PSNH PUBLIC SERVICE
Company of New Hampshire

SEABROOK STATION
Engineering Office:
1671 Worcester Road
Framingham, Massachusetts 01701
(617) - 872 - 8100

April 22, 1982

SBN-260
T.F. B 7.1.2

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Frank J. Miraglia, Chief
Licensing Branch No. 3
Division of Licensing

References: (a) Construction Permits CPPR-135 and CPPR-136, Docket Nos. 50-443 and 50-444
(b) PSNH Letter, dated March 12, 1982, "Response to 451 Series RAIs; (Accident Evaluation Branch; Meteorology Section)," J. DeVincentis to F. J. Miraglia
(c) USNRC Letter, dated February 12, 1982, "Request for Additional Information," F. J. Miraglia to W. C. Tallman

Subject: Submittal of RAI 451.11 (c), (d); (Accident Evaluation Branch; Meteorology Section)

Dear Sir:

We have enclosed a response to the subject RAI which you forwarded in Reference (c).

It was indicated in Reference (b) that RAI 451.11 (c) and 451.11 (d) would be submitted by May 3, 1982.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

J. DeVincentis
Project Manager

8204300226

B001
S/1

451.11 a. Identify meteorological conditions (including extreme temperatures, pressure, humidity, and windspeeds) considered in the design of auxiliary systems and components (e.g., the diesel generator combustion air intake and exhaust system discussed in Section 9.5.8).

b. Provide the bases for the selected values (including the magnitude and duration).

c. Compare the selected values with severe or extreme meteorological conditions observed in the region through 1981 (through January 1982 for extreme minimum temperatures).

d. Compare the selected values with those presented in Section 2.3.1.2 for tornadoes and hurricanes, extreme winds (e.g., 100-year recurrence), extreme temperatures (100-year recurrence; see NUREG/CR-1390, "Probability Estimates of Temperature Extremes for the Contiguous United States"), and other extreme conditions for atmospheric moisture and precipitation.

RESPONSE: a. Meteorological conditions considered in the design of auxiliary systems and components, exclusive of the diesel generator air intake and exhaust system, are summarized below; the environmental conditions for the diesel generator air intake and exhaust system are addressed in RAI 430.130.

Extreme Outdoor Temperatures

Maximum 88°F

Minimum 0°F

Relative Outdoor Humidity

Maximum 100%

Minimum 10%

The above temperature and humidity extremes were utilized in the design of the HVAC systems for all safety-related buildings. The HVAC systems maintain temperature and humidity environments within the buildings as specified in FSAR Figure 3.11(B)-1 (Service Environment Chart) under the outdoor conditions specified above.

Seismic Category I structures and certain non-Seismic Category I structures, as listed in Subsection 3.8.4.1, were designed for wind velocities as follows:

Severe Environmental Load:

A wind speed of 110 mph at 30 feet above ground for a 100-year return.

Extreme Environmental Load:

A total maximum tornado wind velocity (translational plus rotational of 360 mph).

Seismic Category I structures and certain non-Seismic Category I structures were designed for the following atmospheric pressure change accompanying the design basis tornado:

Total pressure change due to passage of tornado: 3 psi
Rate of pressure change: 2 psi per second

b. The bases for specification of temperature extremes are actual measured regional temperature distributions for Massachusetts presented in "ASHRAE Handbook of Fundamentals", Chapter 22, Table 1, page 380, 1967 Edition. The 2-1/2 % values (Summer) and 97-1/2% values (Winter) of the distributions were used.

The bases for the selection of the humidity range is the assumption that relative humidities at or near 100% occur during fog, dew formation and precipitation which are frequently observed in this climate. Relative humidities less than 10% are not observed under the climatic conditions affecting this site.

The bases for the design wind velocities and atmospheric pressures for Seismic Category I structures and certain non-Seismic Category I structures (listed in Subsection 3.8.4.1) are discussed in Subsection 2.3.1.2.

c. Extreme wind speed and ambient temperature conditions observed in the SB Station site region through December 1978 were reported in Seabrook FSAR Tables 2.3-4, 2.3-11 and 2.3-12. SB FSAR Table 2.3-4 shows that the fastest mile wind speed recorded was 87 mph (Boston, September 1938); SB FSAR Tables 2.3-11 and 2.3-12 show that the maximum and minimum ambient temperatures observed were 104°F (Boston, July 1911) and -39°F (Portland, February 1943), respectively. None of these extreme environmental conditions have been exceeded as of January 1982.

A National Severe Storm Center list of tornado data for the Seabrook Station site region for the period 1950-1981 (Reference 1) indicates that the closest initial tornado touchdown point recorded was approximately 2 miles from the site on July 1, 1968. This tornado was rated 1 on the Fujita-Pearson scale estimate of force (73-112 mph winds). The three strongest tornadoes recorded as having initially touched down within 50 miles of the site during this same 32-year period were rated 3 on the Fujita-Pearson scale estimate of force (158-206 mph winds). The estimated wind load of these three extreme tornadoes is well below the design extreme environmental tornado wind velocity of 360 mph.

NOAA Technical Report NWS 23 (Reference 2) provides a list of hurricanes with observed or estimated minimum central pressures less than 29.00 inches Hg which have occurred along the U.S. east coast during the 79-year period 1900-1978. According to NWS 23, the minimum hurricane central pressure estimated to have occurred within 150 nautical miles of the U.S. east coast during this period was 27.44 inches Hg on September 10, 1919 off the Florida coast. Minimum hurricane central pressures along the New England coast have generally been higher due primarily to decreasing water temperatures toward the north. The lowest pressure ever recorded in the site region (e.g., at either Boston, Concord or Portland NWS) was 28.40 inches Hg recorded in Portland on December 2, 1942 (Reference 3). Thus, the diesel generator air intake and exhaust design hurricane and northeastern storm pressure of 26 inches Hg as discussed in SB FSAR Section 9.5.8 and in SB RAI 430.130 is conservative when compared to the minimum pressures which have been observed in the site region.

d. The 100-year return period wind speed at 30 feet above ground is reported in FSAR Section 2.3.1.2 as 110 mph. This was the wind velocity used for the severe environmental wind load. The 100-year recurrence maximum and minimum temperatures for the Seabrook Station site region as reported in NUREG/CR-1390 (Reference 4) are approximately 106°F and -32°F, respectively. The design basis tornado wind velocities and atmospheric pressures are those outlined for Region I in Regulatory Guide 1.76 (Reference 5). The design basis hurricane or northeastern storm pressure of 26 inches Hg is less than the probable maximum hurricane central pressure of 26.80 reported for the New England coastline by NWS 23 (Reference 2).

References

1. National Severe Storms Forecast Center, Tornado Data, "Tornadoes Within 125 Miles of Seabrook", 1950-1981 (unpublished).

2. NOAA Technical Report NWS 23, "Meteorological Criteria for Standard Project Hurricane and Probable Maximum Hurricane Windfields, Gulf and East Coasts of the United States", Washington, D.C., September 1979.

3. Telecon with Ms. Ettinger, Portland NWS, April 21, 1982.

4. Nicodemus, M. L., and N. B. Guttman, "Probability Estimates of Temperature Extremes for the Contiguous United States", NUREG/CR-1390, National Climatic Center, Asheville, NC, May 1980.

5. NRC Regulatory Guide 1.76, "Design Basis Tornado for Nuclear Power Plants", April 1974.