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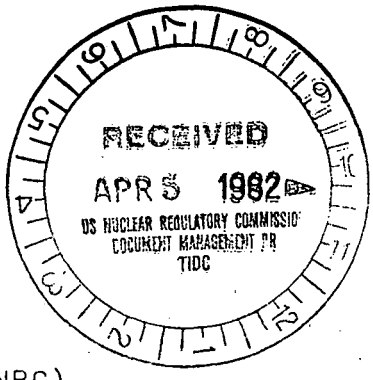
March 23, 1982



Mr. Paul O'Connor, Project Manager
Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Dresden Unit 2
SEP Topic: III-4.A,
Tornado Missles
NRC Docket 50-237

Reference (a): Telecopy from G. Cwalina (NRC) to S. Powers (SNED) dated 2-1-82.

Dear Mr. O'Connor:

Mr. Gregg Cwalina requested additional information on the above referenced SEP topic. The following responses were addressed to questions in the above referenced telecopy to enable the staff to complete their review of Tornado Missles.

Question 1. The Dresden crib house is categorized as a Class II structure in the FSAR. No information on tornado missile protection is available for this structure. The crib house contains the following systems and components that may be required for safe shutdown:

a. Station service water pumps and piping - provides cooling for control room air conditioning and auxiliary electric equipment room coolers;

b. Diesel generator cooling water system pumps and piping - provides cooling for diesel generators and HPCI and LPCI ventilation systems;

c. Firewater pumps and piping - provides coolant for isolation condensers; and

d. Containment cooling service water system (CCSWS) suction piping - The CCSWS is required for safe shutdown cooldown.

State how the above systems and components are protected from tornado missiles. If no protection is afforded, state how the above safety functions are accomplished after the design tornado.

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RESPONSE:

a. The safety of service water pumps and associated piping located in the crib house was evaluated against the strike of tornado missiles. The missiles considered were the one inch diameter steel rod and the utility pole.

   The analysis shows that these missiles can perforate the 11 5/8-inch thick hollow concrete block wall and the 42 inch diameter service water pipe main header which has 3/8-inch thick walls.

b. The diesel generator cooling water pumps and piping are located in the crib house 8 ft. below-ground level in an area surrounded by 3 ft. thick reinforced concrete walls and are protected by a 2 ft. thick reinforced concrete slab.

c. The diesel firewater pump and isolation condenser are not required for safe shutdown. The HPCI and LPCI systems are located in protected areas and will perform the required safety functions.

d. The CCSW suction piping is located below grade in the crib house, and is protected by the 24" reinforced concrete slab at grade.

Question 2. State what tornado missile protection is provided for safety-related HVAC system intakes and exhausts, and for standby gas treatment discharge ducts and dampers.

RESPONSE:

The safety-related ventilation systems in the Reactor Building consist of cubicle coolers which are located in protected areas. The control room ventilation system outside air intakes are located at H-31 in the east wall at elevation 557. The exhaust duct is located the south wall at H1-31. These ducts are not protected from tornado missiles.

As a result of a study conducted by Bechtel Power Corporation, Control Room Habitability Study for Dresden Units 2 and 3 (reference 2), a modification is being implemented to add a redundant safety related system (train B) to the control room HVAC system consisting of an air handling unit (AHU), return air fan, cooling system, associated piping, ducts, dampers, and appurtenances, and an air filtration unit (AFU) common to both air handling systems is to be installed in such a manner that the equipment is protected against tornado missles.

The intent of the modification is to meet NUREG 0737, Item III.D.3.4, Control Room Habitability Requirements and SRP 6.4, Habitability Systems, and to satisfy the requirements of General Design Criterion 19 regarding control room habitability following a radiological DBA during possible toxic gas releases, radioactive gas releases, and direct radiation.

The standby gas treatment system units are located on the Turbine Building mezzanine floor at coordinates E-G/43-45. The floor immediately above this area at elevation 561'-6" is an 8" thick reinforced concrete slab. In combination with the 3 1/2" precast concrete roof slab, adequate protection against tornado missiles from above is provided for the standby gas treatment units. The discharge ducts are routed down through protected areas of the Turbine Building, and then underground by at least 13 feet from the Turbine Building to the stack. This ductwork is thus adequately protected from tornado missiles.

The standby gas treatment system is not required for safe shutdown.

Question 3. State what tornado missile protection is provided for the diesel generator fuel oil storage tanks.

RESPONSE:

The safety of the Diesel Generator Fuel Oil Storage Tanks were investigated against the strike of the following tornado missiles:

1. 1" dia. steel rod
2. Utility Pole

The investigation indicated that these tanks are safe against these missiles.

Calculations were performed to determine the depth of penetration of these missiles into the granular fill which is at least 3.5 feet in depth above the underground tanks. For this purpose, the penetration formula suggested by C.W. Young (Ref. 1) was used. With the soil constant S equal to 7 for loose sand, the depth of penetration for the steel rod is 4.15 feet and that for utility pole is 3.61 feet. Since the depth of fill above the tanks is only 3.5 feet, the residual velocities were calculated at a penetration depth of 3.5 feet. The Ballistic Research Lab. (BRL) formula was used to calculate the perforation velocity through the 3/8 inch thick steel shell of these tanks.

The performation velocities thus calculated were found to be more than the corresponding residual velocities of the missiles. Therefore the tank is not perforated by either missile.

REFERENCE:

1. Young, C.W., "Depth Prediction for Earth Penetrating Projectiles," Proc. ASCE, Journal of the Soil Mechanics and Foundation Division, SM3, Vol-95, May 1969, pp. 803-817.

2. Bechtel Power Corporation, "Control Room Habitability study for Dresden Units 2 and 3, Commonwealth Edison Company, "Final Report November, 1981.

Question 4. The CECo submittal of December 8, 1981 states that external walls of Dresden 2 plant structures housing safety-related systems are of concrete with a thickness of at least 12". Is this also true of ceilings or roofs above safety-related equipment? (Excluding fuel pool superstructure). Are there any exterior masonry walls?

RESPONSE:

Areas housing safety-related equipment in the Reactor and Turbine Buildings (excluding fuel pool) are protected by no less than a 12" concrete slab from above, with the exception of the standby gas treatment units which are discussed in Response 2 above. The cribhouse is discussed in Response 1.a. above.

The Turbine Building contains exterior block walls on the ground and mezzanine floors west of column 35, adjacent to the low pressure heater bay. No safety-related equipment is located in this area. Adjoining areas containing safety-related equipment are separated from the heater bay by either concrete shield walls or floor slabs at least 12 inches thick. The Reactor Building contains no exterior block walls.

Please address any questions you may have concerning this matter to this office.

One (1) signed original and thirty-nine (39) copies of this transmittal are provided for your use.

Very truly yours,

Thomas J. Rausch

Thomas J. Rausch
Nuclear Licensing Administrator

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cc: Region III Inspector - Dresden

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