



Omaha Public Power District

1623 HARNEY ■ OMAHA, NEBRASKA 68102 ■ TELEPHONE 536-4000 AREA CODE 402

July 29, 1982
LIC-82-239

Mr. W. C. Seidle, Chief
Reactor Project Branch 2
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Reference: Docket No. 50-285

Dear Mr. Seidle:

Fort Calhoun Station Final Report
Regarding IE Bulletins 79-02 and 79-14

Omaha Public Power District has completed all necessary inspections, analyses, and modifications at the Fort Calhoun Station resulting from the requirements of the subject IE Bulletins and their subsequent revisions and supplements. These modifications were completed prior to plant startup in June of 1980 following the 1980 refueling outage. However, the District's letter dated April 21, 1980 stated that the District would have an engineering consultant (Gilbert/Commonwealth) analytically verify the District's evaluations and conclusions regarding the operability of accessible safety-related piping systems during and following a design seismic event. The April 21, 1980 letter also stated that restraint deficiencies or discrepancies identified during this voluntary verification program would be corrected and that necessary modifications would be completed during the 1981 refueling outage. This letter serves to inform the Commission that the subject verification program and modification work is complete. A brief discussion of the verification program methodology and results, together with a summary that completes the safety-related pipe restraint issue as identified in IE Bulletins 79-02 and 79-14 for the Fort Calhoun Station, is provided below.

Gilbert/Commonwealth (G/C) personnel experienced in the analysis and design of nuclear power plant piping systems conducted an independent review and verification of accessible safety-related piping supports and restraints utilizing the dynamic computer simulation code T-PIPE. Additionally, G/C reviewed and approved the District's inspection criteria (Attachments 1 and 2 of the District's April 21, 1980 letter) which was utilized for identifying design versus "as-built" pipe support discrepancies for both accessible and inaccessible safety-related piping systems. As a result of the T-PIPE verification analysis,

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restraint modifications, additions, and deletions were completed to provide for a more sophisticated and effective piping restraint network. These restraint modifications, additions, and deletions were completed for the following reasons:

- (1) Additional restraints were attached at various piping locations to raise the first mode frequency (as determined by the T-PIPE analysis) to a minimum value which is greater than the structure resonant frequency. The original piping system designs utilized a spacing nomograph to determine restraint positioning for achieving minimum first mode frequencies. However, this spacing nomograph method is not as sophisticated as the T-PIPE method and additional restraints were added as necessary. Prior to the system modification, detailed piping stress analyses were conducted to ensure that these additional restraints would not result in piping stresses greater than that allowed in the FSAR. Changes in restraint positioning, as necessary, were completed to fulfill both the system frequency and piping stress criteria.
- (2) Original restraints were modified as a precautionary measure to ensure that these restraints would properly function under the piping design loads identified by the T-PIPE analysis. These modifications were completed prior to the addition of new restraints as identified in (1) above.
- (3) Several original piping restraints were designed and built in accordance with former methodology or criteria that are no longer utilized by the nuclear industry for seismic design work. The performance of a qualification verification of these restraint designs utilizing currently accepted standards was considered impractical. Therefore, these restraints were modified such that the present restraint or system configuration could be verified by state of the art methods and criteria and compliance to these standards could be achieved.
- (4) Original restraints that were identified by the T-PIPE analysis to be incompatible with the modified piping restraint system or which were identified as having no justifiable function were removed or disconnected. Examples included replacement of a snubber with a rigid strut where thermal overstressing was identified not to be a concern, or removal of redundant restraints where one restraint, new or existing, could handle the design loads and stresses. Removal of these restraints was not initiated until all restraint additions, or modifications, as identified in items (1) and (2) above, were completed for a given piping section and then the restraint removals were completed in a timely manner for each piping subsystem. This precaution and the subsequent timely restraint removals ensured the integrity of the various piping systems was not compromised during the modification work.

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Documentation generated from the inspections, analyses, verifications, and modifications completed as a result of IE Bulletins 79-02 and 79-14 is retrievable through a document tracking system. Document updating is complete for modified "as-built" restraint detail drawings and is in progress for "as-built" piping isometric drawings. Preliminary "as-built" isometric drawings have been completed for all safety-related piping, 2½ inches in diameter or larger. Permanent, reproducible isometric drawings will be completed as time permits.

To ensure that the Fort Calhoun Station safety-related piping system is maintained in its present seismically qualified state in accordance with the T-PIPE analysis, all future modifications involving safety-related piping and restraints will be reviewed by the District for potential impacts on the functionality of the piping and restraint system or subsystem. Reanalysis or restraint system verification utilizing the T-PIPE code will be conducted as necessary prior to modification installation to assist this effort. Additionally, Technical Specification surveillance requirements and Limiting Conditions for Operation for mechanical and hydraulic safety-related snubbers will assist in the maintenance of an effective and operational piping restraint system.

All seismic support base plates and concrete anchor bolts associated with safety-related piping systems have been reviewed, analyzed, and their safety factors verified per the requirements of IE Bulletin 79-02. The safety factor analysis for these restraint components included all additional loads generated during the performance of the IE Bulletin 79-14 verification program (T-PIPE) analysis. The District maintains the necessary documentation to justify these conclusions.

Completion of the subject verification and modification work has ensured that the Fort Calhoun Station has a safety-related piping and restraint system that will preclude crippling pipe damage during design seismic events.

Sincerely,



W. C. Jones
Division Manager
Production Operations

Attachment

cc: LeBoeuf, Lamb, Leiby & MacRae
1333 New Hampshire Avenue, N.W.
Washington, D.C. 20036

Mr. Lawrence A. Yandell - Resident
Inspector