

DESIGN INPUT DOCUMENT INDEX

for

Design of the Modifications to the Auxiliary Building
and Turbine Building Bracing

(EWR 3322)

GAI W.O. #04-4824-022

Rochester Gas and Electric Corporation

GINNA STATION UNIT 1

Design Input Documents:	<u>Revision</u>	<u>Date</u>	<u>Submitted RG&E</u>	<u>Approved RG&E</u>
1. Design Criteria	0	2-26-82	3-4-82	3-26-82
	1	1-11-83	1-24-83	3-30-83
2. Input Layout/ Arrangement Drawing	0	2-26-82	3-4-82	3-26-82
	1	1-11-83	1-24-83	3-30-83
3. Safety Analysis	0	2-26-83	3-4-82	3-26-82
	1	1-11-83	1-24-83	3-30-83

Responsible GAI P.E. D. R. Panghell

<u>Index Revision</u>	<u>Date</u>	<u>Explanation</u>
1	1-11-83	Revised to add the Turbine Building Bracing Modifications.

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DESIGN CRITERIA

for

The Design of the Modifications to the Auxiliary Building
and Turbine Building Bracing

(EWR 3322)

(GAI W.O. #04-4824-022)

Rochester Gas and Electric Corporation

GINNA STATION Unit 1

Originator(s) J. M. Adametz & L. A. Luchesi

Revisions By: J. M. Adametz 1-11-83

GAI Approval D. E. Pungbell 2-26-82
Project Engineer Date

RG&E Approval 13N1-GR-L0908 3-26-82
Date

Revision

Approval

<u>No.</u>	<u>Page</u>	<u>Date</u>	<u>GAI</u>	<u>RG&E</u>
1	General Revisions	1-11-83	DRC DEC	13N1-GR- L1078, 3-30-83

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This design criteria follows the format and addresses the subjects established in GAI's "RG&E Ginna Station Continuing Service Project Management Manual" (PMM), Appendix U.

1.0 SUMMARY DESCRIPTION OF THE DESIGN

- 1.1.1 The North-South bracing of the Auxiliary Building to be modified is situated in the northeast corner of the building between columns L2-11a and L-11a and extends from EL. 270'-7 1/2" to EL. 312'-3/16". It consists of diagonal and horizontal angle members and wide flange column sections (reference 2.12).

The bracing has been evaluated in accordance with the design criteria defined in reference 2.18. As a result of that evaluation several components of the bracing system were identified as having stresses in excess of the allowables (reference 2.19).

The objective of this effort is to design the necessary modifications that would correct the overstressed condition.

The design shall be based on the analysis performed in the evaluation and shall generally conform to the conceptual modifications that were described in the Analysis Report (reference 2.19).

- 1.1.2 The East-West bracing of the Turbine Building to be investigated and modified (if required) is located on the South wall of the building between columns F-10 and F-11 and extends from El. 309' to 328'. It consists of diagonal double-angle members and horizontal wide-flange struts attached to the columns (ref. 2.26).

The bracing has been evaluated in accordance with the design criteria defined in reference 2.18. As a result of that evaluation no components of the bracing system were identified as having stresses in excess of the allowables (ref. 2.27). However, as a result of discussions with the NRC and Lawrence Livermore Laboratory (LLL) on August 13, 1982 (ref. 2.28), RG&E committed to reanalyze the bracing connections for a 231 kip axial tension load in the bracing. This 231 kip load (from LLL analysis) is considered to be the maximum load from combinations including the Safe Shutdown Earthquake.

The objective of this effort is to analyze the bracing connections for the above 231 kip load and, if overstressing occurs, design the necessary modifications to correct that overstress condition.

- 1.2 The function of both the Auxiliary Building and Turbine Building bracing is to transfer any horizontal loads that exist in the structure down through the building and into the foundation.



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2.0 REFERENCED DOCUMENTS

- 2.1 USNRC Regulatory Guide 1.29, "Seismic Design Classification," Revision 3, September 1978.
- 2.2 USNRC Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," Revision 1, December 1973.
- 2.3 USNRC Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," October 1973.
- 2.4 USNRC Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis," Revision 1, February 1976.
- 2.5 USNRC Standard Review Plan, Section 3.8.4, "Other Category 1 Structures," NUREG-75/087, November 1975.
- 2.6 USNRC NUREGCR-1821, UCRL-53014, "Seismic Review of the Robert E. Ginna Nuclear Power Plant as Part of the Systematic Evaluation Program" by the Lawrence Livermore Laboratory, November 15, 1980.
- 2.7 American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings," effective November 1, 1978.
- 2.8 American Concrete Institute (ACI), "Code Requirements for Nuclear Safety-Related Structures," ACI 349-80.
- 2.9 Rochester Gas and Electric Corporation, Robert Emmett Ginna Nuclear Power Plant Unit No. 1, "Final Facility Description and Safety Analysis Report."
- 2.10 "New York State Building and Construction Code," February 1978.
- 2.11 Gilbert Associates, Incorporated, report entitled "Ginna Station Seismic Upgrading Program Auxiliary Structures Seismic Analysis," May 15, 1980, including Addendum I, March 12, 1981.
- 2.12 Gilbert Associates, Incorporated, Drawing D-522-001, Revision 5, entitled "Auxiliary Building - Steel Framing - Column Schedule and Bracing."
- 2.13 Rochester Gas and Electric Corporation "Ginna Station Quality Assurance Manual", Volume 1 and 2, current revision.
- 2.14 Rochester Gas and Electric Corporation Specification QA-19, "Quality Assurance Requirements for Suppliers of Design, Procurement, and Construction Management Services," Revision 3, January 19, 1978.
- 2.15 Letter from D. Crutchfield, NRC to J. Maier, RG&E dated January 7, 1981.



- 4 0 2 6 0 5
- 2.16 Letter from L. White, RG&E to D. Crutchfield, NRC dated February 6, 1981.
 - 2.17 Letter from J. Maier, RG&E to D. Crutchfield, NRC dated March 23, 1981.
 - 2.18 Gilbert Associates, Incorporated document "Design Criteria for Evaluation of the Structural Steel Bracing of the Auxiliary and Turbine Buildings, May 18, 1981", issued by letter 13N1-GR-T3135 dated June 4, 1981.
 - 2.19 Gilbert Associates, Incorporated Analysis Report "Evaluation of the Structural Steel Bracing in the East Wall of the Auxiliary Building", issued by letter 13NI-GR-T3250 dated September 23, 1981.
 - 2.20 American Society for Testing and Materials (ASTM) "Standard Specification for Structural Steel" ASTM A36-80.
 - 2.21 American Society for Testing and Materials (ASTM) "Standard Specification for Carbon Steel Externally Threaded Standard Fasteners" ASTM A307-80.
 - 2.22 American Society for Testing and Materials (ASTM), "Standard Specification for High Strength Bolts for Structural Steel Joints" ASTM A325-80.
 - 2.23 American Welding Society (AWS): D1.1 Structural Welding Code.
 - 2.24 American Concrete Institute, ACI349-Appendix B, "Steel Embedments", August 1978.
 - 2.25 Letter from J. Maier, RG&E to D. Crutchfield, NRC dated October 28, 1981.
 - 2.26 Gilbert Associates, Incorporated, Drawing D-502-062, Revision 4, entitled "Turbine Building - Steel Framing - South Elevation".
 - 2.27 Gilbert Associates, Incorporated, Analysis Report "Evaluation of the Structural Steel Bracing in the South Wall of the Turbine Building", issued by letter 13N1-GR-T3308 dated October 15, 1981.
 - 2.28 Letter from J. Maier, RG&E to D. Crutchfield, NRC dated August 26, 1982.
 - 2.29 Letter from J. Maier, RG&E to D. Crutchfield, NRC dated November 13, 1981.
 - 2.30 Letter from J. Maier, RG&E to D. Crutchfield, NRC dated April 20, 1982.



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3.0 SEISMIC CATEGORY

The Auxiliary Building is Seismic Category I as defined by USNRC Regulatory Guide 1.29 (reference 2.1).

The Turbine Building is considered to be a Class III structure as described in Section 5.1.2.4 of the FSAR (ref. 2.9).

4.0 QUALITY GROUP

Not applicable.

5.0 CODE CLASS

Not applicable.

6.0 CODES, STANDARDS, AND REGULATORY REQUIREMENTS

The design shall be in compliance with the codes, standards, and regulatory requirements as specified in Section 2.0.

7.0 DESIGN CONDITIONS

Not applicable.

8.0 LOAD CONDITIONS

The Auxiliary Building bracing shall be designed for those loads that correspond to an extreme environmental condition as defined in the Standard Review Plan 3.8.4 (reference 2.5). Pipe rupture, tornado, wind, and missile loads shall not be part of this design.

The Turbine Building bracing connections shall be evaluated and designed, if required, for the load defined in Section 1.1.2.

Loads

a. Dead Load (D)

Dead load is the weight of the structure and any permanently attached equipment, piping, electrical trays, etc.

b. Live Load (L)

Live load is the uniform load for which the floors of the building are designed. Any moving load is also considered as live load.

c. Seismic Load (E')

Seismic loads are those caused by acceleration of the mass of the building during a Safe Shutdown Earthquake (SSE).

Loads generated by the Safe shutdown Earthquake are designated (E').

Seismic loads shall be obtained from the data available from the dynamic analysis that was done for the Ginna Station in May 1980 (reference 2.11).

Load Combinations and Stress Limits

Load Condition	Load Combination	Stress Limit
Extreme Environmental	D + L + E'	1.6S
	D + E'	1.6S

S - The required section strength based on the elastic design method and the allowable stresses defined in AISC (reference 2.7)

9.0 ENVIRONMENTAL CONDITIONS

The ambient environmental conditions are as follows:

Temperature	60° - 120°F
Humidity	20% - 80%
Pressure	Atmospheric
Radiation	Negligible

10.0 INTERFACE REQUIREMENTS

Structural modifications shall be locally designed and tied into the existing overall structural framing system. The modifications shall be coordinated with existing systems as much as possible to avoid disruption of system service.

11.0 MATERIAL REQUIREMENTS

Existing materials shall be assumed to be as shown on the construction drawings.

Additional structural shapes and plates shall conform to ASTM A36.

Additional bolts shall conform to ASTM A307 or ASTM A325.

Welding electrodes shall be E70XX and compatible with base metal.

Concrete expansion anchors shall be Hilti-Kwik bolts.

12.0 MECHANICAL REQUIREMENTS

Not applicable.



13.0 STRUCTURAL REQUIREMENTS

The bracing shall be designed to meet the stress criteria specified in Section 8.0, and in accordance with referenced documents in Section 2.0.

14.0 HYDRAULIC REQUIREMENTS

Not applicable.

15.0 CHEMISTRY REQUIREMENTS

Not applicable.

16.0 ELECTRICAL REQUIREMENTS

Not applicable.

17.0 OPERATIONAL REQUIREMENTS

Not applicable.

18.0 INSTRUMENTATION AND CONTROL REQUIREMENTS

Not applicable.

19.0 ACCESS AND ADMINISTRATIVE CONTROL REQUIREMENTS

Not applicable.

20.0 REDUNDANCY, DIVERSITY AND SEPARATION REQUIREMENTS

Not applicable.

21.0 FAILURE EFFECTS REQUIREMENTS

The bracing shall be designed to withstand the design load conditions stated in Section 8.0 and remain functional during and after a Safe Shutdown Earthquake (SSE).

22.0 TEST REQUIREMENTS

Not applicable.

23.0 ACCESSIBILITY, MAINTENANCE, REPAIR AND INSERVICE INSPECTION REQUIREMENTS

Not applicable.

24.0 PERSONNEL REQUIREMENTS

Not applicable.



25.0 TRANSPORTABILITY REQUIREMENTS

Not applicable.

26.0 FIRE PROTECTION REQUIREMENTS

Not applicable.

27.0 HANDLING REQUIREMENTS

Not applicable.

28.0 PUBLIC SAFETY REQUIREMENTS

Not applicable.

29.0 APPLICABILITY

Not applicable.

30.0 PERSONNEL SAFETY REQUIREMENTS

Not applicable.

31.0 UNIQUE REQUIREMENTS

Not applicable.

