



## Nebraska Public Power District

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NLS970016  
January 28, 1997

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555-0001

Gentlemen:

Subject: Response to NRC Generic Letter 96-06  
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

Reference: 1. NRC Generic Letter 96-06 dated September 30, 1996, "Assurance of Equipment Operability and Containment Integrity during Design-Basis Accident Conditions"

2. Letter to USNRC from G. R. Horn (NPPD) dated October 28, 1996, "Response to NRC Generic Letter 96-06"

This submittal provides the Nebraska Public Power District's (District's) 120 day response to NRC Generic Letter (GL) 96-06 (Reference 1). Per Reference 2, the District committed to determining if:

1. Containment air cooler cooling water systems are susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions.
2. Piping systems that penetrate the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.

Following this determination, the District committed to informing the NRC of the conclusions reached, the specific circumstances for the affected systems, the basis for continued operability of affected systems and components, as applicable, and a summary of corrective actions taken or planned.

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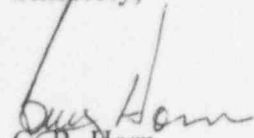
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In summary:

- Containment air cooler cooling water systems are not susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions.
- Six safety-related containment penetrations are susceptible to the affects of thermal overpressurization. An evaluation of the structural integrity of the bounding configuration demonstrates that continued operability is assured for all six penetrations. Additional evaluation is under way to further quantify the impact to the six affected penetrations and to establish the required corrective actions. A follow up response will be provided to the NRC by March 28, 1997, describing the results of this evaluation and the corrective actions planned or taken to resolve this issue.

Attachment 1 provides additional details supporting the above conclusions. Should you have any questions concerning this matter, please contact me.

Sincerely,



G. R. Horn  
Senior Vice President  
of Energy Supply

/crm  
Attachment

cc: Regional Administrator  
USNRC - Region IV

Senior Project Manager  
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector  
USNRC

NPG Distribution

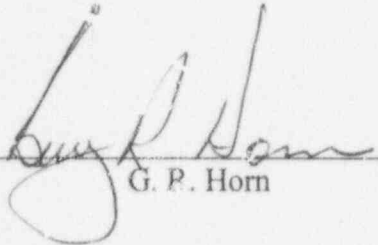
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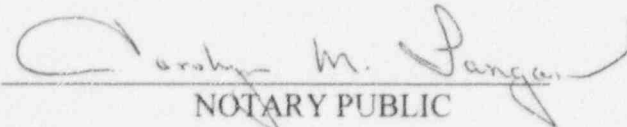
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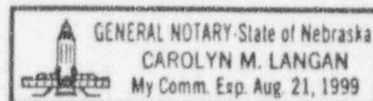
STATE OF NEBRASKA     )  
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G. R. Horn, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized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

  
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G. R. Horn

Subscribed in my presence and sworn to before me this 28th day of January, 1997.

  
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NOTARY PUBLIC



**ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT  
INTEGRITY DURING DESIGN-BASIS ACCIDENT CONDITIONS  
(NRC GENERIC LETTER 96-06)**

Background

Generic Letter 96-06 documents three concerns:

- 1) Cooling water systems serving the containment air coolers may be exposed to the hydrodynamic effects of waterhammer during either a loss-of-coolant accident (LOCA) or a main steamline break (MSLB). These cooling water systems were not designed to withstand the hydrodynamic effects of waterhammer and corrective actions may be needed to satisfy system design and operability requirements.
- 2) Cooling water systems serving the containment air coolers may experience two-phase flow conditions during postulated LOCA and MSLB scenarios. The heat removal assumptions for design-basis accident scenarios were based on single-phase flow conditions. Corrective actions may be needed to satisfy system design and operability requirements.
- 3) Thermally induced overpressurization of isolated water-filled piping sections in containment could jeopardize the ability of accident-mitigating systems to perform their safety functions and could also lead to a breach of containment integrity via bypass leakage. Corrective actions may be needed to satisfy system operability requirements.

These concerns, as they apply to Cooper Nuclear Station (CNS), are addressed in the following sections.

Waterhammer

During normal operation, cooling to the CNS containment is provided by four air coolers. Cooling water to the air coolers is provided by the Reactor Equipment Cooling (REC) system. This system is divided into two subsystems:

1. The critical supply loops which serve the safety-related heat loads; and
2. The non-critical supply loops which serve the nonsafety-related heat loads.

The containment air coolers are nonsafety-related heat loads and, hence, are supplied by the non-critical REC supply loops. Accordingly, the containment air coolers are not required to mitigate the consequences of either a LOCA or a MSLB.

While no credit is taken for the containment air coolers in mitigating the consequences of a LOCA or MSLB, an evaluation was performed to determine susceptibility to waterhammer events. This evaluation identified a LOCA with a concurrent loss of off-site power (LOOP) as being the worst case scenario (i.e., without a concurrent LOOP, REC flow through the containment air coolers would be maintained). The results of this evaluation demonstrate that, with a concurrent LOOP, no significant boiling (i.e., of sufficient magnitude to create the potential for a waterhammer event) will occur in either the REC piping or the cooling coils of the containment air coolers<sup>1</sup>. Therefore, a waterhammer event resulting from the collapse of steam voids as described in GL 96-06 will not occur.

#### Two-Phase Flow in Safety-Related Piping and Components

As noted above, no significant boiling will occur and, hence, two-phase flow as described in GL 96-06 will not occur.

#### Overpressurization of Isolated Piping

A review of all containment penetrations was performed to identify those piping segments that are normally isolated or that isolate in response to a valid LOCA signal. Only those completely filled with water were considered as the compressibility of either gas or steam will naturally limit the potential pressure increase to acceptable limits. The following penetrations were identified as a result of this review:

<u>Penetration No (1)</u>	<u>Size</u>	<u>Description</u>
X8	3"	Main Steam Drainline
X12	20"	Residual Heat Removal Shutdown Cooling Suction
X14	6"	Reactor Water Clean-Up Suction
X18	3"	Drywell Equipment Sump Discharge
X19	3"	Drywell Floor Sump Discharge
X20	4"	Demineralized Water Header Supply (2)
X41	3/4" - 1"	Reactor Recirculation Sample Line

#### Notes

- (1) A complete loss of plant instrument air was assumed in developing this listing due to the fact that the station air compressors are non-essential and will be de-energized following a LOOP.
- (2) Manually isolated whenever containment integrity is required.

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<sup>1</sup> NEDC 97-013, "Determination of REC's Boiling Potential in Piping within Containment during a LOCA/LOOP Event"

Of these penetrations, six were subsequently determined to be susceptible to the affects of overpressurization (specifically X8, X12, X14, X18, X19, and X20). An evaluation of the structural integrity of the bounding configuration demonstrates that, while minor yielding will occur (on the order of 4% or less<sup>2</sup>), continued operability is assured for all six penetrations. Therefore, while these penetrations are susceptible to overpressurization, the safety-significant concerns described in GL 96-06 will not occur.

Additional evaluation is under way to further quantify the impact of the six affected penetrations and to establish the required corrective actions. A follow up response will be provided to the NRC by March 28, 1997, describing the results of this evaluation and the corrective actions planned or taken to resolve this issue.

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<sup>2</sup> NEDC 96-058, "Evaluation of the Overpressurization Potential for Isolated Penetrations in Accordance with GL 96-06"

Correspondence No: NLS970016

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Licensing Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
Additional evaluation is under way to further quantify the impact to the six affected penetrations and to establish the required corrective actions. A follow up response will be provided to the NRC describing the results of this evaluation and the corrective actions planned or taken to resolve this issue.	March 28, 1997