ATTACHMENT

Consumers Power Company
Palisades Plant
Docket 50-255

CRITERIA FOR DETERMINING JUSTIFICATION FOR CONTINUED OPERATION WHEN ENCOUNTERING DISCREPANCIES IN "AS-BUILT" SAFETY-RELATED PIPING

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CRITERIA FOR DETERMINING JUSTIFICATION FOR CONTINUED OPERATION WHEN ENCOUNTERING DISCREPANCIES IN "AS-BUILT" SAFETY-RELATED PIPING

CONSUMERS POWER COMPANY

PALISADES PLANT

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE

These criteria are intended to provide the operability determination requirements for safety-related piping and associated supports if it is determined that stresses exceed allowables presented in the Palisades Plant Updated FSAR (Reference 1). These criteria permit operation for an interim period only. Modifications will be made which return the system to within FSAR allowables.

These criteria are intended to be used to expeditiously perform necessary evaluations to determine interim operability and not to delay appropriate actions.

2.0 CRITERIA

2.1 Piping Operability Criteria

The piping analysis shall be in accordance with ANSI B31.1, 1973 Edition (Reference 2) with the load combination stress limit defined below. The 1973 Edition of ANSI B31.1 is judged to be a comprehensive and updated consolidation of all of the requirements of earlier editions of B31.1 used at Palisades. This edition constitutes use of a single reference encompassing all licensing requirements and is compatible with current computer software used by Consumers Power Company. The design loading conditions to be applied in the analysis shall include the Safe Shutdown Earthquake.

Following are the pipe stress criteria for justifying continued operation of the plant:

$[S_{LP} + S_{WT} \leq 1.0S_y]$ (Ref. 2 Equation 11)

And

$[S_{LP} + S_{WT} + S_{SSE} \leq 2.0\ S_y]$ (Ref. 2 Equation 12)

Where: S_{LP} = Longitudinal Pressure Stress

S_{WT} = Dead Weight Stress

S_{SSE} = Stresses Resulting From Safe Shutdown Earthquake

S_y = Material Yield Stress (Reference 3 Appendices)

Code Case N-411 allows for increased damping values, independent of pipe diameter, for seismic analysis. Therefore, increased damping values, in accordance with Reference 4, will be acceptable when performing these analyses to meet operability. If the piping stress analysis exceed the value of 2.0 S_y, or pipe supports do not meet their operable limits (see Sect. 2.2), then additional iterative analysis of the piping may be required. The iterative analysis may

use the knowledge that a support is not capable of withstanding the loads, and can be removed from the analysis. The Code Case N-411 analysis will be an alternative analysis procedure to that of the original piping seismic design methodology. Analysis employing Code Case N-411 will be performed based upon the requirement of US NRC Regulatory Guide 1.84, Rev. 26. (Reference 5)

For cases where piping secondary stresses (stresses induced by restraint of free end thermal displacement, thermal anchor movements or seismic anchor movements) are determined to exceed FSAR allowables, a specific case by case approach will be used to determine interim operability.

2.2 Pipe Support & Hanger Operability Criteria

As a first step in evaluating the support, a linear elastic analysis method will be used to determine the stress and forces in the support members. In addition to the loading in Section 2.1, the support loads must include pipe thermal loads, restraint of free end thermal displacement and anchor motion. The stresses and forces calculated for each support member shall be compared with the allowables in the FSAR, Chapter 5.10.1.2 criteria for the SSE (Reference 1) combination except as modified below.

A. Structural Steel

Tension	$F_t = 1.20\ S_y$ but $\leq 0.70\ Su$
Bending	$F_b = 1.20\ S_y$ but $\leq 0.70\ Su$
Shear	$F_v = 0.72\ S_y$ but $\leq 0.42\ Su$
Combined Stress	For axial compression and bending or axial tension and bending, use AISC Paragraph 1.6., (Ref. 6)

B. Anchor Bolts — Use Factor of Safety of 2 against ultimate tension and shear values.

C. Snubbers

Hydraulic: Load < manufacturers one time load capacity. Movement < total travel

D. Springs — Load within catalog range without bottoming out

E. All remaining Catalog Items

The maximum of the following:

1. Manufacturer's published faulted load rating.

2. When faulted allowables are not given and the factor of safety is specified in the catalog for the normal operating allowable, a design allowable shall be scaled to a safety factor of 2.

3. When the catalog item is designed to B31.1 and no safety factor is given, a design allowable twice the catalog value.

4. When test data is available, the design allowable shall have a safety factor of 2.0.

5. For a simple component item where an analysis can be performed, the allowable shall be 0.5 of the ultimate stresses or strength.

Where: F_t = Allowable Tensile Stress

F_b = Allowable Bending Stress

F_v = Allowable Shear Stress

S_y = Specified Minimum Yield Stress at Temperature (See Note 1)

Su = Specified Minimum Tensile Stress at Temperature

FS = Factor of Safety

Note 1: Actual yield strength may be used where CMTR's are available for the material.

If a support fails using the linear elastic method, then a more refined analysis may be performed using plastic analysis techniques. The plastic analysis will follow the design rules of ASME Section III, Appendix F, (Ref. 1).

3.0 CONCLUSION

If the above criteria cannot be met, reportability per 10 CFR 50 must be evaluated and system operability requirements per Plant Technical Specifications must be evaluated and appropriate actions taken.

4.0 REFERENCES

1. Palisades Plant Updated Final Safety Analysis Report.

2. ANSI B31.1, 1973 Power Piping Code.

3. American Society of Mechanical Engineers, Boiler and Pressure Vessel Codes, Section III, 1983 Edition, through Winter 1985 Addenda.

4. American Society of Mechanical Engineers, Boiler and Pressure Vessel Codes, Case N-411, Dated 9/17/84.

5. US Nuclear Regulatory Commission Regulatory Guide 1.84, Design and Fabrication Acceptability, ASME Section III, Division 1, July 1989, Rev. 26.

6. "Manual of Steel Construction", American Institute of Steel Construction, Inc., Seventh Edition, 1980.