

September 4, 2003

MEMORANDUM TO: Geoffrey E. Grant, Director
Division of Reactor Projects
Region III

FROM: Ledyard B. Marsh, Director /RA/
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 2 -
RESPONSE TO TIA 2001-10 - "DESIGN BASIS ASSUMPTIONS FOR
ABILITY OF PRAIRIE ISLAND, UNIT 2, EMERGENCY DIESEL
GENERATORS TO MEET SINGLE FAILURE CRITERIA FOR
EXTERNAL EVENTS" (TAC NO. MB2953)

EXECUTIVE SUMMARY

By memorandum dated September 7, 2001, you requested technical assistance from the Office of Nuclear Reactor Regulation (NRR) regarding an issue related to design-basis assumptions for the Prairie Island Nuclear Generating Plant (PINGP), Unit 2, emergency diesel generators (EDGs) to meet single failure criteria for external events.

The NRR staff sent letters to the Nuclear Management Company, LLC (the licensee), dated January 16 and December 30, 2002, providing the licensee an opportunity to comment on Task Interface Agreement (TIA) 2001-10. The licensee responded by letters dated March 18, 2002, and April 21, 2003. The NRR staff has reviewed the licensee's letters. A meeting was held on April 24, 2003, between the NRR staff and the Office of the General Counsel (OGC) staff to discuss the technical and legal aspects of TIA 2001-01.

The NRR staff concludes that the PINGP Unit 2 emergency alternating current (AC) power system is not required to meet single failure criteria coincident with certain external events (e.g., flood conditions).

BACKGROUND

PINGP was designed and constructed prior to the issuance of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50. PINGP was designed to meet the intent of the Atomic Energy Commission's (AEC's) General Design Criteria (GDCs), as originally proposed in July 1967. Construction of the plant was about 50 percent complete and the Final Safety Analysis Report (FSAR) had been filed with the AEC before publication of the AEC's revised GDCs in February 1971 and July 1971.

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The AEC did not require the applicant to reanalyze the plant or resubmit the FSAR. However, the AEC's technical review did assess the plant against the GDCs in effect at the time, and the AEC was satisfied that the plant design generally conformed to the intent of these criteria.

PINGP was originally licensed with only two EDGs. By letter dated April 13, 1989, the licensee committed to (1) add two additional safeguards EDGs, (2) upgrade the safeguards electrical distribution system, and (3) support compliance with the station blackout (SBO) rule in 10 CFR 50.63.

RISK SIGNIFICANCE

Relating to risk significance, you stated that “[t]his issue has no effect on the SDP [significant determination process] for an issue with an emergency diesel generator because unrelated failures of other equipment (such as assumed for single failure criteria) is not assumed in an SDP.”

REQUESTED ACTION

Your requested action was the following: “From a design and licensing basis perspective for system functional capability, is the Unit 2 emergency AC power system required to meet single failure criteria for external events such as a flood even though the rest of the plant may not be required to?”

STAFF EVALUATION

Original Licensing Basis

The Commission, in a Staff Requirement Memorandum (SRM) dated September 18, 1992, stated that “the staff will not apply the General Design Criteria (GDC) to plants with construction permits issued prior to May 21, 1971.” The licensee’s construction permits were issued in 1968. Therefore, the GDCs are not requirements for the licensee and are not part of the original licensing basis.

The licensee’s FSAR states that PINGP was “designed and constructed to comply with Northern States Power’s (NSP’s) understanding of the intent of the AEC General Design Criteria for Nuclear Power Construction Permits, as proposed on July 10, 1967.” The FSAR description of the 1967 AEC GDCs, as applied to the plant design, comprises part of the PINGP licensing basis.

PINGP’s FSAR Section 1.5, Criterion 2, “Performance Standards,” states the following:

Those systems and components of reactor facilities which are essential to the prevention of accidents which could affect the public health and safety or to mitigation of their consequences shall be designed, fabricated, and erected to performance standards that will enable the facility to withstand, without loss of the capability to protect the public, the additional forces that might be imposed by natural phenomena such as earthquakes, tornadoes, flooding conditions, winds, ice, and other local site effects. The design bases so established shall reflect: (a) appropriate consideration of the most severe of these natural phenomena that have been recorded for the site and the surrounding area and (b) an appropriate margin for withstanding forces greater than

those recorded to reflect uncertainties about the historical data and their suitability basis for design.

PINGP's FSAR Section 1.5, Criterion 39, "Emergency Power for Engineered Safety Features," states the following:

Alternate power systems shall be provided and designed with adequate independency, redundancy, capacity, and testability to permit the functioning required of the engineered safety features. As a minimum, the onsite power system and offsite power system shall each, independently, provide this capacity assuming a failure of a single active component in each power system.

A review of the FSAR description of applicability of the 1967 AEC GDCs to the plant and a review of the specific FSAR sections pertaining to the electrical power system did not reveal that the emergency AC power system is required to meet single failure criteria coincident with external events.

The staff's safety evaluation for PINGP was issued September 28, 1972, supplemented March 21, April 30, and May 31, 1973. As with the FSAR, the safety evaluation treats the single failure criteria separately from criteria related to protection against environmental effects. The staff reviewed the electrical power system with respect to compliance with single failure criteria in Chapter 8 of the safety evaluation. Except for noting the seismic classification of the structures housing the EDGs, external events were not mentioned in this part of the review. The staff made separate findings regarding protection against environmental effects. The staff's safety evaluation did not indicate that the emergency AC power system is required to meet single failure criteria coincident with external events.

In summary, neither the GDCs, the FSAR, or the staff's September 28, 1972, safety evaluation, specify that the emergency AC power system is required to meet single failure criteria coincident with an external event.

The Effect of EDG Modifications on the Licensing Basis

The licensee modified PINGP to add two new EDGs in the early 1990s. The specific plant modifications included the addition of the D5/D6 EDGs, the construction of a new diesel generator building, and an upgrade to the electrical safeguards. The licensee made various submittals to the NRC staff regarding the modification. In the TIA, you identified the licensee's "Design Report for the Station Blackout/Electrical Safeguards Upgrade Project," dated September 23, 1993, and the NRC staff's "Prairie Island SBO/ESU Projects Evaluations," dated April 28, 1992, as potential relevant documents related to the effect of the plant modification on the PINGP licensing basis. The staff thoroughly reviewed these two documents. Neither the GDCs, specific Standard Review Plan (SRP) sections, or other guidance pertaining to natural phenomena (with the exception of seismic qualification standards) are identified in the Design Report with respect to the emergency AC power system. Therefore, the design basis with respect to the emergency AC power system does not include external events coincident with a single failure.

With respect to the D5 and D6 EDG building, the design criteria specified in the September 23, 1993, Design Report for the building itself includes all the current GDCs, including GDC-2, and related SRP sections pertaining to GDC-2.

With respect to the upgrade of the electrical safeguards and distribution systems, the licensee's Design Report states that for new plant components and systems, the Class 1E system design will comply with SRP 8.1, "Electrical Power - Introduction" (general requirements), and SRP 8.3.1, "AC Power Systems (On-Site)," among other criteria.

In summary, the licensee's modification to its plant to add two new EDGs did not change the design basis as set forth in the PINGP FSAR for either the existing EDGs or the new EDGs with respect to external events. The modification did have the effect of changing the licensing basis with respect to the new diesel generator building and the new plant components designated Class 1E located in the new building with respect to external events. None of these changes, however, had the effect of requiring that the emergency AC system meet single failure criteria coincident with an external event.

STAFF CONCLUSION

The staff concludes that the PINGP, Unit 2 emergency AC power system is not required to meet single failure criteria coincident with certain external events, such as flood conditions.

Docket No. 50-306

cc: A. Blough, Region I
L. Plisco, Region II
A. Howell, Region IV

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