



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

SAFETY EVALUATION OF STATION BLACKOUT/ELECTRICAL SAFEGUARDS  
 UPGRADE PROJECT  
 PRAIRIE ISLAND UNITS 1 AND 2  
 STRUCTURAL AND GEOSCIENCES BRANCH

BACKGROUND

On November 27, 1990 the licensee submitted for NRC staff review the Design Report for the Station Blackout/Electrical Safeguards Upgrade Project. (Reference 1) Two new diesel generators, D5 and D6, will be added to the Prairie Island Plant. A new Class I building will be constructed to house the D5 and D6 diesel generators, support equipment, and new switchgear for Unit 2. Section 4.0 of the Design Report discusses the design and installation of the new D5/D6 Building and support system and deals with structural engineering problems. The D5/D6 Building will be an above-grade seismic Category I reinforced concrete structure, designed to withstand design basis load combinations, and located along the west wall of the Auxiliary Building (Column Row 15) between Column Rows G and K, with approximate dimensions of 68 x 124 x 61 ft high including penthouses. The D5/D6 Building will not be connected structurally to the existing main plant Auxiliary Building and Turbine Building. On April 16, 1991 the licensee provided further information on this subject in response to the staff's request of February, 1991. (Reference 2)

EVALUATION

The following provides our evaluation and findings based on our review of licensee's submittals.

The criteria used in the analysis, design and construction of the D5/D6 Building to account for anticipated loadings and postulated conditions that may be imposed upon the structure during its service lifetime are in conformance with established criteria, codes, standards, and specifications acceptable to the staff. This includes meeting the updated positions of the Structural and Geosciences Branch on seismic forces, tornado loads and probable maximum precipitation concerns.

The loads and load combinations used in the design of the D5/D6 Building are as conservative as those specified in Section 3.8.4 of the Standard Review Plan. The design response spectra of Regulatory Guide 1.60 are used as seismic design ground motion in two horizontal directional and the vertical direction, with zero period acceleration of 0.06g for OBE and 0.12g for SSE. The design ground motion is applied at the building foundation level. Tornado loads used in the design consist of (1) a lateral force caused by a funnel of wind having a rotational speed of 290 mph and a maximum translational speed of 70 mph, (2) a pressure drop of 3.0 psi with the rate of pressure drop of 2.0 psi/sec., and (3) a list of tornado generated missiles which is consistent with Section 3.5.3 of the Standard Review Plan.

The new D5/D6 Building is structurally independent from the Auxiliary Building to its east side and to the Turbine Building on the north side. The foundation for the new building is also independent. A 1/2 inch clear distance between the D5/D6 Building and the Turbine Building, and 2 inch clear distance between the D5/D6 Building and the Auxiliary Building are designed to permit maximum out-of-phase displacements of the buildings due to wind or seismic events.

The new D5/D6 Building has four separate roof slabs. The main roof slab is insulated and sloped to collect roof drainage at four locations. The remaining roof slabs are also insulated and gently sloped to discharge roof drains on to the main building roof. The water from the main roof is collected by four roof drains and discharged to the plant drainage system. Because of the flat roof construction and lack of parapet or curbs, water will run off the roof from the sides if the roofs drains get plugged and no ponding on the roof slab will happen. The design of the D5/D6 Building roof complies with the requirements of the Generic Letter 89-22 which involves design for probable maximum precipitation.

#### CONCLUSION

Based on the staff evaluation of licensee's submittals, the design of the new D5/D6 Building as stated in the design report for the Station Blackout/Electrical Safeguards Upgrade Project meets the requirements of Standard Review Plan Sections 3.3.2, 3.5.3, 3.7.1 and 3.8.4 and complies with current positions of the Structural and Geosciences Branch. The staff concludes that the design report is acceptable and that all structural issues related to the Station Blackout/Electrical Safeguards Upgrade Project are resolved.

#### Reference:

1. Letter from T. M. Parker of Northern States Power Company to NRC, dated November 27, 1990. Subject: Design Report for the Station Blackout/Electrical Safeguards Upgrade Project.
2. Letter from T. M. Parker of Northern States Power Company to NRC, dated April 16, 1991. Subject: Reply to Questions on Design Report for the Station Blackout/Electrical Safeguards Upgrade Project.

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