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 AUTH. NAME AUTHOR AFFILIATION  
 PARRISH, J.V. Washington Public Power Supply System  
 LAFRAMBOISE, W. Washington Public Power Supply System  
 NOBLE, L.D. Washington Public Power Supply System  
 RECIP. NAME RECIPIENT AFFILIATION  
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SUBJECT: Forwards request for approval to revise WNP-2 tornado design criteria per RG 1.76 section C.1.2.

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January 6, 1994  
G02-94-001

Docket No. 50-397

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

Gentlemen:

Subject: **NUCLEAR PLANT NO. 2, OPERATING LICENSE NPF-21  
REQUEST FOR APPROVAL TO REVISE TORNADO DESIGN CRITERIA**

Reference: Letter, GO2-91-116, dated June 7, 1991, GC Sorensen (SS) to NRC, same subject

By the reference, in accordance with the guidance of Regulatory Guide 1.76, Section C.1.2 the Supply System requested approval to revise the WNP-2 tornado design criteria. Based upon discussions with the Staff, the Supply System has decided to revise this request with regard to the assumed wind speeds, pressure drops and the missiles to be considered. This revised request follows. This request is a complete replacement for the reference.

WNP-2 current tornado design criteria, as stated in FSAR 2.3.1.2.1.3 and 3.3.2.1, are for wind speeds of 300 and 60 mph rotational and translational respectively with a pressure drop of 3 psi occurring at 1.0 psi/sec. These criteria were found acceptable by the Staff as documented in the WNP-2 SER for the Operating License Safety Evaluation Report (NUREG-0892); Section 3.3.2. The Supply System proposes to change the design criteria to 157 and 35 mph rotational and translational velocities with a pressure drop of 0.70 psi occurring at 0.24 psi/sec.

Relative to the requirements of Regulatory Guide 1.76 the current design requirements represent an over-commitment in that WNP-2 is a Region III site for which the criteria are 190 and 50 mph and a 1.5 psi pressure drop at 0.6 psi/sec. FSAR 3.3.2.4 and Appendix C.3 discuss the WNP-2 design relative to Regulatory Guide 1.76. It is also apparent that the proposed criteria are less than those proposed by the Regulatory Guide for a Region III plant.

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**REQUEST FOR APPROVAL TO REVISE  
TORNADO DESIGN CRITERIA**

In addition, FSAR 3.5.1.4 establishes the following design basis tornado generated missiles:

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

The NRC found these missiles acceptable in SER 3.5.1.4.

Based upon the guidance of the above mentioned Regulatory Guide section, NRC approval of the use of revised tornado design criteria is requested. The criteria are:

**Wind Speeds**

192 mph total  
157 mph rotational  
35 mph translational

**Pressure Drop**

0.70 psi  
at 0.24 psi/sec

**Missiles**

<u>Missile</u>	<u>Weight (lbs)</u>	<u>Dimensions</u>	<u>Horizontal Impact Velocity (ft/sec)</u>
Wood Plank	115	3.6"x 0.94'x 12'long	150.7
6" Sch 40 Pipe	287	6.6" dia x 15' long	29.2
1" Steel Rod	8.8	1" dia x 3' long	27
Utility Pole	1124	13.5" dia x 35' long	33.1
12" Sch 40 Pipe	750	12.75" dia x 15' long	23.8
Automobile	3990	16.4' x 6.6' x 4.3'	95.9

The selection of these criteria is based on extensive studies which define site specific tornado hazards for the Hanford area. These include Department of Energy (DOE) sponsored studies of various DOE nuclear related sites including the Hanford Site and NRC sponsored studies of tornado climatology in the United States. These and other studies are discussed in detail in the attached report titled "Justification for Revised Tornado Design Criteria."



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## REQUEST FOR APPROVAL TO REVISE TORNADO DESIGN CRITERIA

As listed above, this request is based upon a total wind speed of 192 mph. The request of the referenced letter was for 180 mph. As is discussed in the attached report, the proposed 192 mph design basis is consistent with the results contained in NUREG/CR-4461, which is the most conservative of the three recent tornado hazards studies applicable to the WNP-2 site.

In addition, the Supply System is proposing that the missiles to be considered consist of the full spectrum of missiles contained in Standard Review Plan (SRP) Section 3.5.1.4. For these missiles, the proposed velocities will be based on a wind speed of 192 mph. These missile velocities were developed by the Supply System using a methodology we believe is consistent with that used to develop the SRP missile velocities for each of the tornado intensity regions.

The previous request did not include an automobile and utility pole as potential missiles. There were concerns expressed by the Staff that there was insufficient evidence that the automobile and utility pole missiles would not become airborne at the postulated wind speeds. In addition, the methodology used to predict missile speeds was not previously reviewed and approved by the NRC (i.e., EPRI Report NP-748). The current request addresses these concerns.

For comparison purposes, the following table summarizes the horizontal missiles speeds for the original design basis, NRC Tornado Intensity Region III, the referenced request, and the current request.

	Original WNP-2 Design Basis (ft/sec)	NRC Tornado Intensity Region III (ft/sec)	WNP-2 Proposed 6/7/91 (ft/sec)	Current WNP-2 Proposed (ft/sec)
<u>Missile</u>				
Wood Plank	--	190	167	150.7
6" Pipe	--	33	17	29.2
Automobile	--	134	--	95.9
1" Rod	259	26	20	27.0
Utility Pole	241	85	--	33.1
12" Pipe	--	23	13	23.8

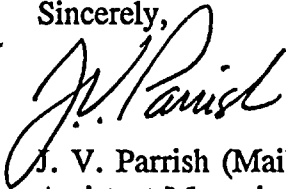
By implementing the proposed revisions, the tornado design criteria will realistically reflect the tornado hazards at WNP-2 while maintaining the objective of providing an annual probability of exceedance of design loads of less than or equal to  $1 \times 10^{-7}$ . These revisions will result in more 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 relief of tornado design criteria will facilitate construction.

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**REQUEST FOR APPROVAL TO REVISE  
TORNADO DESIGN CRITERIA**

The Supply System believes the proposed tornado design criteria will continue to provide adequate protection to safety related structures, systems and components such that, for the most severe tornadoes that would be reasonable to postulate to occur near the site, the safety functions of these structures, systems and components will not be impacted.

Sincerely,



J. V. Parrish (Mail Drop 1023)  
Assistant Managing Director, Operations

WLF/AGH/bk  
Attachments

cc: KE Perkins - NRC RV  
NS Reynolds - Winston & Strawn  
JW Clifford - NRC  
DL Williams - BPA/399  
NRC Site Inspector - 927N