontamination area, the head is not fully bolted. However, the head cannot slide off or drop because the 32 studs which connect to the sleeve nuts prevent sliding by shear resistance. In addition, the cask head is connected by four cables to the primary yoke. When the cask head is removed from or replaced on the cask, these cables provide rigging redundancy and meet single failure proof criteria.

Updated FSAR section 9.1.4.2.3.2 provides an appropriate conclusion for this spent fuel cask handling issue. It states:

"It is extremely improbable that the spent fuel cask could be inadvertently or otherwise dropped during the process of transferring spent fuel for shipment because:

a) Redundancy is employed in all vital portions of the cask hoisting mechanism.

b) Conservative design margins have been used for the cask's related handling equipment (crane, rigging, hooks, etc.).

c) Periodic nondestructive equipment test and inspection procedures are practiced.

d) Qualified operators are used and operating and administrative procedures are enforced."

CP&L believes that the existing UFSAR statements are accurate with respect to this event and no further actions are considered necessary.

References:

1. NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980.

2. Letter from CP&L to NRC dated November 16, 1981, "Control of Heavy Loads."

3. Letter from NRC to CP&L dated May 18, 1984, "Control of Heavy Loads (Phase I)." [Safety Evaluation of Control of Heavy Loads (Phase I)]

4. 0E&RC-0582, Revision 20, "Handling the IF-300 Cask."

5. 0MMM-015, Revision 15, "Operation and Inspection of Cranes and Material Handling Equipment."

6. Letter NELD-B-427 from J. F. Nevill to C. R. Dietz dated May 29, 1986 with UE&C Seismic Tipping Analysis of the IF-300 Cask (UE&C Reference 9527-001).

7. BSEP Updated Safety Analysis Report.

8. NEDO-10084-4, "IF-300 Shipping Cask Consolidated Safety Analysis Report", VECTRA, March 1995.

9. GEI-92817D, "Operating Instructions - IF-300 Irradiated Fuel Transportation System", Pacific Nuclear, December 1992.

10. Plant Dwg. F-11008, 11009, 1386, and 1388.

11. 0SSSD-01, Rev. 18, "Alternate Safe Shutdown Procedure Index."

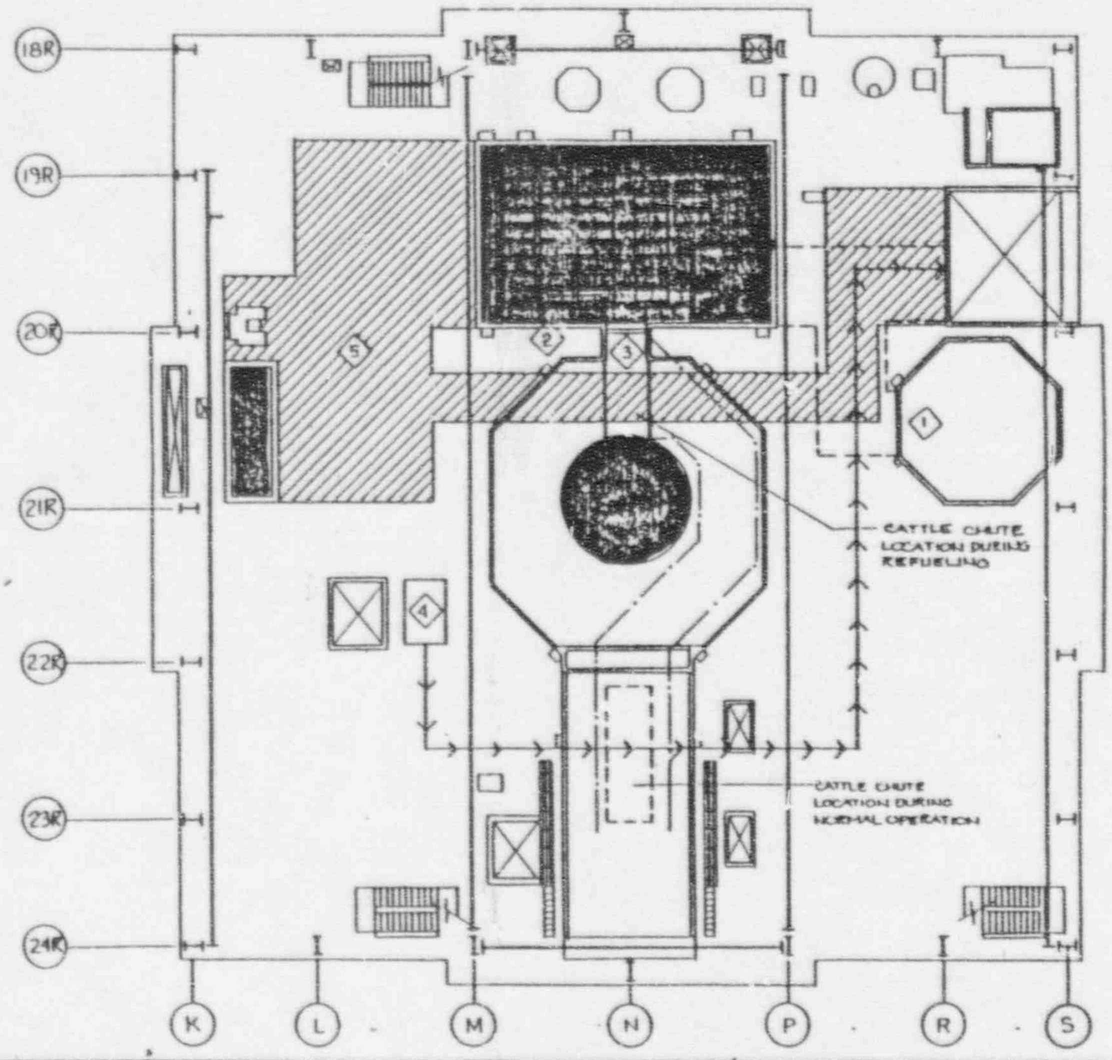
12. 0ASSD-00, Rev. 18, "User's Guide."

EXHIBIT 1

LOAD PATHS FROM
CP&L'S NOVEMBER 16, 1982 LETTER,
SITE PROCEDURE 0E&RC-0582, "HANDLING THE IF-300 CASK," AND
SITE PROCEDURE 0MMM-015, "OPERATION AND INSPECTION OF
CRANES AND MATERIAL HANDLING EQUIPMENT"

81020-M-001

B	REDUCED SIZE OF REPRODUCIBLE AND INCREASED CLARITY OF DWG.			



NOTE
1. FUEL LOCATED IN SHADED AREAS
2. LOAD PATHS APPLICABLE TO UNITS 1 & 2
3. HOISTS MUST BE REMOVED OR PROPERLY SECURED WHEN NOT IN USE

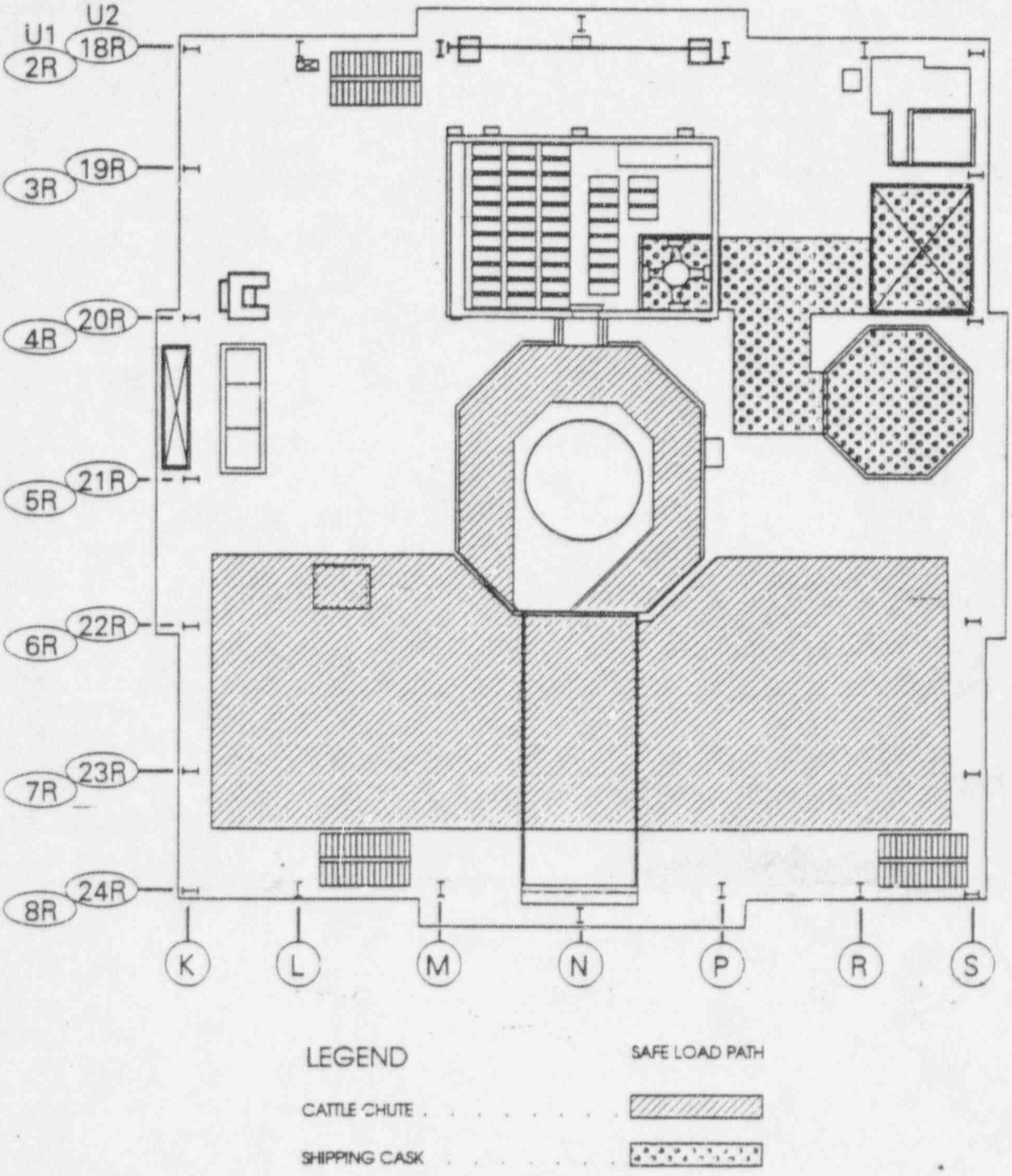
SAFE LOAD PATHS

N°	SYMBOL	LOAD
1	— — — — —	SHIPPING CASK
2	—·· —— ··	SPENT FUEL POOL GATES
3	—— · —— ·	CATTLE CHUTE
4	—→—→—→	HEPA FILTER
5	ZZZZZZZZZZ	NEW FUEL

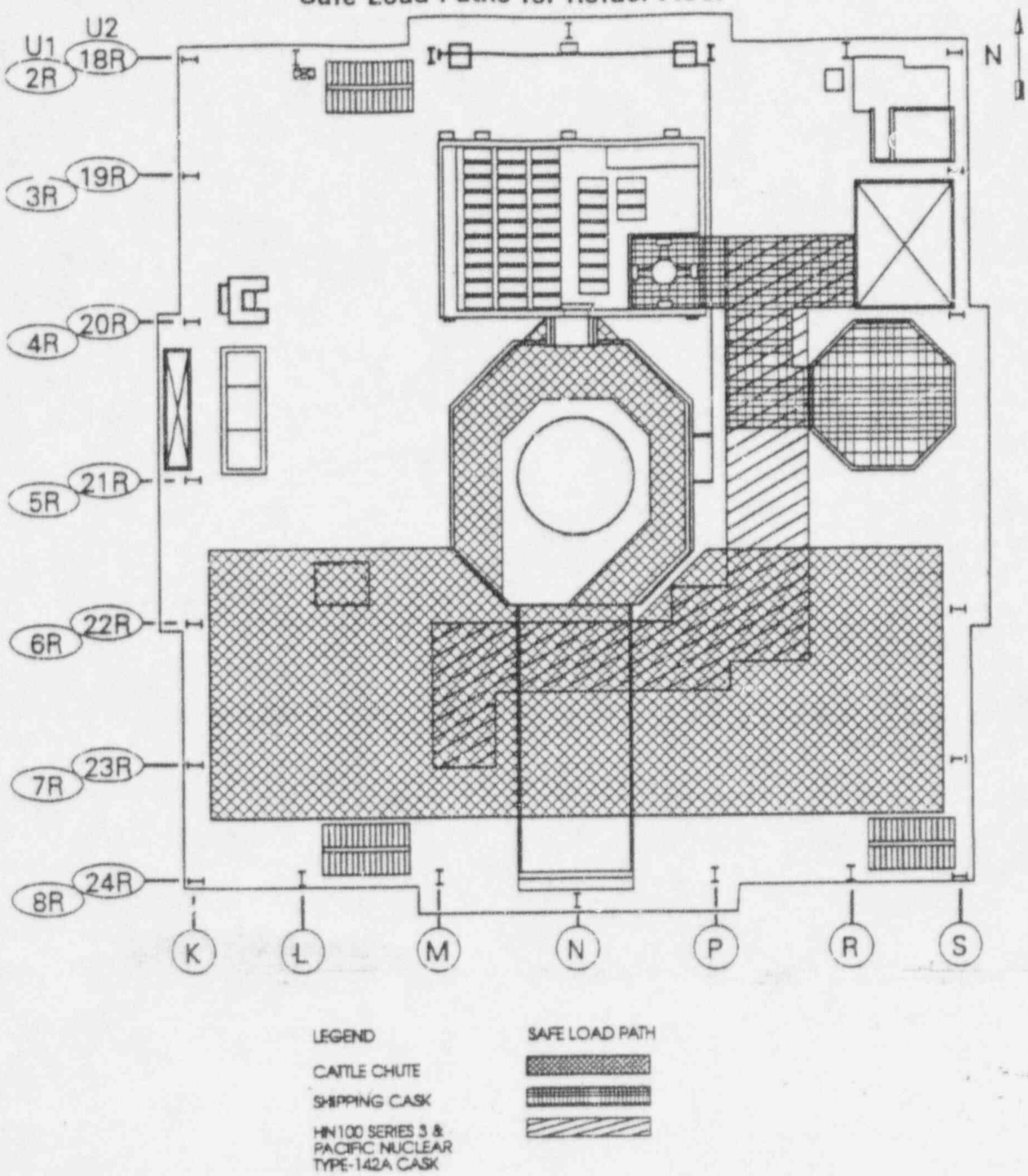
CAROLINA POWER & LIGHT COMPANY
NUCLEAR PLANT ENGINEERING DEPARTMENT - RALEIGH, N. C.
BRUNSWICK STEAM ELECTRIC PLANT
CONTROL OF HEAVY LOADS
SAFE LOADPATHS
REACTOR BUILDING ELEV. 117'-0"
81020-M-001 B

DUNCAN-PARNELL, INC., RALEIGH 191

Safe Load Paths
Refuel Floor



Safe Load Paths for Refuel Floor



NOTES:
1. Load paths applicable to Unit 1 & 2.
2. Hoists must be removed or properly secured when not in use.
3. Irradiated fuel located in fuel pool and in vessel cavity.
4. Items may only be moved over the vessel during removal or reinstallation.
5. Equipment outlines are shown for reference only.
6. Casks shall be placed on a double stack of 4" x 4"s, 9' x 9' long cribbing perpendicular to each other (as identified in EWR 12916).

ENCLOSURE 2

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LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Carolina Power & Light Company in this document. Any other actions discussed in the submittal represent intended or planned actions by Carolina Power & Light Company. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Manager-Regulatory Affairs at the Brunswick Nuclear Plant of any questions regarding this document or any associated regulatory commitments.

Commitment	Committed date or outage
1. None.	N/A