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Vice President
Nuclear Operations

April 22, 2004

Mr. Robert L. Clark
Office of Nuclear Regulatory Regulation
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: Design Information for the Proposed Control Room Emergency Air Treatment System (CREATS) Modification
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

References: 1. Letter from Robert C. Mecredy (RG&E) to Robert L. Clark (NRC) dated May 21, 2003, License Amendment Request Regarding Revision of Ginna Technical Specification Sections 1.1, 3.3.6, 3.4.16, 3.6.6, 3.7.9, 5.5.10, 5.5.16, and 5.6.7 Resulting From Modification of the Control Room Emergency Air Treatment System and Change in Dose Calculation Methodology to Alternate Source Term.

Dear Mr. Clark:

In a conference call on February 5, 2004 between RG&E and members of your staff, RG&E agreed to provide design information related to the piping interconnection between the relay room annex and the control building east wall. The attachments to this letter contain the requested information and should be docketed as an addendum to Reference 1.

I declare under penalty of perjury under the laws of the United States of America that I am authorized by Rochester Gas and Electric Corporation to submit this documentation and that the foregoing is true and correct.

If you have questions regarding the content of this correspondence please contact Mr. Mike Ruby at (585) 771-3572.

Very truly yours

Executed on April 22, 2004

Robert C. Mecredy

Attachments:

1. Outside Piping Analysis Summary
2. Drawings 33013-3100 and 33013-3102

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Attachment 1

Outside Piping Analysis Summary

Outside Piping Analysis Summary

Impact of Relay Room Annex on the Control Building response spectra.

The floor response spectra of the Control Building and other site buildings are based on a STARDYNE finite element model produced under the Seismic Upgrade Program. The Control Building response spectra was developed using Regulatory Guides 1.60 and 1.61,under the Ginna Station Seismic Upgrade Program, Auxiliary Structures Seismic Analysis, Addendum I, Additional Floor Response Spectra, dated 3/12/81, by Gilbert Associates. In the late 1980's the Control Building Relay Room East wall was modified as part of the Ginna Structural Upgrade Program. A separate enclosure (Relay Room Annex) was installed to address the SEP topics of Severe Weather Phenomenon, Wind and Tornado, Tornado Missile and Flooding. As a result of adding the Relay Room Annex enclosure, ABS Consulting, Inc. was contracted to:

- Investigate the impact of Relay Room Annex modification on the floor response spectra of the Control Building.
- Develop floor response spectra for the Relay Room Annex.
- Develop seismic differential displacements between the Control Building and the Relay Room Annex.

ABS Consulting developed calculation # 1292405-C-001 using SAP2000, the STARDYNE inputs for the existing Control Building response spectra model, drawings of the Relay Room Annex, and masses of the equipment to be installed in the building. Analyses of the Control Building with and without the Relay Room Annex and with varying soil properties beneath the Annex, showed that the Relay Room Annex adds mass and stiffness to the Control Building and that the existing response spectra for the Control Building structure remains bounding and also bounds the Relay Room Annex response spectra. Additionally, the calculation provides seismic differential displacements that were used to analyze the duct/pipe between the Relay Room Annex and the Control Building.

Summary of seismic qualification for duct/pipe between the Relay Room Annex and the Control Building.

The supply and return air ducts running between the Relay Room Annex and the Control Building for Control Room Emergency Air Treatment System (CREATS) were seismically analyzed as piping in accordance with PCR 2000-0024, Design Criteria section 9.6. The computer program PS+CAEPIPE along with the seismic differential displacements from ABS Consulting calculation # 1292405-C-001 were used and determined the piping loads and stresses for all piping runs. The piping was modeled as fixed at both anchor points and considers deadweight, thermal, Operating Basis Earthquake (OBE), and Safe Shutdown Earthquake (SSE). Friction loads were not considered since there are no movements that cause the pipe to slide over any member support. The outputs from the computer model were combined to determine the maximum ANSI B31.1 Stress Due to Sustained Loads (equation 11), Stress Due to Occasional Loads (equation 12), and Thermal Expansion Stress Range (equation 13). The maximum piping stresses for equations 11, 12 (OBE), 12 (SSE), and 13 are well below the defined allowable stress. The maximum piping stresses are summarized below:

	PIPE STRESS SUMMARY		
	Supply Air Pipe Maximum Stress (psi)	Return Air Pipe Maximum Stress (psi)	B31.1 Piping Allowable Stress (psi)
Equation 11	52	195	15000
Equation 12 (OBE)	177	418	18000
Equation 12 (SSE)	296	741	27000
Equation 13	6854	8841	37500

Additionally, PS+CAEPIPE also defined the loads and moments at the connections to the Relay Room Annex Roof and the Control Building East Wall. Analysis of the loads and moments applied to the building structure connections were performed. The connection at the Relay Room Annex Roof was designed using the return air duct loads since they were bounding relative to the supply air duct. A summary of the design and allowable values for the Relay Room Annex Roof connection is shown below:

	Relay Room Annex Roof Baseplate	
	Design	Allowable
Anchor Bolt Tension (psi)	15298	41250
Anchor Bolt Shear (psi)	3911	27500
Bolt Interaction	.51	1
Concrete Pullout Strength (lbs)	4620	28679
Plate Thickness (in)	0.92	1.25
Weld Size (in)	.04	.375

The connection at the Control Building East Wall was designed using the return air duct loads since they were bounding over that of the supply air duct. A summary of the design and allowable values for the Control Building East wall is shown below:

	Control Building East Wall Connection	
	Design	Allowable
Plate Thickness (in)	0.72	0.75
Weld Sizes (in)	.03	.375
Armor Plate Moment (lbs-ft)	10854	48417

Summary of structural qualification for duct/pipe between the Relay Room Annex and the Control Building.

The supply and return air ducts running between the Relay Room Annex and the Control Building for CREATS were also structurally analyzed in accordance with PCR 2000-0024 Design Criteria Attachment A. The structural analysis included dead loads, live loads, normal wind loads, and design tornado loads. Lateral Earth Pressure and Buoyant Force was not considered since it is not applicable to this application. Additionally, Snow loads were not considered since the majority of the piping is vertical and the horizontal piping will not allow for a significant buildup due to its geometry. A conservative maximum wind speed of 188 mph is used in the analysis for wind loading and the two specific design basis tornado missiles considered per PCR 2000-0024 Design Criteria are:

- 8 lb, one inch diameter steel rod, 36 inches long traveling at 116 ft/second.
- 1490 lb, 13.5 inch diameter utility pole, 35 feet long traveling at 77 ft/sec.

The penetration analysis compared the kinetic energy of the two tornado missiles to the energy required to penetrate the pipe/duct. The acceptance criteria was that the total kinetic energy of the missile prior to impact is less than the energy required for penetration. Based on the analysis results, the CREATS pipe/duct would not be penetrated by either design basis missiles, the 13.5 inch diameter utility pole or the one inch diameter steel rod. The safety factor for missile penetration by the 13.5 inch/1490 lb utility pole was found to be 7.23. Additionally, the safety factor for missile penetration by the one inch - 8 lb steel rod was found to be 11.96.

The impact analysis models the pipe/duct as a elastic-plastic spring using the approach specified in Civil Engineering and Nuclear Power "Vol V: Report of the ASCE Committee on Impactive and Impulsive Loads", which also defines the forcing function of the utility pole missile. That forcing function was factored to consider the site specific design basis missile. Since a forcing function is not available for the for the case of the steel rod missile impact, the analysis for this case will be based on the principles of conservation of energy and momentum. The acceptance criteria for the impact analysis of both missiles was that the pipe/duct remain in the elastic range and is therefore ductile enough to absorb the energy transmitted to it during the impact. The analysis results show that the CREATS pipe/duct remains in the elastic range for the impact of the design basis steel rod and the utility pole. In performing this analysis, it was conservatively assumed that the pipe/duct was unsupported creating a longer piping span. Thus, it can be concluded that the pipe/duct is ductile enough such that the impact from either missile would not cause CREATS pipe/duct failure.

Utilizing ANSI A58.1-1982 and a maximum wind speed of 188 mph the velocity pressure and total wind pressure was determined. The return air duct was used in determining the velocity pressure and wind pressure since it has a higher surface area over the supply duct. The results from the total wind pressure were used in conjunction with the results from the impact analysis for combined load combinations. The results found that the velocity pressure is 119.4 Lb/Ft^2. Using the design criteria case 2 load combination of deadweight, live load and tornado wind load the combined stress of 4098 psi was well below the acceptance criteria of 23100 psi.

The results from the impact analysis and tornado wind analysis were combined along with the deadweight and live loads to determine the maximum stress on the pipe/duct. The combined loads were compared to the allowable stress to determine its acceptability. A combined load stress lower than the allowable stress results in sufficient ductility that the pipe/duct can withstand the combined deadweight, live, tornado wind, and missile impact loads. The pipe/duct was determined to have sufficient ductility to withstand the impact of both missiles. Using the design criteria case 8 load combination of normal operating, tornado wind and tornado missile the combined stress of 33848 psi was below the acceptance criteria of 36960 psi.

Drawings

Drawings associated with the duct/piping are attached. Drawing 33013-3100 provides the duct/pipe location, anchorage to the Relay Room Annex roof, and routing from the Relay Room Annex to the Control Building. Drawing 33013-3102 provides the details for penetrating the Control Room East wall, installation of the duct/pipe, and anchorage to the Control Building East wall.

Attachment 2

Drawings
33013-3100
33013-3102

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: DWG NO.33013-3100 "RELAY ROOM ANNEX ROOF PENETRATIONS AND CREATS DUCTS."

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