Nebraska Public Power District

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NSD921014
September 28, 1992

Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Response to NRC Generic Letter 92-04
Resolution of the Issues Related to
"Reactor Vessel Water Level Instrumentation in BWR's"
Cooper Nuclear Station
NRC Docket 50-298, DPR-46

Gentlemen:

NRC Generic Letter (GL) 92-04, Resolution of the Issues Related to "Reactor Vessel Water Level Instrumentation in BWR's", was issued on August 19, 1992. The Generic Letter contains requested actions and reporting requirements regarding the adequacy of, and corrective actions for BWR water level instrumentation with respect to the effect of noncondensible gases on system operation.

As requested by the Generic Letter, attached is the Nebraska Public Power District's (District) response to the requested actions contained in the NRC Generic Letter 92-04. This response is submitted under oath in accordance with the provisions of 10 CFR 50.54(f).

Please contact me at this office if you have any questions.

Sincerely,

G. R. Horn
Nuclear Power Group Manager

GRH/tja:GL92-04
Attachment

cc: NRC Regional Office
Region IV
Arlington, TX

NRC Resident Inspector
Cooper Nuclear Station

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STATE OF NEBRASKA)
)ss
PLATTE COUNTY)

G. R. Horn, bei 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 28th day of September, 1992.

NOTARY PUBLIC

GENERAL NOTARY-State of Nebraska
ALOIS J. HUBL
My Comm. Exp. Aug. 21, 1995

NEBRASKA PUBLIC POWER DISTRICT'S RESPONSE TO GENERIC LETTER 92-04 RESOLUTION OF THE ISSUES RELATED TO "REACTOR VESSEL WATER LEVEL INSTRUMENTATION IN BWRs"

INTRODUCTION

On August 19, 1992, the NRC issued Generic Letter 92-04, Resolution of the issues related to "Reactor Vessel Water Level Instrumentation in BWRs." The Generic Letter required licensee's to provide a written response to the following requested actions by September 27, 1992. The following is the Nebraska Public Power District's Response to those requested actions.

Requested Actions

1. In light of potential level indication errors from the effects of noncondensible gas, each licensee should determine:

   a. The impact of potential level indication errors on the automatic system response during all licensing basis transients and accidents.

      RESPONSE:

      The BWR Owners' Group (BWROG) provided to the NRC and each of the member utilities a report[1] which addresses the safety impact of potential water level indication errors on automatic system response during all licensing basis transients and accidents. The analysis basis is contained in Section 6.0, Safety Analysis, of the report and is summarized in Section 2.2, Plant responses to Postulated Accident Scenarios. It is the Nebraska Public Power District's (District) position that the information in the BWROG report is applicable to the design of Cooper Nuclear Station (CNS). This conclusion is based on our review of the report and the evaluation made by General Electric as contained in Attachment 2 to the report.

      The District recognizes that there are differences between the designs of BWR plants and systems; however, our review of the report and the Attachment 2 conclusions reinforce CNS's general understanding that the basic plant response to design basis transients and accident events is sufficiently similar to obviate the need for additional plant unique detailed re-analysis.

      Additionally, the CNS design incorporates features that are more conservative than those evaluated in the BWROG report, including the initiation of automatic safety system actuation for Emergency Core Cooling Systems (ECCS) from hot leg instrumentation, and a qualified system for backfilling reactor water level indication cold reference legs (flow diagram enclosed as Figure 1 to the Attachment). The CNS ECCS automatic initiation signals originate from instrumentation that utilize hot

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[1] BWROG Report, "BWR Reactor Vessel Water Level Instrumentation", Revision 1, August 28, 1992.

(Yarway) reference legs. These Yarway instruments provide the signals for Diesel Generator start, HPCI/RCIC start, Core Spray injection, RHR LPCI injection, ADS initiation, Reactor Recirculation Pump Trip, ARI initiation, and also provide Group 1 and 7 isolations as described in the CNS Technical Specifications. As such, the CNS ECCS actuation would not be affected by the potential noncondensible gas phenomenon in the cold references legs. These Yarway indicators/switches are located on local instrument racks at CNS and can be accessed and monitored depending on the circumstances surrounding the transient or accident event. The qualified system for backfilling reactor water level indication cold reference legs uses the Core Spray System to inject water into the divisional cold reference legs. This design[2] and approval[3] was to eliminate flashing and boil-off of water from cold reference legs in response to NUREG 0737, item II.F.2. However, this system could be used to backfill the cold reference legs during potential water level indication errors caused by noncondensible gas buildup in the cold reference legs during depressurization events.

b. The impact of potential level indication errors on operator's short and long term actions during and after all licensing basis accidents and transients;

RESPONSE:

The BWROG report addresses, in Section 6.9, Operator Responses, the operator actions that could be anticipated in response to potential water level indication errors. An evaluation was conducted that verified that CNS is conservatively bounded by the BWROG report[1]. Further reviews have verified that station procedures provide for proper short and long term operator actions during all licensing basis accidents and transients. These procedures include instructions for responding to indeterminate water level indications, including reactor vessel flooding (EOPs). Additionally, CNS operators have procedures available for their use that allow backfilling of the cold reference legs of water level instrumentation. These procedures, 4.6.1 "Reactor Vessel Water Level Indication", and (EOP) 5.8.19 "Reference Leg Injection", are available for the operator to assure the recovery of any instrumentation that may have lost water level indication. These procedures have been augmented by special guidance and training as detailed in 2.b below.

c. The impact of potential level indication errors on operator actions prescribed in emergency operating procedures or other affected procedures not covered in (b).

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[2] Letter from J.M. Pilant (NPPD) to D.B. Vassallo (USNRC) dated May 31, 1985 NPPD, Cold Reference Leg Modifications to Comply with NRC Generic Letter 84-23.

[3] Letter from D.B. Vassallo (NRC) to J.M. Pilant (NPPD) dated August 21, 1985, NRC Safety Evaluation Report (SER) Inadequate Core Cooling Instrumentation.

RESPONSE:

As stated in Section 6.9 of the BWROG report[1], and addressed in the BWROG letter[4], and as discussed in response 1.b above, plant operators have adequate information in the present CNS procedures, as augmented by the additional guidance and training detailed in 2.b below. CNS will continue to follow any recommendations provided by the Emergency Procedure Committee (EPC) for implementation of additional guidance addressing potential water level indication errors. These possible recommendations will take into account the information from the BWROG program of analysis and testing regarding this issue as detailed in the BWROG letter[4].

2. Based upon the results of (1), above, each licensee should notify the NRC of short term actions taken, such as:

a. Peridic monitoring of level instrumentation system leakage;

RESPONSE:

Historical data of reactor depressurization events at CNS have been examined for the possible effects of noncondensible gases on reactor water level indications. Evaluation of this data determined that reactor water level indication anomalies potentially attributable to noncondensible gases, occurring during normal depressurization, are limited to less than 5 inches and only occur at reactor pressures less than 100 psig. These anomalies in reactor water level instrumentation do not present a concern to the safety of operation of the plant. Additionally, enhanced monitoring of reactor water level indications was utilized during two recent normal reactor depressurizations. This enhanced monitoring has not indicated any reactor water level indication anomalies potentially attributable to noncondensible gas phenomenon above reactor pressures of 100 psig. Below reactor pressures of 100 psig CNS has noticed some minute anomalies that could be attributable to noncondensibles however, these minute anomalies were less than 5 inches difference between divisional instruments and presented no safety or operational concern to the plant. The District will continue this enhanced monitoring of reactor water level instrumentation until this issue is resolved.

Reactor Pressure Vessel water level reference leg sensing lines, both inside and outside containment, have been examined for proper configuration. A five foot horizontal run of tubing at an instrument rack was found bent downward (sagging) and was replaced during a recent plant shutdown.

Methods, procedures, and training for monitoring reactor water level instrumentation system leakage were evaluated and found to be thorough and effective. These include procedures that require instrument rack inspections during reactor startup and routine inspections following all instrument valve manipulations (e.g., during monthly surveillances). Personnel performing these inspections are VT-2 qualified and receive additional training that ensures that they are aware of the need and

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[4] Letter form BWROG to USNRC dated September 24, 1992, "Reactor Water Level Instrumentation".

reason for checking for leaks. Additionally, other activities, such as radiation control practices, management, supervisory, system engineers, and operator tours contribute to ensuring that leaks are identified. Leaks found are documented and tracked to ensure that corrective action is timely and comprehensive. Together, these activities are considered a major element contributing to the apparent lack of the major noncondensible gas phenomenon in reactor water level indication at CNS.

b. Implementation of procedures and operator training to assure that potential level errors will not result in improper actions;

RESPONSE:

CNS personnel are currently trained in the use of CNS procedures 4.6.1 "Reactor Vessel Water Level Indication" and (EOP) 5.8.19 "Reference Leg Injection" to assure the recovery of any instrumentation that may have lost water level indication. Personnel are also trained in the use of the EOPs that instruct the operator to reflood the vessel in the event that water level is indeterminate.

Additionally, operators have been provided training (in the form of tailgate sessions) and written guidance that; 1) describes the theory and postulated effects of noncondensible gases in reactor water level instrument reference legs, 2) addresses how existing procedures provide guidance to ensure that proper operator actions are taken in response to the effects of the phenomenon, and 3) identifies the instruments, and their functions, that are potentially effected.

3. Each licensee should provide its plans and schedule for corrective actions, including any proposed hardware modifications necessary to ensure the level instrumentation system design is of high functional reliability for long term operation;

RESPONSE:

The District endorses the BWROG plans originally provided in the BWROG letter to the NRC on August 12, 1992[5]. The District also reaffirms support of the BWROG plans by endorsing the BWROG letter of September 24, 1992[4]. If the BWROG program indicates that modifications and/or procedure changes are necessary, the District will review such modifications and/or procedures changes against the current CNS configuration such as the Core Spray cold reference leg injection, and ECCS actuation of the reactor water hot (Yarway) reference legs. If the District determines that additional modifications and/or procedure changes are necessary after this review, a schedule and description for such modifications and/or procedure changes will be provided at that time.

The District believes that hardware and procedure modifications should not be implemented at this time, until a better understanding of the underlying phenomenon and its significance relative to the performance of reactor water level instrumentation systems can be determined. Once this determination has

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[5] Letter from BWROG to USNRC dated August 12, 1992, "BWROG Reactor Water Level Instrumentation Long Term Action Plan".

been made, the District will evaluate potential alternatives to resolve this issue, and will review such modifications and/or procedures changes against the current CNS configuration, such as the Core Spray cold reference leg injection, and ECCS actuation off the reactor water hot (Yarway) reference legs.

SUMMARY

The District recognizes the importance of reliable water level instrumentation to confirm plant safety, and has taken interim actions to assure safe operation of CNS. Based on the BWROG assessment[1] of the issue, the BWROG is able to conclude, and the NRC has indicated concurrence, that a substantial safety hazard does not exist. In Generic Letter 92-04, the NRC has indicated that it would like the schedule for long term actions defined in the BWROG letter[5] to be accelerated. The District believes that the proposed schedule recognizes the need to resolve this issue as soon as possible, and that the schedule is realistic.

In closing, the District wishes to emphasize the fact, that CNS has not noticed this phenomenon of noncondensible gases in reactor level cold reference legs occurring during normal operation of the plant. CNS has noticed through review of historical data of reactor depressurization events, indication anomalies potentially attributable to noncondensible gases. However, these indication anomalies were limited to less than 5 inches and only occurred at reactor pressures less than 100 psig. Furthermore, enhanced monitoring of reactor water level indications were utilized during two recent normal reactor depressurizations at CNS. This enhanced monitoring has not indicated any reactor water level indication anomalies potentially attributable to noncondensible gas phenomenon above reactor pressures of 100 psig. Below reactor pressures of 100 psig CNS has noticed some minute anomalies that could be attributable to noncondensibles however, these minute anomalies were less than 5 inches difference between divisional instruments and present no safety or operational concern to the plant.

Additionally, the CNS design is somewhat unique in that CNS ECCS initiation signals transpire from instrumentation that utilize hot (Yarway) reference legs. These Yarway instruments provide the signals for Diesel Generator start, HPCI/RCIC start, Core Spray injection, RHR LPCI injection, ADS initiation, Reactor Recirculation Pump Trip, ARI initiation, and also provide Group 1 and 7 isolations as described in the CNS Technical Specifications. As such, the CNS ECCS actuation would not be affected by noncondensible gas phenomenon found in the cold references legs. These Yarway indicators/switches are located on local instrument racks at CNS and can be accessed and monitored depending on the circumstances surrounding the transient or accident event. CNS also has available for immediate operator use a qualified system for backfilling reactor water level indication cold reference legs. This system uses the Core Spray System to inject water into the divisional cold reference legs, and has been approved by the NRC. This system could be used to backfill the cold reference legs during potential water level indication errors caused by noncondensible gas buildup in the cold reference legs during depressurization events.

FIGURE 1
Attachment to
NSD921014