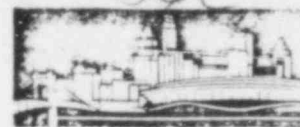


THE CINCINNATI GAS & ELECTRIC COMPANY



CINCINNATI, OHIO 45201

August 8, 1979

E. A. BORGMANN  
VICE PRESIDENT-ENGINEERING

U.S. Regulatory Commission  
Office Of Inspection and Enforcement  
Region III  
7999 Roosevelt Road  
Glen Ellyn, Illinois 60137

ATTN: Mr. James G. Keppler  
Regional Director

RE: WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1  
IE BULLETIN 79-14, DOCKET 50-358  
W.O. 57300, JOB E-5590

In response to IE Bulletin 79-14, dated July 2, 1979, we submit the following:

For WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1, all Seismic Category 1 systems are being verified that the seismic analysis applies to the actual piping configuration as a part of the Zimmer Construction Program. Field inspections are performed on each system to verify pipe support design and location, embedments, attachments, and valve location and orientation. The architect-engineer, Sargent & Lundy, also verifies actual valve and valve operator weights by the use of certified vendor data.

The field inspection data, in the form of marked-up drawings, are forwarded to Sargent & Lundy to assess the validity of the original system analysis. This work is performed on a sub-system basis and is illustrated by "Attachment A", Status of Piping Analysis, which shows the sequence for piping calculations, review, and reanalysis, if required. Sargent & Lundy submits sub-system packages to the field office for their review and comment to cover the as-built conditions for piping and pipe supports. "Attachment B", letter SLC-12875, is a typical transmittal of a subsystem package.

The field review and inspection of seismic pipe supports is governed by Construction Inspection Procedure MC-5, "Final Inspection of Pipe Supports", Attachment C. CG&E QA is responsible for audit and implementation of Procedure MC-5. Installed supports which deviate from design drawings are reworked or modified to comply with the specified design, or alternatively, a Design Document Change is processed and submitted to Sargent & Lundy.

Internal procedures within Sargent & Lundy for final piping analysis are governed by Project Instruction PI-ZI-13.1 titled "Finalizing Piping Analysis, Hanger and Restraint Design, and Support Loading", Attachment D. For illustrative purposes, please find copies of Sargent & Lundy internal transmittals which demonstrate the use of the referenced Project Instruction Procedure for a typical subsystem:

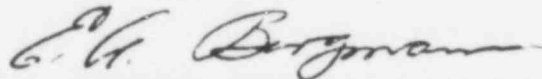
7909110 0149 AUG 13 1979

937267

- a. Attachment E, March 2, 1979 memo from Mechanical Design and Drafting (MD&D) to Engineering Mechanics (EMD) requesting review of Design Document Changes M-8055 and M-9038 for subsystem RH-33.
- b. Attachment F, March 23, 1979 memo from EMD to MD&D indicating that re-analysis is required for subsystem RH-33.
- c. Attachment G, April 23, 1979 memo from MD&D to EMD which transmits the computer program card deck and the piping analytical drawings for reanalysis of subsystem RH-33.

We believe the information contained in this response illustrates that the Zimmer Project has an ongoing program to verify the seismic analysis of all safety related piping systems and thus addresses the concerns of IE Bulletin 79-14.

Very truly yours,  
THE CINCINNATI GAS & ELECTRIC COMPANY



E.A. BORGMANN, SENIOR VICE PRESIDENT

DJF/kjd

cc: W.D. Waymire  
J.D. Flynn  
W.W. Schwiers  
S.G. Salay  
J.R. Schott  
R.F. Scheibel  
H.C. Brinkmann  
NRC Office of Inspection and Enforcement  
Division of Reactor Inspection Programs  
Washington, D.C. 20555

937268



SARGENT & LUNDY  
ENGINEERS  
CHICAGO

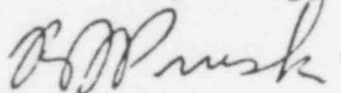
Mr. E. A. Borgmann  
The Cincinnati Gas & Electric Company

SLC-12875  
May 22, 1979  
Page 2

analysis prior to certifying the final stress report and hanger designs. Hangers which are not installed should be reviewed for feasibility and space reserved in the location to preclude future interferences when hardware is delivered and installed.

Reanalysis on these systems will be held until the field confirms that the subsystem packages are complete and correct or comments returned to us to complete the package. Your early response is required so that final drawing issue can be expedited. Drawings would be expected to be issued approximately 12 weeks after receipt of your comments if reanalysis is necessary.

Yours very truly,



R. J. Pruski  
Project Manager

RJP/mw

In triplicate

Copies:

B. K. Culver	(1/1)
W. W. Schwiers	(1/0)
H. C. Brinkmann	(1/0)
S. Rurka	(1/0)
S. G. Carlson	(1/0)
R. E. Cotta	(1/0)
C. A. Nordstrom	(1/0)

937270

THE CINCINNATI GAS & ELECTRIC COMPANY  
WM. H. ZIMMER NUCLEAR POWER STATION

## MECHANICAL CONSTRUCTION TEST PROCEDURE

PROCEDURE NUMBER:	MC-5	REV:	2
PROCEDURE TITLE: PIPE SUPPORT FINAL INSPECTION			
APPROVAL RECORD			
APPROVED BY:		DATE:	
<i>W. H. Zimmer</i>		6-14-79	
MANAGER OF CONSTRUCTION		GENERATION CONSTRUCTION	
<i>W. H. Zimmer</i>		6-18-79	
PRINCIPAL Q.A. AND S. ENGINEER		GENERAL ENGINEERING DEPARTMENT	

## 1.0 PURPOSE

- 1.1 To outline the inspection sequences required to assure that pipe hanger supports are installed and adjusted in accordance with specifications and approved design drawings included under the jurisdiction of the ASME and ANSI Codes referenced in the Project Specification H-2256.

## 2.0 SCOPE

- 2.1 This procedure provides instructions for the final inspection of installed essential pipe hangers, supports and restraints for Startup Testing. Weld inspection requirements are not included in this procedure.

## 3.0 REFERENCED DOCUMENTS

- 3.1 S&L Specification H-2256  
3.2 S&L Specification H-2259  
3.3 S&L Specification Form 270E  
3.4 S&L Specification Form 275B  
3.5 S&L Specification Form 278  
3.6 FCP 2-126  
3.7 FCP 2-127  
3.8 FCP 2-128  
3.9 BP Procedure 73-1 "Installation Instructions for HSSA's"  
3.10 ITTG Procedure PHD-6511-3 "Instruction Manual for ITTG HSSA's"  
3.11 E Systems Procedure 19156 "Snubber and Accessories Installation for the MS and RR Systems" R2  
3.12 S&L Specification H-2897 R2

## 4.0 RESPONSIBILITIES

- 4.1 The CG&E Hanger Engineer shall be responsible for implementing this procedure and identifying all the hangers that are ready for inspection.
- 4.2 The CG&E QA&S Section shall be responsible for auditing the implementation of this procedure.
- 4.3 The Configuration Control Center shall be responsible for furnishing the inspection group with the latest revision of the DDC's, ISK's, mechanical drawings, and hanger drawings required to perform the inspection function. R2
- 4.4 The CG&E Hanger Engineer shall be responsible for training inspection personnel to implement the requirements of this procedure.

REVISION NUMBER:

2

PROCEDURE NUMBER:

PIPE SUPPORT FINAL INSPECTION

PAGE 2 OF 12

#### 4.0 RESPONSIBILITIES - continued

4.5 The Inspectors shall be responsible for:

- 4.5.1 Performance of inspection activities as detailed in Paragraph 5.0 of this procedure.
- 4.5.2 Initiation and completion of all documentation required by Paragraph 6.0 of this procedure.
- 4.5.3 Reading documents referenced in Section 3 as part of their training.

#### 5.0 PROCEDURE

- 5.1a The inspector shall inspect all hanger installations for compliance with the criteria outlined in Paragraph 5.2. Results of this inspection shall be documented on the Daily Hanger Inspection Log (Attachment 1).
- 5.1b After completion of the final inspection, the hanger shall be so identified by attaching a white tag (see Attachment 2) to the hanger in a conspicuous location. The tag shall have the following information:

HANGER NUMBER: \_\_\_\_\_ DWG. REV.: \_\_\_\_\_  
REF. DWG.: \_\_\_\_\_ REV.: \_\_\_\_\_  
SPRING/SNUBBER SETTING: \_\_\_\_\_ Cold: \_\_\_\_\_  
INSPECTED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
HOT SET: \_\_\_\_\_  
VERIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

The tag shall have the following warning:

"DO NOT REMOVE OR ALTER THIS SUPPORT WITHOUT PRIOR APPROVAL FROM THE CG&E GENERAL ENGINEERING DEPARTMENT."

#### 5.2 Inspection tolerances and acceptance criteria.

##### 5.2.1 Hanger location

- a. Supports for Class A piping shall be located within 6" of specified locations along the pipe axis.



5.0 PROCEDURE - continued

## 5.2.1 Hanger location

- b. Supports for Class B and C (with B seismic) shall be located within the following distance from specified location:

R2

1. Rigid restraints (hanger, struts and guides) and snubbers perpendicular to pipe shall be within 6" or  $\frac{1}{2}$  pipe diameter of specified locations along the pipe axis, whichever is larger.
2. Spring supports (variable or constant) perpendicular to pipe shall be within 6" or one pipe diameter of specified location along the pipe axis, whichever is larger.
3. Supports restraining pipe axially (such as snubbers, struts, or spring supports acting in a direction parallel to pipe) shall be within 6" or 2 pipe diameters of specified locations on the pipe, whichever is larger.
4. The minimum clearance between variable supports and other obstructions must be equal to the pipe movement from cold to hot plus 1".

- 5.2.2 Hanger configuration shall be in accordance with the hanger design and the tolerances listed in Paragraph 5.2.3.

## 5.2.3 General Inspection Tolerances

- a. Structural dimensions for Class A piping supports may be  $\pm 1"$ , except as specified in Paragraph 5.2.5 and 5.2.6 and the hanger drawing.
- b. For Seismic Class B supports, dimensions are toleranced at  $\pm 2"$  except as specified in Paragraph 5.2.5 and 5.2.6 and the hanger drawing.
- c. Tolerance on total rod length may be  $\pm 12"$ .

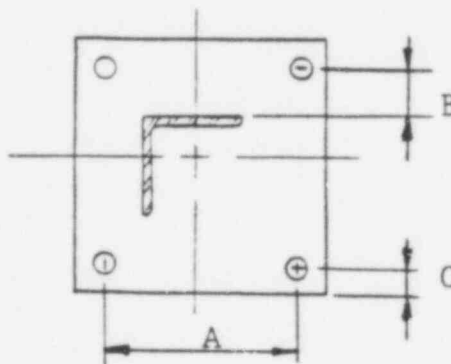
R2



5.0 PROCEDURE - continued

## 5.2.3 General Inspection Tolerances

- d. Equal leg angles may be installed opposite hand.
- e. Angle of structural brace may be varied  $\pm 10^\circ$ .
- f. Use of thicker plates is acceptable provided the anchor bolts meet the requirements in Paragraph 5.2.4.a.
- g. Use of heavier hanger rods/hanger rod components is acceptable.
- h. Use of larger clamp stock is acceptable.
- i. The location of the bolt holes in a four bolt plate shall be located as shown in Figure 1. R2



A = Design Dimension  $\pm 1/2''$

B = Design Dimension  $\pm 3/4''$

C = Design Dimension  $\pm \frac{1''}{0''}$

For Any Structural Shape

NOTE: Dimension "A" must not be less than the minimum anchor bolt spacing

(Figure 1)

5.0 PROCEDURE - continued

## 5.2.4 Concrete Anchor Bolts

- a. Anchor bolts must be installed in accordance with Table 1.
- b. No anchor bolts may be cut short under any circumstances.
- c. Minimum distance from uncontained hole may be less than required in Paragraph 5.2.4.a provided a minimum embedment of the anchor is the manufacturer's minimum embedment requirement plus the depth of the uncontained hole.

## 5.2.5 Snubbers and Struts

- a. Pin to Pin
  1. The maximum pin to pin dimensions on adjustable strut assemblies and snubber assemblies shall be in accordance with the design dimensions and the manufacturer's tolerances.
  2. The pin to pin length may be shortened as required for installation.
- b. Snubber cold position setting may be varied from the design drawing provided the minimum distance from either stop is the absolute value of the thermal movement plus  $1\frac{1}{4}$ ".
- c. Hydraulic snubber units shall not be leaking oil.
- d. Use of splice plates between snubber/strut end attachment and structural attachment is acceptable from  $3/8$ " to 1". Weld size shall be as required on the design drawing.
- e. Snubbers and struts must be installed such that the direction of restraint is in accordance with the hanger drawing with a maximum tolerance of  $\pm 5^\circ$  in any direction.

R2

5.0 PROCEDURE - continued

## 5.2.5 Snubbers and Struts

- f. The size, bore and stroke of snubbers shall comply to the latest revision of the detail drawing.
- g. Horizontal strut assemblies shall be engaged although shall not be carrying any appreciable load.
- h. Bolting on snubber and strut assemblies shall be torqued per the manufacturer's specifications. Thread engagement on snubber and strut end pieces shall be in accordance with the manufacturer's specifications.
- i. Piston rods must be clean and free of any paint, weld spatter, etc.
- j. There shall be no evidence of physical damage to the snubber or strut assembly.
- k. The protective plastic cover must be installed over the accumulator plunger on all Bergen-Paterson Hydraulic Snubbers during construction. The cover shall be removed prior to normal operation of the system.
- l. The fluid level in the hydraulic reservoir must be per the manufacturer's requirements.
- m. The cold piston setting must be adjusted and identified on the Hanger Inspection Log. The preset wire on mechanical snubbers shall be removed. The shipping clamp on hydraulic snubbers shall be removed.

R2

## 5.2.6 Contact Surfaces

- a. The clearance between walls and structural attachment plates should not exceed 1/16" over a maximum of 20% of the bearing area. If the gap exceeds 1/16" or if the clearance exists more than 20% of the bearing area, grouting or shimming is required in order to insure proper bearing.

5.0 PROCEDURE - continued

## 5.2.6 Contact Surfaces

- b. Clearance between the support and the pipe shall be 1/32" minimum and 1/8" maximum unless otherwise specified on the design drawing. The clearances are acceptable if they are in two mutually perpendicular directions. R2
- c. Clearance between a U-bolt and the pipe may be achieved by either welding the U-bolt nuts to the underside of the structural steel or by installing the nuts on both sides of the structural steel. R2
- d. Support components may be either carbon steel or stainless steel regardless of pipe material unless welded directly to pipe or the design temperature exceeds 600° F. R2

## 5.2.7 Threaded connections

- a. Must have a minimum thread engagement of one full nut.
- b. Threaded lengths at turnbuckles and couplings shall be adequate to allow full adjustability.
- c. All U-bolt and rod nuts shall be tight.
- d. All rigid assemblies, including rod hangers, shall be adjusted so as to be supporting gravity loads.

## 5.2.8 Saddles and Stanchions welded to the Pipe R2

- a. Shall be of the same material as the pipe and attached to the pipe per the design drawing.

## 5.2.9 Attachments to Pipe

Location of attachment to pipe shall be offset from attachment to structure to allow for thermal movement in accordance with the drawing.

## 5.2.10 Deleted R2

## 5.0 PROCEDURE - continued

### 5.2.11 Springs

- a. Travel stops shall not be removed prior to hydrostatic testing except as required by the specification.
- b. Check to assure spring canisters are not dented or damaged in any way as to interfere with their operational function.
- c. After hydrostatic testing, the cold setting must be adjusted and identified on the Hanger Inspection Log.

### 5.2.12 The distance shown below must be maintained between all hanger components contacting the pipe and Nuclear Class I and II but welds requiring ultrasonic inservice inspection.

3 inch Ø	requires 4 inches	each side of the weld
4 inch Ø	requires 4½ inches	each side of the weld
6 inch Ø	requires 5½ inches	each side of the weld
8 inch Ø	requires 6½ inches	each side of the weld
10 inch Ø	requires 6½ inches	each side of the weld
14 inch Ø	requires 7½ inches	each side of the weld
16 inch Ø	requires 9½ inches	each side of the weld

### 5.2.13 General

- a. Tape, Visqueen, etc., shall not be allowed between the pipe and hangers.
- b. Hangers to be installed so that they do not interfere with adjacent pipe (including insulation).
- c. All materials and components (springs, struts, beam attachments, clamps, fasteners, structural shape, etc.) shall be the type and size specified on the drawing.

## 6.0 DOCUMENTATION

### 6.1 Daily Hanger Inspection Log

- 6.1.1 The hanger inspector shall list each hanger inspected on the Daily Hanger Inspection Log with the required information.

REVISION NUMBER:

2

PROCEDURE NUMBER:

PIPE SUPPORT FINAL INSPECTION

PAGE 9 OF 12

## 6.0 DOCUMENTATION - continued

### 6.1 Daily Hanger Inspection Log

6.1.2 Each Inspection Log sheet shall be submitted to the CG&E Hanger Engineer on a daily basis. A file of the log sheets shall be maintained for permanent record.

6.2 For all unacceptable hangers, the inspector shall detail the reason for non-acceptance by a Nonconformance Report if it cannot be resolved by Paragraph 5.0.

6.3 Upon completion of final inspection and acceptance of the hanger, the inspection tag shall be filled in and attached to the hanger per Paragraph 5.1b.

HILTI "QUIK BOLT" INSTALLATION DATA

Bolt Size	Minimum Spacing	Minimum Edge Dist.	Minimum Embed.	Max. Mat'l Thickness	Torque Ft.-Lbf.	Length Code	Minimum Spacing From Unused Bolthole
2 3/4" 3/8" x 3 1/2" 5"	3 3/4"	1 7/8"	1 5/8"	7/8" 1 5/8" 3 1/8"	25 to 35	C E H	15/16
3 3/4" 1/2" x 5 1/2" 7"	5"	2 1/2"	2 1/4"	1 1/8" 2 7/8" 4 3/8"	45 to 65	E I L	1 1/4
4 1/2" 5/8" x 6" 8 1/2"	6 1/4"	3 1/8"	2 3/4"	1 3/8" 2 7/8" 5 3/8"	80 to 90	G J O	1 9/16
5 1/2" 3/4" x 7" 8 1/2" 10"	7 1/2"	3 3/4"	3 1/4"	1 3/4" 3 1/4" 4 3/4" 6 1/4"	125 to 175	I L O R	1 7/8

(TABLE i)

937281



Hanger No.: \_\_\_\_\_ Rigid \_\_\_\_\_ Snubber \_\_\_\_\_ Variable \_\_\_\_\_ Strut \_\_\_\_\_

Drawing No.: \_\_\_\_\_ Rev. \_\_\_\_\_ ISK/M-Dwg No. \_\_\_\_\_ Rev. \_\_\_\_\_

Item	Accept	Reject	Item	Accept	Reject
(5.2.1) Location			(5.2.7) Threaded		
(5.2.2) Configuration			Connections		
Dimensions			(5.2.10) U-bolt Clearance		
(5.2.4) Anchor Bolts			(5.2.5) Snubber Pin to Pin		
(5.2.5) Strut Pin to Pin			Hydro. Fluid		

Snubber C.P.S. \_\_\_\_\_ ins. Spring C.L. \_\_\_\_\_ LB.

REMARKS:

Hanger No.: \_\_\_\_\_ Rigid \_\_\_\_\_ Snubber \_\_\_\_\_ Variable \_\_\_\_\_ Strut \_\_\_\_\_

Drawing No.: \_\_\_\_\_ Rev. \_\_\_\_\_ ISK/M-Dwg No. \_\_\_\_\_ Rev. \_\_\_\_\_

Item	Accept	Reject	Item	Accept	Reject
(5.2.1) Location			(5.2.7) Threaded		
(5.2.2) Configuration			Connections		
Dimensions			(5.2.10) U-bolt Clearance		
(5.2.4) Anchor Bolts			(5.2.5) Snubber Pin to Pin		
(5.2.5) Strut Pin to Pin			Hydro. Fluid		

Snubber C.P.S. \_\_\_\_\_ ins. Spring C.L. \_\_\_\_\_ LB.

REMARKS:

Hanger No.: \_\_\_\_\_ Rigid \_\_\_\_\_ Snubber \_\_\_\_\_ Variable \_\_\_\_\_ Strut \_\_\_\_\_

Drawing No.: \_\_\_\_\_ Rev. \_\_\_\_\_ ISK/M-Dwg No. \_\_\_\_\_ Rev. \_\_\_\_\_

Item	Accept	Reject	Item	Accept	Reject
(5.2.1) Location			(5.2.7) Threaded		
(5.2.2) Configuration			Connections		
Dimensions			(5.2.10) U-bolt Clearance		
(5.2.4) Anchor Bolts			(5.2.5) Snubber Pin to Pin		
(5.2.5) Strut Pin to Pin			Hydro. Fluid		

Snubber C.P.S. \_\_\_\_\_ ins. Spring C.L. \_\_\_\_\_ - LB.

REMARKS:

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

PROCEDURE NUMBER: MC-5	MECHANICAL CONSTRUCTION TEST PROCEDURE
REVISION NUMBER: 2	
PROCEDURE TITLE: Pipe Support Final Inspection	PAGE <u>12</u> OF <u>12</u>

5

"DO NOT REMOVE OR ALTER THIS SUPPORT WITHOUT  
PRIOR APPROVAL FROM THE CG&E GENERAL  
ENGINEERING DEPARTMENT"

HANGER NUMBER:	REV. _____
REF. DWG:	REV. _____
SPRING/SNUBBER SETTING:	COLD
INSPECTED BY: _____	DATE: _____
HOT SET: _____	VERIFIED BY: _____
	DATE: _____

## INTER-OFFICE MEMORANDUM

ATTACHMENT "E"From N. Doligosa/A. Bansil-20

X-7728

Date MARCH 2, 1979Dept./Div. MD&DDProject No. 4130-05

Spec. No. \_\_\_\_\_

File No. \_\_\_\_\_

Page No. 1Client CG&E Co., CSOE Co. & DP&L Co., Stn.ZimmerUnit 1Subject Subsystem (s) Re-AnalysisTo: C. Podczerwinski - 20

cc: R. F. Scheibel (w/o Attachments) - 20  
 R. J. Pruski (w/o Attachments) - 20  
 S. G. Carlson (w/o Attachments) - 20  
 C. A. Nordstrom (w/o Attachments) - 20  
 R. W. Chien (w/o Attachments) - 21  
 A. Deguermendjian (w/o Attachments) - 21  
 S. Zidonis (w/o Attachments) - 23  
 E. Palomado (w/o Attachments) - 23  
 File

Listed below are the subsystems transmitted to MD&D, and the DDC's received after the final analysis has been done. Please advise us if re-analysis is needed so we could hold the release of hangers for fabrication.

<u>Subsystem</u>	<u>DDC (s) Received</u>
1. <u>LP-03</u>	<u>M-9031</u>
2. <u>RH-33</u>	<u>M-8055 ; M-9038</u>
3. <u>SC-01</u>	<u>M-8765</u>

Remarks:

(ND:AB:dd

POOR  
ORIGINAL

937284

From S. NEDELTON Date 3/23/79  
Dept./Div. EMD Project No. 433-00  
Spec. No. \_\_\_\_\_  
File No. \_\_\_\_\_  
Page No. \_\_\_\_\_  
Client C.G. & E. Stn. ZIMMER Unit 1  
Subject DESIGN DOCUMENT CHANGES

To:

N. DOLIGOSA (20)  
E. PALOMADO (23)

ATTACHED IS A LIST OF DDCS REVIEWED  
FOR EFFECTS ON PIPE STRESSES.

POOR  
ORIGINAL

SARGENT LUNDY

ENGINEERS  
CHICAGO

Safety-Related

Non-Safety-Related

Calc. No.

Rev.

Date

Page

of

Client

Project

Proj. No.

Equip. No.

Prepared by E.N.

Reviewed by

Approved by

Date 3-15-75

Date

Date

DDC  
NO.

COMMENTS

8723

OK

8791

POSITION OK, STRUCTURALLY BAD

8777

OK

3172

OK

3241

RESTRAINT AT TOO HIGH ANGLE

8821

POSITION OK, STRUCTURALLY BAD

8170

OK

8856

OK

8055

POSITION BAD, REQUIRES ANALYSIS

9033

POSITION BAD, REQUIRES ANALYSIS

POOR  
ORIGINAL

937286

SARGENT & LUNDY ATTACHMENT "G"  
INTER-OFFICE MEMORANDUM

From N. Delicose/A. Farsil-20 X-7728 Date 4-23-79  
Dept./Div. Mechanical Design & Drafting Div. Project No. 4130-00  
Spec. No. \_\_\_\_\_  
File No. \_\_\_\_\_  
Page No. 1  
Client CG&E Co., CSCE Co. & DP&L Co. SIn Zimmer Unit 1  
Subject REQUEST FOR RE-ANALYSIS

To: C. PODCZERWINSKI

cc: R. J. Pruski (w/o Attachments) - 20  
S. G. Carlson (w/o Attachments) - 20  
E. Palomado (w/o Attachments) - 23  
C. A. Nordstrom (w/o Attachments) - 20  
R. W. Chien (w/o Attachments) - 21  
File

Attached is a Piping Integrated Program output card deck and a  
copy of Analytical Drawing of Subsystem for Final Stress Analysis.

Subsystem:

- |   |                               |
|---|-------------------------------|
| 1. <u>RH-33 + (M-8055)</u><br><u>M-9038</u>                     | 7. <u>LP-11 +</u>             |
| 2. <u>RH-38 + (M-8174)</u>                                      | 8. <u>LP-15 (NEW)</u>         |
| 3. <u>RH-56 (NEW)</u>   | 9. <u>NB-41 *</u>             |
| 4. <u>RH-59 (NEW)</u>   | 10. <u>MS-20 *</u>            |
| 5. <u>RI-01 AT (123) DELETED DUE</u><br><u>TO 23# LOAD EACH</u> | 11. <u>WS-10 +</u> - 2241     |
| 6. <u>RI-17 (NEW)</u>   | 12. <u>FC-01(A) &amp; (B)</u> |

Remarks:

\* RE-ANALYSIS DUE TO PIPE REROUTING  
+ " " " " HANGER DDC

Released by: \_\_\_\_\_

File: \_\_\_\_\_

MD/AB/66  
Attachments

POOR ORIGINAL

337287

REV. (See Below)

ATTACHMENT "D"



1.0 PURPOSE

The purpose of this procedure is to document the process for finalizing piping analysis, hanger and restraint design and structural loading.

This procedure also defines the required interface and exchange of design information to ensure adequate interdepartmental and intradepartmental review.

2.0 DEFINITIONS

DDC - Design Document Change. These are change requests originated either by the field or by Sargent & Lundy.

3.0 RESPONSIBILITIES

- 3.1 EMD is responsible for the piping analysis, and maintaining a progress status and schedule for their analysis.
- 3.2 MD&D is responsible for providing the necessary physical design information for piping analysis, hanger design, hanger calculations and review, and hanger progress status report.
- 3.3 SD&D is responsible for providing a review, using engineering judgment of the support and support attachment to building structural steel or concrete for structural adequacy.
- 3.4 PMD is responsible for issuing the support design drawing for fabrication and construction following the hanger review.
- 3.5 The Supervising Piping Analyst shall be responsible for coordinating the piping analysis in EMD, and hanger review (drawing signature).
- 3.6 The Hanger Design Engineer shall be responsible for coordinating the hanger design, calculations and calculation review in MD&D.
- 3.7 The Supervising Structural Design Engineer shall be responsible for coordinating the support and attachment design review in SD&D.
- 3.8 The Project Manager shall be responsible for approving the hanger drawings after EMD review and affixing his Professional Engineer's stamp on each drawing prior to issuing for construction.
- 3.9 The Mechanical Project Engineer shall be responsible for issuing design drawings for construction.

#### 4.0 INSTRUCTIONS

4.1 MD&D shall finalize the pertinent analytical drawings and data. This shall consist of:

4.1.1 Updating of Analytical Drawing using the following:

- a. Single system drawing
- b. Final equipment drawing
- c. Final valve drawing
- d. P&ID drawing
- e. Piping line list
- f. Piping design tables

4.1.2 Updating the hanger configuration including:

- a. Field design changes (DDC's)
- b. Incorporating final restraint direction in analytical data

4.1.3 Sending the finalized analytical drawing, data, hanger drawings and review checklist to EMD for final analysis.

4.2 EMD shall perform the final piping analysis by:

- A. Checking the basic data received from MD&D for correctness of modeling, including valve distributed loads, valve centers of gravity, flanges and special fittings.
- B. Reviewing the support drawings for locations and directions. For non-standard supports, check the modeling of the support to see if it is capable to function as intended in the analysis.
- C. Performing the different analyses and providing the combined loads on all supports (including SRSS and Absolute Sum) to MD&D.
- D. Reviewing and signing the final support drawing prior to issue for construction or fabrication.

4.3 After receiving the final analysis from EMD, MD&D shall perform the following:

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- A. Check adequacy of standard hanger items.
  - B. Perform calculations and their review for non-standard items.
  - C. If inadequacies are found, review the design and, if necessary, request a field check for feasibility. R
  - D. If support design is changed, send drawings to EMD for functional review and signature in the approval box. R
  - E. Enter support information into "Pipe Support List."
  - F. Enter the support location into the structural loading drawing and send drawing to SD&D for review.
- 4.4 SD&D shall upon receipt of the support drawings from MD&D:
- A. Review the hanger and attachment for structural adequacy.
  - B. Return any comments to MD&D on the standard transmittal form per GDS 4.1.1.
- 4.5 SD&D shall prepare the "LS" loading drawings, and: R
- A. Review the adequacy of the structure for loadings from all supports.
  - B. Issue design changes for upgrading the building structure or structural steel to accommodate the total loading.

5.0 FIELD CHANGES

- 5.1 Design Document Changes (DDC's) received after a piping system is analyzed will be reviewed and processed per Project Instruction PI-ZI-2.1.
- 5.2 MD&D shall review the DDC for changes and, if necessary, incorporate the information per Paragraph 4.1.2 above and initiate a review and/or reanalysis per Paragraphs 4.2, 4.3, 4.4 and 4.5 above.

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- 5.3 Field changes which are determined not to require updating of the analytical drawings by MD&D shall be routed by MD&D per Paragraphs 4.2, 4.3, 4.4 and 4.5 for review. All reviewers will document their review on the DDC form by signing their name per Project Instruction PI-ZI-2.1, Paragraph 4.4.B.
- 5.4 If the proposed change on a DDC is determined unacceptable, an alternate design will be proposed by MD&D and issued to the field for feasibility. If the alternate design is found feasible by the field, the DDC will be processed per Paragraphs 5.1, 5.2 and 5.3 above.

6.0 REFERENCES

All design and review shall be in accordance with the following:

- 6.1 GQ-3.07, Sargent & Lundy Drawings
- 6.2 GQ-3.08, Design Calculations
- 6.3 GDS 4.1.1, Processing of Comments on Sargent & Lundy Drawings
- 6.4 PI-ZI-2.1, Preparation and Review and Approval of Design Document Change Notices

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