

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 AUTH. NAME      AUTHOR AFFILIATION  
 BOUCHEY, G. D.      Washington Public Power Supply System  
 RECIP. NAME      RECIPIENT AFFILIATION  
 SCHWENCER, A.      Licensing Branch 2

SUBJECT: Forwards addl info re potential effect of severe meteorological events on diesel generator intakes & exhausts. Diesel generator design insures that at low load or no load operation, adequate air is delivered to engine.

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	<u>REG FILE</u> 04	1 1		RGN5	3 3
	RM/DDAMI/MIB	1 0			
EXTERNAL:	ACRS 41	6 6		BNL (AMDTs ONLY)	1 1
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## Washington Public Power Supply System

P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

December 28, 1982  
G02-82-1015

Docket No. 50-397

Mr. A. Schwencer, Chief  
Licensing Branch No. 2  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2  
CLARIFICATION OF DIESEL GENERATOR CAPABILITY  
TO WITHSTAND SEVERE METEOROLOGICAL EVENTS

Reference: Letter G02-82-641, G.D. Bouchev (SS) to  
A. Schwencer (NRC), "Design Basis Dust  
Storm Effect on Diesel Generator Building  
Air Intake", dated August 5, 1982

The Nuclear Regulatory Commission staff has requested additional information regarding the potential effect of severe meteorological events (dust storms, rain, freezing rain, and snow) on the WNP-2 Diesel Generator intakes and exhausts (SER Section 9.5.8). The staff has also requested information regarding cold weather diesel generator no load operation.

The potential effect of severe meteorological events on the diesel generator intake is discussed in the referenced letter. The potential effects on the diesel exhaust are discussed below:

### Rain

The diesel generator exhaust design includes a low point drain which was evaluated and shown adequate for draining heavy rainfall. In the evaluation, a probable maximum precipitation of 5.2 inches per hour (worst hour of design basis thunderstorm) was assumed to enter the exhaust pipe. This precipitation is equivalent to 0.14 gpm down the exhaust pipe, which is easily removed by the one inch drain.

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### Freezing Rain

A review of historical freezing rain (ice storm) data indicates a worst case storm in southeast Washington depositing one-half inch of ice. For conservatism, the effect of 1.5 inches of ice on the diesel exhaust opening was considered. This amount of ice around the circumference of the exhaust opening would reduce the flow area by 25% for a short period of time until the ice is melted and blown off by the hot exhaust. This reduction in area would not prevent starting and running of the diesels.

### Dust

The design basis volcanic ashfall has an average dust concentration of  $174 \text{ mgm/m}^3$  while the severe dust storm had  $8.9 \text{ mgm/m}^3$ . The volcanic ashfall has a duration of 20 hours and the dust storm 18 hours; therefore, the ashfall is the worst case to consider for dust effects on the diesel exhaust. The exhaust is a closed pipe except for a one-inch drain. Air flow into the pipe would be small. For dust accumulation evaluation purposes, a 5 mph constant air flow was assumed into the closed exhaust pipe, resulting in deposition of  $0.4 \text{ ft}^3$  of ash ( $39 \text{ lbm/ft}^3$  density uncompacted). This quantity of dust would not restrict the diesel exhaust enough to cause loss of capability to meet design requirements. The ash is of very fine particle size (average  $.75\mu\text{m}$ ) and would be blown out of the exhaust as the diesel accelerates to operating speed.

### Snow

The design basis snow fall for the WNP-2 site is 3.2 feet. Since the diesel exhaust opening is on a vertical plane and 6 feet above the roof where snow would accumulate, blockage by snow is not credible. Any snow that might blow into the exhaust pipe would be blown out and/or melted on starting of the diesel. The diesel can operate with up to .15 inches ( $\text{H}_2\text{O}$ ) of back pressure, but is designed for less than 5 inches ( $\text{H}_2\text{O}$ ) for long term operation. Even if half the snow fall went into the exhaust pipe, the back pressure would only increase 3 inches ( $\text{H}_2\text{O}$ ) using a snow density of  $7 \text{ lbm/ft}^3$ . Therefore, snow effects would not prevent starting of the diesels.

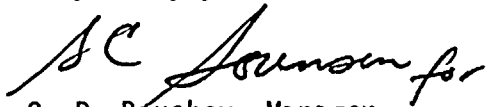


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Diesel Generator Cold Weather No Load Operation

The WNP-2 diesel engines are manufactured by Bruce G.M. A unique feature of their design is that they may operate for long periods of time at rated speed with no load and not impair their operation even in below zero degree weather. This capability is due to the engine's turbocharger being operated by a direct gear drive design until the engine approaches rated load, at which time the turbocharger drive operates by exhaust gases. This design insures that at low load or no load operation adequate air is delivered to the engine to assure complete combustion of the fuel, thereby keeping injectors and other components clean.

Very truly yours,



G. D. Bouchey, Manager  
Nuclear Safety and Regulatory Programs

DMM/vlc

cc: R. Auluck - NRC  
W. S. Chin - BPA  
R. Feil - NRC Site

