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October 22, 1996

ComEd

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

Subject: Zion Station Units 1 and 2
Response to Request for Additional Information
Operating Licenses DPR-39 and DPR-48
NRC Docket Nos. 50-295 and 50-304

Reference: 1) Letter from R. P. Tuetken, Commonwealth Edison, to U.S. Nuclear Regulatory Commission, dated July 26, 1996, - Application for Amendment to Facility Operating Licenses DPR-39 and DPR-48.

2) Letter from C. Y. Shiraki, U. S. Nuclear Regulatory Commission, to I. Johnson, Commonwealth Edison, dated October 18, 1996, Request for Additional Information

This letter provides Commonwealth Edison's (ComEd's) response to an NRC Request for Additional Information regarding a proposed amendment to the Zion Station Units 1 and 2 Facility Operating Licenses.

ComEd previously submitted, in Reference (1), a request to amend the Zion Station Technical Specifications. The proposed amendment would remove the requirements governing reactor coolant system pressure and temperature limits for heatup, cooldown, low temperature operation, and hydrostatic testing from the Technical Specifications. Such requirements would be governed by a ComEd controlled Pressure Temperature Limits Report (PTLR). The NRC subsequently issued a request for additional information (Ref. 2) concerning the proposed amendment. ComEd's response to the specific items in the NRC request is provided in the following attachments to this letter:

Attachment A — Item by item response to the information requested in Reference (2)

Attachment B — Zion Calculation No. 22S-B-004E-189, Revision 0, "Low Temperature Overpressure Protection (LTOP) Setpoint Calculation"

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Attachment C	Westinghouse letter CWE-93-181, dated October 4, 1993, "Evaluation of COMS Analyses"
Attachment D	Westinghouse Letter MSE-REME-0308, dated June 21, 1996, "Zion Units 1 and 2 Enable Temperature Calculations (including ASME Code Case N-514)"
Attachment E	Zion Calculation No. 22S-B-004E-192, Revision 0, "Wide Range RCS Cold Leg Temperature Indication Uncertainty"
Attachment F	Zion Calculation No. 22S-B-004E-166, Revision 0, "COMS/LTOP Pressure Instrument Loop Accuracy Calculation"

Please direct any questions you may have concerning this submittal to this office.

Respectfully,

G X Schwartz for

J. H. Mueller
Site Vice President
Zion Station

Attachments

cc: NRC Regional Administrator - RIII
Zion Station Project Manager - NRR
Senior Resident Inspector - Zion Station
Office of Nuclear Facility Safety - IDNS
IDNS Resident Inspector
Zion NLA
Reg. Assurance File
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ATTACHMENT A

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION

1. The WCAP-14040-NP-A analysis accounts for only a single reactor coolant pump (RCP) in LTOP operation. How does Zion justify running more than one RCP?

   RESPONSE: The operation of more than one RCP under LTOP conditions is acceptable because it is the startup of the first RCP that creates the limiting heat injection event. An immediate startup of additional RCPs, resulting in a higher heat input rate, was not included in the Westinghouse analysis because it is not considered to be a credible scenario.

   In typical secondary to solid water primary heat input scenarios, the pressure transient following the startup of a single RCP peaks in about 10 - 15 seconds, and the heat transfer from the steam generators to the RCS due to backflow is largely complete within the first minute. By comparison, the startup of an additional RCP could not reasonably occur for at least ten minutes following the startup of the first RCP. This time is required for the operator to acknowledge new alarms and reset those that have cleared, and for the operator to complete 2 - 3 pages of procedurally required checks of fluid, thermal, and electrical parameters associated with the RCS, the RCP, and supporting systems. Additionally, an RCP startup is a significant operational event, and the operators would not start any RCP unless the RCS pressure and temperature were relatively stable. Finally, if the startup of the first RCP was conducted at the lower end of the minimum allowed RCS temperature (as discussed in the response to Item 3.c), it may take 1 - 2 hours to reach a temperature which would permit starting an additional pump.

   Therefore, by the time an additional RCP could reasonably be started, the initial event, consisting of startup of the first RCP, is essentially over. For these reasons, the startup of the first RCP is considered as the design basis heat injection scenario, as stated in Section 3.1 of WCAP-14040-NP-A. Note that the NRC SER states (page i-6 of WCAP-14040-NP-A) that the most limiting case is the startup of an RCP in a single loop.

2. The proposed wording for LCO 3.3.2.G.3 verifies the 50 degree Fahrenheit temperature difference when starting the first RCP. Is this criteria also met when starting additional pumps?

   RESPONSE: The backflow from the first pump RCP started will ensure that compliance with the 50°F criteria is maintained if an additional pump is started. Prior to starting the first pump, the secondary side temperature of all steam generators will have to be less than 50°F higher than the RCS temperature.

After starting the first pump, the temperature of the RCS and the temperature of the secondary side of all steam generators will tend to equalize, due to backflow in the three other RCS loops. With backflow established, there are no plant operations which would cause the RCS and steam generator secondary side temperatures to diverge. Therefore it is not necessary for the Technical Specifications to require verification that the 50°F criteria is met when starting an additional pump.

3. Please submit calculations for :

   a) The pressure difference between the limiting location and the pressure transmitter as a result of static and dynamic head.

RESPONSE: A copy of Zion Calculation No. 22S-B-004E-189, Revision 0, is provided as Attachment B. This calculation validates continued use of the existing LTOP setpoint. Section 4.2 of the calculation shows the determination of the pressure difference between the limiting location and the pressure transmitter due to static head.

As indicated in Section 4.4 of the calculation, the pressure differences due to dynamic head were taken from page 11 of Westinghouse letter, CWE-93-181, dated October 4, 1993. A copy of this letter is provided as Attachment C.

   b) The LTOP PORV lift setpoint.

RESPONSE: The calculation provided as Attachment B was used to verify that the existing LTOP PORV setpoint of 407 psig is valid for the heatup and cooldown curves contained in the PTLR submitted in ComEd's amendment request and supplement, dated July 26, 1996, and October 10, 1996 respectively.

   c) The LTOP enable temperature.

RESPONSE: Calculation of the LTOP enable temperature was conducted in two parts. First, Westinghouse used ASME Code Case N-514 to calculate an enable temperature of 300.66°F. This calculation was transmitted to ComEd via letter MSE-REME-0308, dated June 21, 1996. A copy of this letter is provided as Attachment D.

ComEd then calculated a value of 7.595°F for instrument uncertainty and added it to the 300.66°F value determined by Westinghouse. A copy of this calculation, No. 22S-B-004E-192, Revision 0, is provided as Attachment E. Since the LTOP enable temperature obtained by adding the instrument uncertainty to the Westinghouse result was close to, and bounded by, the existing value of 320°F, ComEd decided to continue using 320°F as the LTOP enable temperature.

Include an explanation of how the 60 psig and 10 degree Fahrenheit conservatism, which are included in the current technical specification curves, are accounted for in these calculations.

RESPONSE: In accordance with the NRC SER (pages i-6 and i-7 of WCAP-14040-NP-A), the results of a pressure instrument uncertainty calculation were used in the PORV lift setpoint calculation, rather than using the 60 psig conservatism included in the current TS curves. The instrument uncertainty calculation, Zion Calculation No. 22S-B-004E-166, Revision 0, was conducted using ISA Standard 67.04-1994. A copy of this calculation is provided as Attachment F.

In accordance with the same NRC SER section, the results of a temperature instrument uncertainty calculation were used in determining the LTOP enable temperature, rather than using the 10°F conservatism included in the current TS curves. The instrument uncertainty calculation, Zion Calculation No. 22S-B-004E-192, Revision 0, was conducted using ISA Standard 67.04-1994. As previously noted, a copy of this calculation is provided as Attachment E.

Also discuss how the dynamic head effect during different pump configurations is accounted for and controlled at Zion

RESPONSE: Zion operating procedures specify the minimum RCS temperature for various RCP and RHR pump combinations. These restrictions are based on Westinghouse determined values for the dynamic pressure difference between the location of the LTOP controlling instrument and the limiting location in the vessel.

To determine the minimum allowable temperatures specified in the procedure, the pressure difference for each pump combination is added to the LTOP PORV setpoint (as well as values for PORV overshoot, static head, and instrument uncertainty), and the pressure/temperature curves are used to identify a corresponding minimum temperature for each combination. The Westinghouse determined values for the dynamic pressure difference are specified on page 11 of Attachment C.

4. Describe how the LTOP response time was accounted for in the LTOP analysis, and discuss the effects of more than one RCP running on response time and peak pressure.

RESPONSE: The time required for the PORV to stroke open was accounted for in Section 4.3 of the calculation that validated the LTOP setpoint (Attachment B). With the exception of the contribution from the Eagle-21 system, the instrument response time is accounted for in the Westinghouse analysis of the mass injection

transient, which is the most limiting transient analysis. As indicated on page 13 of the Westinghouse analysis of the mass injection transient (provided as Attachment C), the actuation delay caused by the Eagle-21 system was estimated to be 5 - 10 milliseconds, which has a negligible effect on the results of the analysis. Subsequent testing at Zion has confirmed that this estimate was valid.

The three contributors to the total LTOP response time (PORV stroke time, instrument response time, and Eagle-21 response time) are affected very little by the number of RCPs running. Therefore, running more than one RCP will have negligible effect on the total LTOP response time. As discussed in the response to Item 1, the operation of additional RCPs will not affect the peak pressure, since the peak will occur prior to starting an additional pump.

Attachment B

Zion Calculation No. 22S-B-004E-189, Revision 0