Nebraska Public Power District

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

Subject: Generic Letter 94-02
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

Reference: 1. Generic Letter 94-02, "Long-Term Solutions and Upgrade of Interim Operating Recommendations for Thermal-Hydraulic Instabilities in Boiling Water Reactors", dated July 11, 1994.

2. Letter, A. Thadani (NRC) to L. A. England (BWROG), "Acceptance for Referencing of Topical Reports (NEDO-31960 and NEDO-31960, Supplement 1, "BWR Owner's Group Long-Term Stability Solutions Licensing Methodology," dated July 12, 1993).

Gentlemen:

On July 11, 1994, the NRC issued Generic Letter 94-02 which requests that all BWR licensees, except for Big Rock Point, to review their current procedures and training programs and to modify them as appropriate to strengthen the administrative provisions intended to avoid power oscillations or to detect and suppress them if they occur prior to implementation of the long-term solutions. The Generic Letter further requires that each holder of an operating license for a BWR (except for Big Rock Point) provide within sixty (60) days of the letter the licensee's plans and status with respect to the actions requested in the letter. In accordance with 10 CFR 50.54(f), the Nebraska Public Power District (District) hereby provides its response to NRC Generic Letter (GL) 94-02 for Cooper Nuclear Station (CNS).

Ensure procedural requirements exist for initiation of a manual scram under all operating conditions when all recirculation pumps trip (or there are no pumps operating) with the reactor in the RUN mode.

Abnormal Procedure 2.4.2.2.1, "Trip of Reactor Recirculation Pumps," requires, as an immediate operator action, that the reactor be scrammed if both recirculation pumps trip and reactor power is greater than 1% of rated thermal power.

Ensure that operators are aware of the potential for very large power oscillations and the potential for exceeding thermal safety limits before automatic protection systems function following the trip of all recirculation pumps.

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Industry events lesson INT023-99-31 provides a history of all instability issues and the BWROG interim recommendations for instability management. This lesson was covered during requalification cycle 94-14. Lesson INT023-99-33 has been developed for future presentation of instability training.

In addition, the actions required to avoid or to respond to thermal-hydraulic instability are covered in the following simulator lesson plans.

SKL051-51-11, "Single Recirculation Pump Trip/Instability Region Operation/Loss of 161 KV Line/Plant Shutdown"

SKL051-51-23, "Recirc Pump Seal Failure/Single Loop Operation"

SKL051-51-32, "Flow-Power Instability/Fuel Clad Failure"

SKL051-51-47, "Jet Pump Failure/Tech Spec LCO Shutdown"

SKL012-44-09, "Recirc Pump Trip/Instability Region Operation/Recirc Pump Restart"

SKL012-44-11, "Recirc Pump Runback/Loss of Both Recirc Pumps"

Ensure that factors important to core stability characteristics (e.g., radial and axial peaking, feedwater temperature, and thermal hydraulic compatibility of mixed fuel types) are controlled within appropriate limits consistent with the core design, power/flow exclusion boundaries, and core monitoring capabilities of the reactor in question.

The current CNS core reload design change placed an emphasis on ensuring that the reactor core meets all of the design limits (all parameters are within the allowed ranges) and assessed the impact of any cycle differences on the thermal limits and the appropriate transient behaviors. The current fuel design uses GE-9 fuel which is the most stable of the currently available fuel types. The other types of fuel available (i.e., GE-10, GE-11, etc.) have less stability than the GE-9 currently used. The District has no plans to introduce a less stable fuel type than that currently in use, especially since stability is further reduced when the core consists of two product lines.

Ensure that factors important to core stability characteristics are controlled through procedures governing changes in reactor power, including startup and shutdown, particularly at low-flow operating conditions. Determine if instability can be avoided by these procedures and if the procedures can be carried out using existing instrument information.

Abnormal Procedure 2.4.1.6, "Abnormal Neutron Flux Oscillations Or Operation In The Instability Region," provides the primary guidance for control of the reactor in or near the region of thermal hydraulic instability. A power flow map which shows the region of thermal-hydraulic instability is included in Procedure 2.1.10. Additionally, the following procedures provide instruction on avoidance of the region of potential thermal hydraulic instability or prescribe the actions to be taken upon entry into the region of potential thermal hydraulic instability:

General Operating Procedure 2.1.1, "Startup Procedure"

General Operating Procedure 2.1.4, "Normal Shutdown From Power"

Abnormal Procedure 2.4.1.7, "Unexplained Decrease In Reactor Power"

General Operating Procedure 2.1.10, "Station Power Changes"

Abnormal Procedure 2.4.2.2.1, "Trip Of Reactor Recirculation Pumps"

Abnormal Procedure 2.4.2.2.2, "Reactor Recirculation Flow Control System Failure"

System Operating Procedure 2.2.68, "Reactor Recirculation System"

The use of these procedures and the installed instrumentation to detect and suppress instability is covered in dynamic simulator training as well as classroom and static simulator training.

If it is concluded that a near-term upgrade of core monitoring capability is called for to ease the burden on operators, determine the need to incorporate on-line stability monitoring or monitors for stability sensitive parameters and inform the NRC of the schedule and technical evaluation for such upgrades found to be necessary.

The current procedures make use of existing instrumentation to provide the operators with the means to avoid the region of thermal-hydraulic instability. The procedures also provide guidance on actions to take when the region is entered, how to detect the onset of thermal-hydraulic instability, and what actions to take should instability be detected. The use of these procedures and the installed instrumentation to detect and suppress instability is covered in dynamic simulator training as well as classroom and static simulator training. An initial review of the stability monitors currently available indicate that installation of such a system would involve similar cost and require similar lead time to install as the long-term solution design change being developed. For these reasons, the installation of a stability monitor for the interim period until a long-term solution has been installed is not of benefit to the operators.

Develop and submit to the NRC a plan for long-term stability corrective actions, including design specifications for any hardware modifications or additions to facilitate manual or automatic protective response needed to ensure that the plant is in compliance with General Design Criteria 10 and 12. An acceptable plan could provide for implementing one of the long-term stability solution options proposed by the BWROG and approved by the NRC. The plan should include a description of the action proposed and a schedule of any submittal requiring plant-specific design review and approval by the NRC and an installation schedule. The plan should also address the need for near-term and long-term Technical Specification modifications. Generic BWROG documents or planned submittal may be referenced in the plan.

The NRC requirement for thermal-hydraulic instability long-term corrective action was originally presented in NRC Bulletin 88-07 Supplement 1 (December 30, 1988). The Bulletin acknowledged that the NRC was working with the BWR Owner's Group (BWROG) to develop generic approaches to resolve this issue. The resulting BWROG efforts have led to the solution concepts and supporting methodology described in NEDO-31960 and NEDO-31960, Supplement 1, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology." NRC acceptance of the BWROG developed solutions and supporting methodology was provided in the a letter from A. Thadani to L. A. England, dated July 12, 1993 (Reference 2).

Cooper Nuclear Station has elected to proceed with a solution which introduces new plant hardware/software to provide early detection of core thermal power oscillations and to initiate appropriate mitigation actions. This Long-Term Solution Stability System (LTSSS) features the Option III (OPRM) concept described in NEDO-31960 and NEDO-31969, Supplement 1. To complete this activity, CNS is participating with other utilities under a BWROG program and has contracted with ABB/Combustion Engineering to develop the hardware/software design and deliver the final product. Recommendations for Technical Specification changes will be provided as part of the program. These will be incorporated at CNS as appropriate. Implementation of this option is contingent upon NRC acceptance of the BWROG submittal on methodology and the BWROG-ABB/Combustion Engineering submittal on hardware and software.

The current schedule for completion of the joint design and licensing activities is provided in Attachment 1. The LTSSS hardware is scheduled to be available in the fall of 1995. The plan, as discussed at the July 21, 1994, Option III Owners meeting with the NRC, is for the first installation of the LTSSS to be in the fourth quarter of 1996. This allows appropriate time for engineering preparation for system installation. The Owners' Group recommendation is for all plants to operate with the Reactor Protection System (RPS) instability trip function disabled for at least six (6) months to evaluate the system performance, the potential for spurious trip signals, and to become familiar with the system's operation. The present Interim Corrective Actions (ICA) will be used during the period when the RPS trip is disabled. During this period, the alarm and trip alarm functions will be operational to increase the operator's ability to recognize an instability event. Upon successful completion of the evaluation period, the RPS trip function will be enabled and the system declared operational. The ICAs will then be replaced by appropriate operational procedures and the Technical Specifications modified to reflect the installation of LTSSS as a new Reactor Protection System.

Assuming that the joint development and NRC acceptance is completed as scheduled, it is the District's intention to have the LTSSS installed at CNS by June 1, 1997, and, following acceptance testing, to have it operational by December 1, 1997.

Sincerely,

G. R. Horn
Vice-President, Nuclear

/nr

cc: Regional Administrator
USNRC - Region IV
Arlington, Texas

NRC Resident Inspector
Cooper Nuclear Station

NPG Distribution

STATE OF NEBRASKA)
)
PLATTE COUNTY)

G. R. Horn, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this response on behalf of Nebraska Public Power District; and that the statements contained herein are true to the best of his knowledge and belief.

G. R. Horn

Subscribed in my presence and sworn to before me this 9th day of September, 1994.

NOTARY PUBLIC

GENERAL NOTARY-State of Nebraska
RITA L. GOFF
My Comm. Exp. Dec. 19, 1996

ATTACHMENT 1

DESIGN AND LICENSING SCHEDULE
(ABB/CE OPTION III)

Second Quarter/94	Initiate design work (ABB/CE)
Third Quarter/94	Meet with the NRC on hardware/software development process
Fourth Quarter/94	Option III hardware/software topical report submittal (ABB/CE)
First Quarter/95	Detect and suppress topical report submittal (first time application reload review)
Third Quarter/95	NRC approval of Option III Licensing topical and generic Technical Specification
Third Quarter/95	Start Option III initial plant installation engineering preparation
Fourth Quarter/95	System design and development complete
Fourth Quarter/96	Option III initial plant installation (LaSalle 2) outage start
Refuel Outage 17/97	Option III installation at Cooper Nuclear Station