

April 14, 1998

Dr. Robert C. Mecredy
Vice President, Nuclear Operations
Rochester Gas and Electric Corporation
89 East Avenue
Rochester, NY 14649

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO GENERIC
LETTER 96-06 RESPONSE FOR R. E. GINNA NUCLEAR NUCLEAR
POWER PLANT (TAC NO. M96814)

Dear Dr. Mecredy:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment-air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. You provided the assessment for the Ginna plant in a letter dated January 30, 1997. In order to complete our review of the resolution of the waterhammer and two-phase flow issues, we have determine the need for additional information as discussed in the enclosure. We request that you provide this information by June 30, 1998, in order to support our review schedule for GL 96-06.

Sincerely,

ORIGINAL SIGNED BY:
Guy S. Vissing, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure: Request for Additional
Information

cc w/encl: See next page

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Dr. Robert C. Mecredy
Vice President, Nuclear Operations
Rochester Gas and Electric Corporation
89 East Avenue
Rochester, NY 14649

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO GENERIC
LETTER 96-06 RESPONSE FOR R. E. GINNA NUCLEAR NUCLEAR
POWER PLANT (TAC NO. M96814)

Dear Dr. Mecredy:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment-air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. You provided the assessment for the Ginna plant in a letter dated January 30, 1997. In order to complete our review of the resolution of the waterhammer and two-phase flow issues; we have determine the need for additional information as discussed in the enclosure. We request that you provide this information by June 30, 1998, in order to support our review schedule for GL 96-06.

Sincerely,

ORIGINAL SIGNED BY:
Guy S. Vissing, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

April 14, 1998

Dr. Robert C. Mecredy
Vice President, Nuclear Operations
Rochester Gas and Electric Corporation
89 East Avenue
Rochester, NY 14649

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO GENERIC
LETTER 96-06 RESPONSE FOR R. E. GINNA NUCLEAR POWER
PLANT (TAC NO. M96814)

Dear Dr. Mecredy:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. You provided the assessment for the Ginna plant in a letter dated January 30, 1997. In order to complete our review of the resolution of the waterhammer and two-phase flow issues, we have determine the need for additional information as discussed in the enclosure. We request that you provide this information by June 30, 1998, in order to support our review schedule for GL 96-06.

Sincerely,

A handwritten signature in cursive script, appearing to read "Guy S. Vissing".

Guy S. Vissing, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure: Request for Additional
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Dr. Robert C. Mecredy
Rochester Gas and Electric Company

R.E. Ginna Nuclear Power Plant

cc:

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Mr. Paul Eddy
New York State Department of
Public Service
3 Empire State Plaza, 10th Floor
Albany, NY 12223

REQUEST FOR ADDITIONAL INFORMATION FOR RESOLUTION OF
GENERIC LETTER 96-06 ISSUES AT
THE R. E. GINNA NUCLEAR POWER PLANT

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. The Rochester Gas and Electric Corporation (the licensee) provided its assessment for the Ginna plant in a letter dated January 30, 1997. It is not clear from the licensee's response that the worst-case assumptions have been identified for the waterhammer and two-phase flow scenarios and that all assumptions that have been used are applicable to the Ginna plant. Therefore, in order to adequately assess the licensee's resolution of the waterhammer and two-phase flow issues, the following additional information is requested:

1. If a methodology other than (or in addition to) that discussed in NUREG/CR-5220, "Diagnosis of Condensation-Induced Waterhammer," was used in evaluating the effects of waterhammer, describe this alternate methodology in detail. Also, explain why this methodology is applicable and gives conservative results for the Ginna plant (typically accomplished through rigorous plant-specific modeling, testing, and analysis).
2. For both the waterhammer and two-phase flow analyses, provide the following information:
 - a. Identify any computer codes that were used in the waterhammer and two-phase flow analyses and describe the methods used to bench mark the codes for the specific loading conditions involved (see Standard Review Plan Section 3.9.1).
 - b. Describe and justify all assumptions and input parameters (including those used in any computer codes) such as amplifications due to fluid structure interaction, cushioning, speed of sound, force reductions, and mesh sizes, and explain why the values selected give conservative results. Also, provide justification for omitting any effects that may be relevant to the analysis (e.g., fluid structure interaction, flow induced vibration, erosion). While the January 30, submittal was not expected to be complete in this regard, examples of information that is contained in the January 30, submittal that has not been adequately justified include:
 - assumption that the containment recirculation fan coolers (CRFCs) will coast down over a period of 30 seconds;
 - applicability and validity of EPRI interim and draft reports (references 3.7 and 3.8 of the January 30, submittal);
 - other sections of the CRFCs will resist the effects of waterhammer peak pressure;
 - the amount of steam formed and extent of the steam envelope that is formed within the service water piping (i.e., where is the steam/water interface and what is the basis for water temperature assumptions); and

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- water temperature assumption used for evaluation of waterhammer in the service water system discharge piping system.
- c. Provide a detailed description of the "worst case" scenarios for waterhammer and two-phase flow, taking into consideration the complete range of event possibilities, system configurations, and parameters. For example, all waterhammer types and water slug scenarios should be considered, as well as temperatures, pressures, flow rates, load combinations, and potential component failures. Additional examples include:
- the effects of void fraction on flow balance and heat transfer;
 - the consequences of steam formation, transport, and accumulation;
 - cavitation, resonance, and fatigue effects; and
 - erosion considerations.
- Licensees may find NUREG/CR-6031, "Cavitation Guide for Control Valves," helpful in addressing some aspects of the two-phase flow analyses.
- d. Confirm that the analyses included a complete failure modes and effects analysis (FMEA) for all components (including electrical and pneumatic failures) that could impact performance of the cooling water system and confirm that the FMEA is documented and available for review, or explain why a complete and fully documented FMEA was not performed.
- e. Explain and justify all uses of "engineering judgement."
3. Determine the uncertainty in the waterhammer and two-phase flow analyses, explain how the uncertainty was determined, and how it was accounted for in the analyses to assure conservative results for the Ginna plant.
4. Confirm that the waterhammer and two-phase flow loading conditions do not exceed any design specifications or recommended service conditions for the piping system and components, including those stated by equipment vendors; and confirm that the system will continue to perform its design-basis functions as assumed in the safety analysis report for the facility.
5. Provide a simplified diagram of the system, showing major components, active components, relative elevations, lengths of piping runs, and the location of any orifices and flow restrictions.

