



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

DEC 08 1980

Docket No. 50-213  
LS05-80-12-009

Mr. W. G. Council, Vice President  
Nuclear Engineering and Operations  
Connecticut Yankee Atomic Power Company  
Post Office Box 270  
Hartford, Connecticut 06101

Dear Mr. Council:

SUBJECT: HADDAM NECK - SEP TOPIC II-2.A, SEVERE WEATHER PHENOMENA

The SEP review of Topic II-2.A, "Severe Weather Phenomena" has been completed. Enclosure 1 is the staff's safety evaluation (SE) for the Haddam Neck site. The review was done in conformance with Standard Review Plan 2.3.1 and covers extreme temperatures, lightning strikes, snow and ice loads and wind and tornado loadings. The wind and tornado loadings analysis was performed by the Texas Tech. University, Institute for Disaster Research. Enclosure 2 is the Texas Tech. report. Please inform us if your as-built facility differs from the licensing basis assumed in our assessment within 30 days of receipt of this letter.

You will note that the SE identifies a design basis tornado with a probability of  $10^{-7}$  per year and is consistent with a Regulatory Guide 1.76 design basis tornado. The staff intends to evaluate the structural characteristics of specific structures, systems and components important to safety to determine their ability to withstand the severe weather loadings. The plant design parameters will then be compared to the probability of occurrence of the wind as a part of our structural evaluation. This comparison will be used to evaluate the necessity of design changes.

Sincerely,

*Dennis M. Crutchfield*  
Dennis M. Crutchfield, Chief  
Operating Reactors Branch #5  
Division of Licensing

Enclosure: As stated

cc w/enclosure:  
See next page

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Mr. W. G. Council

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DOCKET NO. 50-213

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U. S. Environmental Protection  
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Boston, Massachusetts 02203

Resident Inspector  
Haddam Neck Nuclear Power Station  
c/o U. S. NRC  
East Haddam Post Office  
East Haddam, Connecticut 06423

ENCLOSURE 1

Systematic Evaluation Program

Meteorology

Haddam Neck Nuclear Power Plant

Topic II-2.A Severe Weather Phenomena

Extreme meteorological conditions and severe weather phenomena in the Haddam Neck site region were examined to determine if safety-related structures, systems, and components are designed to function under all severe weather conditions. Discussed below are the severe weather phenomena which could adversely affect the Haddam Neck site and which should be examined relative to the current design.

Normal daily temperatures range from a minimum of 18 degrees Fahrenheit in January to a maximum of 80 degrees Fahrenheit in July. Measured extreme temperatures for the site region are 101 degrees Fahrenheit which occurred in August 1955 and -24 degrees Fahrenheit which occurred in February 1943. The extreme maximum and minimum temperatures appropriate at the Haddam Neck site for general plant design (i.e., HVAC systems) are 90 degrees Fahrenheit (equalled or exceeded 1% of the time) and -3 degrees Fahrenheit (equalled or exceeded 99% of the time).

Thunderstorms occur an average of 25 days per year in the site region. Based on the annual number of thunderstorm days, the calculated annual flash density of ground lightning strikes is three flashes per square

kilometer. A structure with the approximate dimensions of the Haddam Neck reactor building can be expected to be subjected, on the average, to one strike every 10 years.

The design wind speed (defined as the "fastest-mile" wind speed at a height of 30 feet above ground level with a return period of 100 years) acceptable for the site region is 90 miles per hour. On the average, hail storms occur about two days annually, and freezing rain occurs approximately 10 days per year. The maximum radial thickness of ice expected in the site region is about 0.75 inch.

Mean annual snowfall in the site region is approximately 48 inches. The normal winter precipitation snow load on a flat surface is about 35 pounds per square foot. The maximum monthly snowfall occurred in December 1945 and totaled 45.3 inches. The maximum snowfall from a single storm totaled 19.2 inches in February 1949. The maximum measured snow depth on the ground for the site region is 32.8 inches. Based on the 100-year recurrence accumulated ground snowpack and probable maximum winter precipitation for the site region, the extreme winter precipitation snow load on a flat surface is about 125 pounds per square foot.

Tornadoes have been reported 117 times during the period 1950-1977 within an approximate 60-mile radius from the Haddam Neck site, excluding the water area over the Atlantic Ocean. On the average, four tornadoes can be expected to occur in the vicinity of the Haddam Neck

site every year. Based on the path length and width of tornadoes occurring in the site region, the recurrence interval for a tornado at the site is calculated to be about 4000 years.

The assumptions used in Regulatory Guide 1.76 provide an adequate design basis tornado for the site region. These characteristics include a maximum windspeed of 360 miles per hour (a maximum rotational windspeed of 290 miles per hour plus a maximum translational windspeed of 70 miles per hour), a maximum pressure drop of three pounds per square inch, and rate of pressure drop of two pounds per square inch per second.

Based on actual tornado occurrences in the site region area (77 tornadoes with available data) and using the procedures discussed in WASH-1300, a "site-specific" design basis tornado (with a probability of occurrence of  $10^{-7}$  per year) can be calculated. For the Haddam Neck site, the characteristics of tornadoes occurring within a 60-mile radius are a maximum windspeed of 315 miles per hour (a maximum rotational windspeed of 255 miles per hour plus a maximum translational windspeed of 60 miles per hour), a maximum pressure drop of two pounds per square inch, and a rate of pressure drop of 1.5 pounds per square inch per second.

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- "American National Standard Building Code Requirements for Minimum Design Loads in Buildings and Other Structures," ANSI, A58.1-1972.
- "Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours," Hydrometeorological Report No. 33, Washington, D. C., April 1956.
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- Memo from Harold R. Denton (Assistant Director for Site Safety, Division of Technical Review, NRR) to R. R. Maccary (Assistant Director for

Engineering, Division of Technical Review, NRR) dated March 24, 1975,  
Subject: Site Analysis Branch Position - Winter Precipitation Loads.

Memo from Jerry Harbour (Chief, Site Safety Research Branch, Division  
of Reactor Safety Research, RES) to L. G. Hulman (Chief, Hydrology-  
Meteorology Branch, Division of Site Safety and Environmental Analysis,  
NRR) dated August 14, 1978, Subject: Tornado Frequency Data for SEP  
Review.

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U.S. Nuclear Regulatory Commission, Washington, D.C.

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U.S. Atomic Energy Commission, May 1974.

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