THE CINCINNATI GAS & ELECTRIC COMPANY

CINCINNATI, OHIO 45201

J. WILLIAMS, JR
SENIOR VICE PRESIDENT
NUCLEAR OPERATIONS

September 21, 1983
LOZ-83-0132

Docket No. 50-358

Mr. Harold Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

RE: WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1
REQUEST FOR ADDITIONAL INFORMATION: NUREG-0969

This letter is in response to NRC letter dated July 26, 1983 from Mr. B. J. Youngblood, which requested that additional information be provided in response to certain recommendations contained in NUREG-0969, "Report of the NRC Evaluation Team on the Quality of Construction at the Zimmer Nuclear Power Station". The enclosed responses will be reflected in a future revision to the FSAR.

Very truly yours,

THE CINCINNATI GAS & ELECTRIC COMPANY

By J. Williams, Jr.
J. WILLIAMS, JR.
SENIOR VICE PRESIDENT

SJT/sfr

ATTACHMENT

B001
1/1

cc: John H. Frye III
M. Stanley Livingston
Frank F. Hooper
Troy B. Conner, Jr.
John E. Dolan
James P. Fenstermaker
Steven G. Smith
William J. Moran
Stephen F. Koziar, Jr.
Samuel H. Porter
G. C. Ficke
W. F. Christianson
Lynne Bernabei, Esq.
John D. Woliver
Deborah F. Webb
David K. Martin
George E. Pattison
Andrew B. Dennison
L. Kintner

REQUEST FOR ADDITIONAL INFORMATION REGARDING RECOMMENDATIONS CONTAINED IN NUREG-0969 "REPORT OF THE NRC EVALUATION TEAM ON THE QUALITY OF CONSTRUCTION AT THE ZIMMER NUCLEAR POWER STATION, APRIL 1983"

HVAC DUCTWORK BOLTING SPECIFICATION

1. "The NRC Evaluation Team (NET) found numerous connections where the fastener nut, or hex bolt was partly drawn into the slotted flange hole of the HVAC ducting because washers were not installed under the nuts nor bolts. Thus, the installation of bolts into the oversize bolt holes without washers resulted in a connection where the bolt-required tightness and strength might not be properly developed. The use of washers is not mentioned in the specifications. Thus, the staff concern regarding the bolting adequacy appears to be related to design rather than construction."

   "Provide an assessment of the above identified design deficiency and the basis for assuring that the integrity of the HVAC ductwork bolting is acceptable."

   "Provide the corrective measures (if required) that will be taken to assure the adequacy of the HVAC bolting integrity."

RESPONSE

S&L has reviewed Specification H-2298, HVAC Work, and its attached Form 320, Standard Specification for HVAC ductwork. Form 320, Article 3.1 requires that the bolt material be per ASTM A307, and Article 4.1.2b requires duct flanges to be bolted together with 3/8 inch diameter bolts. The ductwork specification does not specify the use of oversized holes. Industry's (Sheetmetal and Air Conditioning Contractors National Association) standard practice is to provide a round hole 1/16 inch larger in diameter than the specified bolt size.

The Waldinger Corporation's Sheet Metal Standards, Revision 0, which were reviewed by S&L and released for construction by S&L on April 8, 1975, did not indicate slotted holes in the companion angle.

S&L recommends that a testing program of the slotted holes and bolts be performed to verify that it is an

acceptable condition. S&L is preparing a detailed test procedure for CG&E's use for testing of the slotted flange connections. Based on the results of the testing program appropriate action as necessary will be taken by CG&E.

CODES AND STANDARDS USED FOR THE DESIGN OF PIPING HANGERS

2. "In Revision 94 to the FSAR, the applicant provided changes which addressed (a) the design of manufacturer catalog components and (d) the design of supplementary steel used for pipe supports that are non-integral to the pipe pressure boundary. However, the applicant has not yet documented (b) the codes used in design of field welds and (c) the design of any integrally welded attachments."

"Provide the FSAR changes to document the design practices (b) and (c) identified above.

RESPONSE

See attached proposed FSAR revision Exhibit "A". Page 1 of Exhibit "A" is a marked up copy of FSAR page 3.9-36. Page 2 of Exhibit "A" contains additional words to be inserted on FSAR page 3.9-36.

excitation dominating. Thus, the results indicate the maximum response of the associated piping system.

It should be noted that the main steam relief valve piping going to the suppression pool has a column of water sitting in the pipe. The hydraulic transient analyses on this piping have accounted for blowing out this water column.

Hydraulic snubbers or strut-type restraints are used on all relief valve and safety valve piping to ensure that the stresses resulting from the loads produced by the sudden opening of a relief of safety valve when combined with stress due to other upset loads satisfy the ASME Section III code for upset conditions. Also, the analyses show that the loads applied to the flanges of the safety and relief valves do not exceed the maximum loads specified for the valve design used. 81

3.9.3.4 Component Supports

3.9.3.4.1. Piping 9

INSERT "B"

Piping supports are designed in accordance with Subsection NF of ASME Section III (1971 through Winter 1972 Addendum) or ANSI B31.1.0 (1967 through Addendum d 1972) or ANSI B31.7 (1969) as appropriate. Manufacturer catalog components for ASME Section III piping are designed in accordance with ANSI B.31.7 (1969). All structural members (plates, angles, channels, etc.) used for pipe supports but nonintegral with the pipe pressure boundary are designed in accordance with AISC (1969) and in conjunction with Standard Review Plan 3.8.4. In general, the load combinations for the various operating conditions correspond to those used to design the supported pipe. Design transient cyclic data are not applicable to piping supports as no fatigue evaluation is necessary to meet the Code requirements. All components supports are designed, fabricated, and assembled so that they cannot become disengaged by the movement of the supported pipe or equipment after they have been installed. 75 49 9

The design criteria and dynamic testing requirements for component supports are as follows:

a. Hangers

INSERT "A"

The design load on spring hangers is the load caused by dead weight. The hangers are calibrated to ensure that they support the design load at both their hot and cold load settings. Hangers provide a specified down travel in excess of the specified thermal movement. 75

b. Snubbers

The design load on snubbers includes those loads caused by seismic forces (operating-basis earthquake and safe shutdown earthquake) system anchor movements, reaction forces caused by relief valve discharge, turbine stop valve closure, and all other dynamic loads. 94 75

Insert A

All integrally welded attachments to piping pressure boundary are designed and fabricated in accordance with ASME Section III Subsections NB, NC or ND requirements for quality class A, B, or C systems respectively.

Insert B

Including field welds and modifications.

RESIDUAL HEAT REMOVAL (RHR) DISCHARGE PRESSURE INDICATORS

3. "NUREG-0969 states that residual heat removal (RHR) discharge pressure indicators were not installed in local instrument racks as specified on design drawings. NUREG-0969 also states that applicant advised the NRC Evaluation Team that local indicators are not required for RHR discharge pressure and the drawings would be changed. Confirm that these pressure indicators are not required for remote shutdown of the plant. Also provide the surveillance test requirements planned for these RHR discharge pressure indicating switches (PIS IE 12-No. 19A and PIS IE 12-No. 19B).

RESPONSE

These pressure indicators are in fact pressure switches that provide contact inputs for ADS initiation logic. As such they were never intended to be used for remote shutdown of the plant. However, on the same local panels as pressure switch numbers 1E12-NO19 (A&B) are pressure indicating switches 1E12-NO22 (A&B). These pressure indicating switches provide local pressure indication and supply high and low pressure alarms in the control room.

The surveillance test requirements for NO19 A&B are:

Monthly - perform a channel functional test.

Refueling outages - perform a channel calibration.

QA SURVEILLANCE PROGRAM FOR BACKFILL COMPACTION

4. "NUREG-0969 indicates that the seismic Category I buried service water pipeline, which provides emergency cooling water to the plant, was not included in the QA surveillance program for backfill compaction operations. This appears to be inconsistent with FSAR Table 3.2.1 Revision 95, which indicates that the service water pipeline is subject to the quality assurance requirements of 10CFR50, Appendix B. NUREG-0969 also indicates that other safety-related structures and buried systems were not included in the QA soils surveillance program."

   Provide the following information:

   (a) Identify all safety-related structures and systems founded on or in backfill which did not have QA surveillance during compaction operations and include this information in notes to FSAR Table 3.2.1. However, Table 3.2.1 should also clearly indicate that any future soils compaction activities for their safety related structures and systems are subjected to QA surveillance under Appendix B, 10CFR50.

   (b) For all structures and systems identified in (a), including the service water pipeline, investigate and determine the as-constructed backfill density using appropriate ASTM field and laboratory sampling and testing procedures and perform engineering evaluations to demonstrate that in site densities are adequate for design loads.

RESPONSE

(a) CG&E has identified the safety-related structures and systems founded on or in backfill which did not have QA surveillance during compaction operations. These structures/systems are as follows:

   1. The service water pipe line outside the area of the main power block.

   2. The electrical duct bank outside the area of the main power block.

3. The service water pump structure. (Adjacent Backfill)

4. The intake flume for the service water pump structure. (Adjacent Backfill)

Based on the engineering evaluations specified below; the FSAR, specifications and design drawings will be clarified to indicate Class II compaction requirement for soils around the four structures/systems indicated above.

(b) Per the conclusion identified in NUREG-0969, Section 2.4.1.1.5(2), an evaluation was made of the engineering basis for the soil compaction requirements of the design of these four structure/systems. The limiting condition would be liquefaction of the soils adjacent to these structures/systems. The evaluation concluded that the original design was predicted upon liquefaction occurring and that this design is still valid. Therefore, the compaction requirements are not necessary and additional backfill testing is therefore not required.

All four structures/systems were designed for potential liquefied soil conditions and independently reviewed by Newmark and Associates, as documented in the February 18, 1972 U.S. Atomic Energy Commission Safety Evaluation Report (Docket No. 50-358), Appendix E (September 7, 1971). All four structures/systems were found adequate.

The service water line and adjacent electrical duct bank are supported by concrete piles to bedrock and thus do not rely on the specified relative density of the backfill. Battered piles supporting the service water line and electrical duct resist lateral forces due to drag from liquefied soils tending to move down slope.

The intake flume and service water pump structure were not constructed on backfill but have adjacent backfill. These structures have been evaluated considering the effect of soil liquefaction. The calculations show that the intake flume structure, consisting of sheet piles, wales, struts and rods, is adequate for the loads caused by the postulated soil liquefaction. The calculations

also show that the service water pump structure, consisting of shear walls, concrete slabs, beams and structural steel floor framing, is adequate for the postulated soil liquefaction loads.

STRUCTURAL DEFICIENCIES OF MASONRY WALL CONSTRUCTION

5. In Section 2.4.2.2, NUREG-0969, three types of structural deficiencies with respect to the masonry wall construction have been identified and they are:

   a. unfilled collar joints

   b. inadequate embedded support column connections

   c. discontinuous and missing joint reinforcement."

"Provide an evaluation of the significance of these deficiencies from the point of view of design using the criteria established for Zimmer and in conformance with the staff's requirements. Indicate the reduction in margin of safety on the basis of the extent of construction deficiencies uncovered and your evaluation of their significance. Provide a conclusion as to the structural adequacy of the safety-related masonry walls which have not been inspected. Describe practical measures to upgrade masonry walls to meet the minimum requirements."

RESPONSE

Multi-wythe masonry walls which do not have running bond through the thickness of the wall have been designed as two independent walls based on the unfilled collar joints. Additional support columns will be provided consistent with the design.

The engineering evaluation of the embedded seismic column connections has been completed. The evaluation assumed a locked-up bolt condition and a reduced design weld size of 25 percent. The connections which do not meet the NRC imposed criteria of 2 will be reworked.

Reinforcement in the masonry wall construction provides additional margin of safety that is not required. The design criteria for masonry walls is being revised to omit the structural use of the masonry wall reinforcement. Using the revised design criteria, a

review of the masonry walls is being preformed to assure that wall reinforcement is not necessary.

BOLT CORROSION IN THE FLUME STRUCTURE

6. "In Section 2.4.2.4 of NUREG-0969, it has been identified that certain bolts in the flume structure are undergoing significant corrosion, and corrosion was not considered in the original design nor was there any inservice inspection specified. Indicate your planned action to alleviate this situation."

RESPONSE

Corrosion was considered in the original design, in that corrosion resistant bolts (A-325, type 3) were specified. However, as stated in NUREG-0969, corrosion allowances were not specified.

CG&E is performing an inservice corrosion monitoring inspection and maintenance program. To ensure that corrosion levels are acceptable, the program will be expanded to include the periodic removal of high strength bolts to determine their current ultimate capacities compared with new Type 3 high strength bolts.

In addition to inservice inspection, a bolting reinspection program will be conducted by the Quality Confirmation Program. Reinspections include verification of bolt type for accessable connections in the flume structure.

PROBABILITY OF ELECTRICAL FAULTS

7. "In Section 2.4.3.1.4(4) of NUREG-0969, the NRC Evaluation Team concluded that there is a higher probability of electrical faults occuring at Zimmer than with normal construction and turnover situations due to the extensive amount of rework modifications and potential for damaged cables resulting from the rework. In this regard, describe the steps you have taken to ensure the integrity of the cables in these areas following completion of the rework modification."

RESPONSE

Following completion of the rework, cables which were previously disconnected and pulled back will be reconnected, inspected and tested for faults in accordance with approved construction and inspection procedures.

When construction is resumed, cables in the containment and in other plant areas where rework is occuring will be disconnected and pulled back or will be physically protected. The protective material will be inspected for damage sufficient to have damaged the cable. Where such damage is noted, the protected cable will be inspected for damage and tested for faults.

BACKUP OVERCURRENT PROTECTION DEVICES

8. "In NUREG-0969, the NRC Evaluation Team recommended that you consider installing the backup overcurrent protection devices in containment penetration circuits before initial fuel load. The Zimmer SER Supplement No. 1 originally accepted your commitment to install the second means of overcurrent protection at the first refueling outage. However, in view of the length of time elapsed since that commitment (2 years), the staff considers it reasonable to install these backup overcurrent devices prior to initial fuel load. Provide us with your commitment to complete the installation of these devices prior to fuel load or justification for not completing prior to fuel load.

RESPONSE

Backup overcurrent devices for low and medium voltage penetration circuits will be installed prior to fuel load.

NON-CLASS IE & ASSOCIATED CABLES & CIRCUITS SHARING COMMON RACEWAYS

9. "NUREG-0969 referenced a program which you have instituted to analyze all non-class 1E and associated cables and their circuits sharing common raceways. The NUREG also stated that you will analyze those cables and their circuits which do not maintain the specified separation distance in other locations such as panel interiors and the transition between panels and raceways. Provide the results of this analysis and your methodology for NRR staff review."

RESPONSE

A presentation of the applicants' program to resolve Electrical Separation Concerns was made to the NRC staff on July 27, 1983 at the ZPS-1 Site. The presentation described ZPS-1 compliance with regulatory requirements and outlined the programs intiated to verify the electrical separation design and installation. The programs consist of walkdowns to verify the existing installation, reviews to verify the existing design and analyses to confirm the acceptability of the existing design and installation where it deviates from the separation criteria. Upon completion, the results of the walkdowns and analyses will be submitted as an FSAR amendment. The submittal will include substantive descriptions of the methodology utilized in the analyses.