CP&L

Carolina Power & Light Company

P. O. Box 1551 • Raleigh. N. C. 27602

MAY 9 1990

R. A. WATSON
Senior Vice President
Nuclear Generation

SERIAL: NLS-90-102

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
ALLOWABLE CONTAINMENT LEAK RATE

Gentlemen:

On March 5, 1990, Carolina Power & Light Company received a request for information, via telecopy, regarding the October 10, 1989 license amendment request to raise the allowable containment leak rate (L_a) at Brunswick from 0.5 volume percent per day to 1.0 volume percent per day. This information was requested to aid the NRC staff in performing independent offsite and control room operator dose calculations. Enclosure 1 contains the requested information.

Please refer any questions regarding this submittal to Mr. M. R. Oates at (919) 546-6063.

Yours very truly,

R A Watson

R. A. Watson

RAW/MAT

Enclosure

cc: Mr. Dayne H. Brown
Mr. S. D. Ebneter
Mr. N. B. Le
Mr. W. H. Ruland

R. A. Watson, 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, contractors, and agents of Carolina Power & Light Company.

Susie G. Bunn
Notary (Seal)

My commission expires: 3/28/92

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ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKETS 50-325 & 50-324
OPERATING LICENSES DPR-71 & DPR-62
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
ALLOWABLE CONTAINMENT LEAK RATE

Staff Request 1

Core Thermal Power Level (MWt) (includes an additional 2% for instrument error).

Response

The core thermal power level to be used in this calculation is 2550 MWt.

Staff Request 2

Control Room Unfiltered In-leakage (cfm).

Response

The control room unfiltered in-leakage is 3000 cfm. This information was not used in the calculation of control room doses. Instead, a bounding analysis, which demonstrated on a worst case basis that control room doses were directly proportional to the primary containment leak rate, was used. For example, if the leak rate doubled, then the control room dose rate doubled.

Staff Request 3

Control Room Volume (ft^3).

Response

The control room volume is 298,650 ft^3. This information was not used in the calculation of control room doses. See response to Staff Request 2.

Staff Request 4

Control Room Normal Ventilation System Charcoal Adsorber Iodine Removal Efficiency (%).

Response

The control room normal ventilation system charcoal adsorber iodine removal efficiencies are as follows:

    Elemental Iodine   95%
    Methyl Iodine   90%
    Particulate Iodine   95%

This information was not used in the calculation of control room doses. See response to Staff Request 2.

Staff Request 5

Breathing Rate (m^3/sec).

Response

The following breathing rates were used in performing the dose calculations.

	Offsite	Control Room
0 to 8 hours	3.47×10^{-4} m^3/sec	3.47×10^{-4} m^3/sec
8 to 24 hours	1.75×10^{-4} m^3/sec	3.47×10^{-4} m^3/sec
1 to 30 days	2.32×10^{-4} m^3/sec	3.47×10^{-4} m^3/sec

Control room breathing rates were not used in the calculation of control room doses. See response to Staff Request 2.

Staff Request 6

Control Room Recirculation Rate (cfm).

Response

The control room recirculation rate is 1000 cfm. This information was not used in the calculation of control room doses. See response to Staff Request 2.

Staff Request 7

Control Room Emergency Ventilation Rate (cfm).

Response

The control room emergency ventilation rate is 1000 cfm. This information was not used in the calculation of control room doses. See response to Staff Request 2.

Staff Request 8

Occupancy Factors.

Response

The following occupancy factors are assumed for calculation of offsite and control room doses.

	Offsite	Control Room
0 to 8 hours	1.0	1.0
8 to 24 hours	1.0	1.0
1 to 4 days	1.0	0.6
4 to 30 days	0.333	0.4

Control room occupancy factors were not used in the calculation of control room doses. See response to Staff Request 2.

Staff Request 9

Primary and secondary containment free volume.

Response

The primary and secondary containment free volumes were not used in the calculation of the offsite doses. Instead the primary containment leakage was expressed as a fraction per day leaked into the reactor building. The analysis then assumed that all of the primary containment passed directly into the emergency exhaust without mixing with the surrounding atmosphere. This approach represents maximum conservatism.

The primary and secondary containment volumes were used in the analysis of the environmental qualification doses. These volumes are:

Primary Containment Volume $298,700 \text{ ft}^3$
(sum of drywell and wetwell)

Reactor Building Free Volume $2.6 \times 10^6 \text{ ft}^3$

Staff Request 10

Annulus Exhaust (Standby) Gas Treatment System Flow Rate (cfm).

Response

The annulus exhaust (Standby) gas treatment system flow rate was not used in determining the offsite doses. All activity released from the primary containment is assumed to be directly released through the SGTS regardless of flow. The flow rate was used in determining the environmental qualification doses. This flow is as given in the Brunswick Updated FSAR Section 6.5.1.1.1 which states that each filter train blower in conjunction with the secondary containment ducting was designed to maintain a negative secondary containment pressure of 0.25 inches of water by controlled venting at the rate of 100% volume per day following reactor building isolation. Table 6.5.1-1 of the Brunswick Updated FSAR gives the design blower capacity of 3000 cfm against an external pressure of 3 inches of water.

Staff Request 11

Secondary Containment Pressure Drawdown Time (min).

Response

A value was not obtained for the secondary containment drawdown time since the reactor building is normally operated at a negative 0.25 inches of water.

The Brunswick FSAR Section 15.6.4.1.2 assumes a leak rate for the reactor building of 1%/day. The analysis assumes that 1% of the primary containment leakage bypassed the SGTS filters for the entire duration of the event without credit for hold up and dilution in the reactor building.

NUREG-0800, Section 6.5.3, Paragraph III.c states that large reactor buildings around older BWR containments are usually maintained at a negative pressure during normal operation, and the dose model assumed for these cases has not assumed any positive pressure period.

Brunswick System Description SD-31.1, Revision 7 dated May 17, 1988 states that the reactor building exhaust and supply fans are operated in such a manner as to maintain a negative static pressure of 0.25 inches of water.

Staff Request 12

Annulus Exhaust (Standby) Gas Treatment System Charcoal Adsorber Iodine Removal Efficiency (%).

Response

The following are the SGTS charcoal adsorber efficiencies.

Elemental Iodine	99%
Methyl Iodine	99%
Particulate Iodine	99%

Staff Request 13

Maximum Main Steam Isolation Valve Leak Rate (cfh).

Response

The calculations for control room doses and offsite doses do not include a contribution from MSIV leakage. It is assumed that there is no direct leakage from the primary containment to the environment. All exhaust from the secondary containment is directed through the standby gas treatment system. This is consistent with the Brunswick Control Room Habitability Studies submitted March 2, 1983 and August 30, 1985 and accepted by the NRC on October 18, 1983 and February 16, 1989, respectively.

The maximum MSIV leakage is established by Technical Specifications independent of the Integrated Leak Rate Test limit. MSIV leakage is maintained at or below 11.5 scfm per valve in accordance with Technical Specification Section 3.6.1.2.

Staff Request 14

Atmospheric Dispersion Coefficients, X/Q values (sec/m^3)

 a. Containment leakage
 b. Main Steam Isolation Valve Leakage
 c. Elevated (Stack) Release

Response

a. No Atmospheric Dispersion Coefficients for containment leakage were used since one of the assumptions is that 100% of all leakage exits from primary containment directly into the intake of the SGTS. Dilution and dispersion in the reactor building is not taken into account. See response to Staff Request 9.

b. No Atmospheric Dispersion Coefficients for the Main Steam Isolation Valve Leakage are used. See response to NRC Request 13.

c. The following Atmospheric Dispersion Coefficients (in sec/m^3) are used for Elevated Stack releases:

Time	EXCLUSION AREA		LOW POPULATION ZONE	
	Thyroid	Whole Body	Thyroid	Whole Body
0-1/2 hr	1.14×10^{-4}	1.14×10^{-4}	3.63×10^{-5}	3.63×10^{-5}
1/2-2 hr	1.33×10^{-5}	2.46×10^{-5}	7.81×10^{-6}	1.10×10^{-5}
2-8 hr			7.81×10^{-6}	1.10×10^{-5}
8-24 hr			3.25×10^{-6}	4.59×10^{-6}
1-4 days			1.04×10^{-6}	1.22×10^{-6}
4-30 days*			3.47×10^{-7}	4.07×10^{-7}

 * 1/3 occupancy has been included in values for this period

Time	Control Room X/Qs
0-1/2 hr	3.3×10^{-4}
1/2-8 hrs	1.8×10^{-6}
8-24 hrs	1.1×10^{-6}
1-4 days	2.0×10^{-7}
4-30 days	2.7×10^{-8}

Control Room X/Qs include occupancy factor.

Stack Data
        Height-100 m
        Distance to exclusion zone-3000 ft.
        Distance to low population zone-2 miles

Staff Request 15

Control Room Isolation Time (sec)

Response

The 1983 report, Response to NUREG 0737, TMI Action Item III.D.3.4, dated March 2, 1983, uses a closure rate of 7 seconds This is conservative with respect to the design of the damper. The control room isolation time was not used in the calculation of control room doses. See response to Staff Request 2.