June 19, 1972

Mr. Edward J. Bloch, Acting Director
Division of Reactor Licensing
U.S. Atomic Energy Commission
7920 Norfolk Avenue
Bethesda, Maryland 20014

Subject: R.E. Ginna Nuclear Power Plant Unit No. 1
Pressurizer Safety Valves

Dear Mr. Bloch:

In March of this year the Rochester Gas and Electric Corporation began a review of the major safety valve installations installed on Class 1 and Class 2 systems at Ginna Station Unit No. 1. A report on the main steam safety valves was submitted to you at a meeting at your office on June 5, 1972. We are herewith submitting the results of our dynamic analysis of the pressurizer safety valve discharge piping at Ginna Station.

The initial analysis of the inlet and discharge piping of the pressurizer safety valves PCV 434 and PCV 435 indicated the need for installation of additional supports on the Class 2 discharge pipe. During the recent refueling shutdown, eight hydraulic sway braces and four rigid pipe supports were installed on the safety valve discharge piping. The first anchor on the downstream Class 2 piping for each valve was also upgraded to provide additional system rigidity.

A time history hydraulic analysis was performed by Westinghouse Electric Corporation to determine the magnitude and resolution of the momentum and pressure forces acting on the discharge piping during the valve relieving condition. The results of this program were used to perform a dynamic stress analysis of the Class 1 inlet piping and the Class 2 discharge piping. A more detailed description of the methods of analysis used in both the hydraulic and stress analysis appears in Appendix I to this report.

TABLE I

DYNAMIC STRESS SUMMARY

CLASS I PIPING PCV 434, 435

LOCATION	STRESS Ksi				
	$S_{D.\ W\ +}$ Reaction	S Seismic	$S_{Long.}$ Pressure	S_t Total Mechanical	S_E Thermal Expansion
1) Pressurizer Nozzle					
PCV 434 at Pt. 286	2.3(Max)	2.2	3.5	8.0	20.7(Max)
PCV 435 at Pt. 315	1.9	7.7	3.1	12.7	12.5
2) Max. Stress in Loop					
PCV 434 at Pt. 240	.8	1.9	3.1	5.8	13.6
PCV 435 at Pt. 260	1.2	3.0	3.1	7.3	12.4
3) Safety Valve Inlet					
PCV 434 at Pt. 223	.8	1.6	3.1	5.5	8.6
PCV 435 at Pt. 242	.4	3.0	3.1	6.5	8.9

Material - SA 376 Stainless Grade 316

B31.1 Allowable Stress - Sustained Mechanical Load

$$Sa > S_{(\text{Deadload + reaction})} + S_{\text{Seismic}} + S_{\text{Long. Pressure}}$$

$$Sa = 1.2\ S_H = 1.2\ (17.05) = 20.45 \text{ Ksi}$$

B31.1 Allowable Expansion Stress S_E

$$Sa = f\ (1.25\ S_c + .25\ S_h)$$

$$Sa = 1\ (1.25[18.75]) + .25\ (17.05) = 27.66 \text{ Ksi}$$

TABLE II

DYNAMIC STRESS ANALYSIS

CLASS II PIPING PCV 434, 435

LOCATION	STRESS Ksi				
	$S_{D.W+Reaction}$	$S_{Seismic}$	$S_{Long.Pressure}$	S_{t} Total Mechanical	S_{E} Thermal Expansion
1) Safety Valve Discharge					
PCV 434 at Pt. 223	0.6	1.1	3.1	4.8	13.4
PCV 435 at Pt. 234	2.6 (Max)	3.3	3.1	9.0	18.4 (Max)
2) PCV 434 at Pt. 210	0.9	1.8	3.1	5.8	3.5
PCV 435 at Pt. 210	1.1	3.2	3.1	7.4	3.0
3) At Header					
PCV 434 at Pt. 103	0.2	3.5	3.6	7.3	4.1
PCV 435 at Pt. 104	0.5	3.9	3.6	8.0	5.6

Material SA 106B Carbon Steel

B31.1 Allowable Stress - Sustained Mechanical Load

$Sa > S_t = S_{(Dead\ Load + reaction)} + S_{(Seismic)} + S_{(Long.\ pressure)}$

$Sa = 1.25_H = 1.2(15.0) = 18.0$ Ksi

B31.1 Allowable Expansion Stress S_E

$S_A = f(1.25\ S_c + .25\ S_h)$

$S_A = 1(1.25\ [15]) + .25\ [15] = 22.5$ Ksi

June 19, 1972
Mr. Edward J. Bloch

The results of the dynamic stress analysis for the Class 1 piping are summarized in Table I. The dynamic analysis performed with the new supports installed on the Class 2 system shows that the Class 1 piping is well protected from the effects of the transient forces acting on the discharge piping during safety valve relieving condition. The dynamic analysis also indicates that the Class 2 safety valve discharge piping with the new supports meets the design requirements of B31.1 for sustained mechanical and thermal loading. A summary of this analysis is shown on Table II.

The Westinghouse Electric Corporation has also reviewed the nozzle design for each safety valve attachment to the pressurizer. The results of this review show that the structural integrity of the safety valve nozzle remains intact during the transient loading and all the requirements of Section III of the ASME Pressure Vessel Code for primary and secondary stress are met.

Very truly yours,

R. R. Koprowski
Vice President and
Chief Engineer