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SUBJECT: Requests approval to revise Tornado Design Criteria.

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October 10, 1995
GO2-95-212

Docket No. 50-397

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21**
REQUEST FOR APPROVAL TO REVISE TORNADO DESIGN CRITERIA

References:
1) Letter G02-91-116, dated June 7, 1991, GC Sorensen (SS) to NRC, same subject

2) Letter G02-94-001, dated January 6, 1994, JV Parrish (SS) to NRC, same subject

3) Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design, NUREG-1503, July 1994

4) NUREG-0892, Safety Evaluation Report Related to the Operation of WPPSS Nuclear Project No.2, March 1982

5) NUREG-0800, Standard Review Plan, June 1987

6) Regulatory Guide 1.76, April-1974, Design Basis Tornado for Nuclear Power Plants.

By References 1 and 2, in accordance with the guidance of Reference 6, Section C.2, the Supply System requested approval to revise the WNP-2 tornado design criteria. Reference 1 requested that the total design basis tornado wind speed for WNP-2 be revised to 180 mph. Based on discussions with the staff, the Supply System revised its request via Reference 2 to set the tornado design basis wind speed to 192 mph. Although the Supply System feels that each of these submittals is technically justified, the Supply System is hereby further revising its request to establish the total design basis wind speed to 200 mph. The current request is based on further discussions with the staff and is consistent with the design basis tornado characteristics accepted by the NRC in Reference 3 for the tornado intensity region containing WNP-2. The complete definition of the proposed design basis tornado characteristics including the proposed design basis missiles are provided in the attachment.

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Should you have any questions or desire additional information regarding this matter, please call me or D. A. Swank at (509) 377-4563.

Sincerely,

J. V. Parrish (Mail Drop 1023)
Vice President, Nuclear Operations

WLL/REB/ml
Attachment

cc: LJ Callan - NRC RIV
KE Perkins, Jr. - NRC RIV, Walnut Creek Field Office
NS Reynolds - Winston & Strawn
JW Clifford - NRC
DL Williams - BPA/399
NRC Sr. Resident Inspector - 927N

Attachment

WNP-2 current tornado design criteria, as stated in WNP-2 FSAR Sections 2.3.1.2.1.3 and 3.3.2.1, are for wind speeds of 300 mph rotational and 60 mph translational, with a pressure drop of 3 psi to occur in 3 seconds. These criteria were found acceptable by the staff as documented in Reference 4, Section 3.3.2. The Supply System proposes to change the design criteria to 160 and 40 mph rotational and translational velocities with a pressure drop of 0.90 psi occurring at 0.30 psi/sec.

Relative to the requirements of Reference 6, the current design requirements are conservative in that WNP-2 is a Region III site for which the criteria are 190 mph rotational and 50 mph translational with a 1.5 psi pressure drop at 0.6 psi/sec. WNP-2 FSAR Section 3.3.2.4 and Appendix C.3 discuss the WNP-2 design relative to Reference 6. It is apparent that the currently proposed criteria are less than those proposed by the Regulatory Guide for a Region III plant.

WNP-2 FSAR Section 3.5.1.4 establishes the following design basis tornado generated missiles:

Missile	Weight (lbs)	Dimensions	Horizontal Impact Velocity (ft/sec)
Utility Pole	1600	14"dia x 35'	241
Steel Rod	8	1"dia x 3'	259

The NRC found these missiles acceptable in Section 3.5.1.4 of Reference 4.

Based upon the guidance of Reference 6, NRC approval of the use of revised tornado design criteria is requested. The criteria are:

Wind Speeds:

200 mph maximum
160 mph rotational
40 mph translational

Pressure Drop:

0.90 psi
at 0.30 psi/sec

Missiles:

Missile	Weight (lbs)	Dimensions	Horizontal Impact Velocity (ft/sec)
Wood Plank	115	3.6" x 0.94' x 12'long	161.7
6" Sch 40 Pipe	287	6.6"dia x 15'long	27.0
1" Steel Rod	8.8	1" dia x 3' long	24.9
Utility Pole	1124	13.5"dia x 35' long	30.7
12" Sch 40 Pipe	750	12.75" dia x 15' long	21.8
Automobile	3990	16.4' x 6.6' x 4.3'	105.2

Consistent with Reference 5, Section 3.5.1.4, these missiles are considered to strike surfaces in any direction. Vertical velocities are taken to be 70 percent of the horizontal velocities except for the 1" steel rod which is assumed to have the same velocity in any direction. The utility pole and the automobile are considered to strike surfaces at any elevation up to a maximum elevation of 30 feet above the highest finished grade within 0.5 miles of the plant. The other missiles are considered to strike at any elevation.

Based on Reference 5, Section 3.3.2, total tornado loads resulting from wind loads, differential pressure loads, and tornado generated missiles will be established from the following equations:

$$W' = W_w$$
$$W' = W_p$$
$$W' = W_m$$
$$W' = W_w + 0.5\ W_p$$
$$W' = W_w + W_m$$
$$W' = W_w + 0.5\ W_p + W_m$$

where:

W' = Total tornado load
W_w = Tornado wind load
W_p = Tornado differential pressure load
W_m = Tornado generated missile load

The above wind speed and pressure drop parameters are consistent with those values approved by the NRC for the Advanced Boiling Water Reactor Design for Tornado Intensity in Region III as defined in Section 2.0 of Reference 3. Based on the extensive studies which define site specific tornado hazards for the Hanford area, these wind speed and pressure drop parameters are conservative for the WNP-2 site. These studies are discussed in detail in the report attached to Reference 2.

In addition, the Supply System is proposing that the missiles to be considered consist of the full spectrum of missiles contained in Reference 5, Section 3.5.1.4. For those missiles, the proposed velocities are based on the above wind speed and pressure drop parameters. These missile velocities were developed by the Supply System using a methodology that we feel is consistent with that used to develop the SRP missile velocities. The Supply System will formalize the calculations associated with the development of these missile velocities after NRC has concurred with the proposed revised tornado design criteria, but prior to use in design work.

By implementing the proposed revisions, the tornado design criteria will conservatively reflect the tornado hazards at WNP-2 while maintaining the objective of providing an annual probability of exceedance of design loads of less than or equal to 1×10^{-7}. These revisions will result in more realistic wind velocities, differential pressure loads, missile velocities, and load combinations. The proposed revisions will benefit the design of exterior structures and components that must consider postulated tornado effects. Significant benefit is expected during the implementation of future plant modifications where the revised tornado design criteria will facilitate construction. An example of this application is the Supply System's current effort to procure and install a dry cask spent fuel storage facility.