U. S. NUCLEAR REGULATORY COMMISSION
REGION I

REPORT NO.	50-244/92-11
DOCKET NO.	50-244
LICENSE NO.	DPR-18
LICENSEE:	Rochester Gas & Electric Corporation
FACILITY NAME:	R. E. Ginna Nuclear Power Plant
INSPECTION AT:	Ontario, New York
INSPECTION DATES:	August 10-14, 1992

INSPECTOR: Robert A. McBrearty — 9/1/92
R. A. McBrearty, Reactor Engineer, Materials Section, EB, DRS — Date

APPROVED BY: E. H. Gray — 9/1/92
E. Harold Gray, Chief, Materials Section, Engineering Branch, DRS — Date

Areas Inspected: An unannounced inspection was conducted of the licensee's erosion/corrosion (E/C) inspection program to ascertain that activities relative to the long-term E/C monitoring program are being accomplished in accordance with Generic Letter 89-08 and licensee commitments and procedures. Additionally, inservice inspection data were reviewed and the activities related to the "B" reactor compartment cooler tube leak were examined.

Results: The E/C program is an excellent program. The staff responsible for E/C program development and implementation (Engineering, Materials Evaluation & Inspection Services and Ginna Maintenance) is qualified and knowledgeable of the activities for which it is responsible. To aid in program development, the licensee has contracted a consultant who has experience in that area at other nuclear facilities. Inservice inspection results were clearly and fully documented, and the activities related to the cooler tube leak were evidence of the maintenance staff's familiarity with the ASME Code and requirements applicable to the incident.

1.0 EROSION/CORROSION (E/C) PROGRAM (49001)

1.1 Background

Concerns regarding erosion and corrosion in balance of plant piping systems has been heightened as a result of the October 6, 1986, feedwater line rupture that occurred at Surry Unit 2. This event was the subject of NRC Information Notice 86-17, Bulletin 87-01 and Generic Letter (GL) 89-08. The GL specifies that all licensees provide assurances that a program, consisting of systematic measures to ensure that E/C does not lead to degradation of single and two phase high energy carbon steel systems, has been implemented.

An effective E/C program will detect erosion of high energy carbon steel piping before the pipe wall is significantly reduced below the design or piping code minimum wall thickness. This program should reduce risk to the plant staff and prevent unnecessary system transients, thereby contributing to the safety of the public.

1.2 Inspection Objective

The inspection was conducted to determine whether licensee activities relative to the long-term E/C monitoring program are being accomplished in accordance with NRC requirements and licensee commitments and procedures.

1.3 Licensee Response to Generic Letter (GL) 89-08

Generic Letter 89-08, "Erosion/Corrosion-Induced Pipe Wall Thinning," dated May 2, 1989, asked licensees to provide assurances that a program, consisting of systematic measures to ensure that erosion/corrosion does not lead to degradation of single phase and two phase high energy carbon steel systems, has been implemented. Licensees were to respond within 60 days of their receipt of the GL.

Licensee letters, dated 7/21/89, 6/5/90, 11/20/90 and 2/6/91, submitted to the NRC in response to Bulletin 87-01 and Generic Letter 89-08 describe the evolution of the licensee's current erosion/corrosion program. The February 6, 1991 letter notes that an E/C integrated program plan document has been prepared, and lists related procedures and specifications which have been approved by the licensee for use at Ginna. The letter further notes that the licensee's commitments and actions relative to Generic Letter 89-08 are completed.

The inspector verified that the licensee's commitments and actions described by its responses to the bulletin and GL were completed, and the program was implemented during the 1991 and 1992 refueling outages.

1.4 Erosion/Corrosion Program Responsibilities

The licensee contracted the ALTRAN Corporation to prepare an erosion/corrosion program manual. Areas described in the manual include program description, system selection criteria, selection of components for examination, non-destructive examination, wear rate calculation and predicted wall thickness, acceptance criteria and corrective action. The current E/C program system and component selection process was performed by ALTRAN using the EPRI developed CHEC and CHECMATE computer programs to model plant systems based on the appropriate plant specific data provided by the licensee's engineering department. Additionally, industry experience, plant history and extensive plant inspection data compiled over a period of approximately 10 years were used in the selection process. ALTRAN has been contracted to provide training to the licensee's engineering personnel in the use of the CHECMATE program.

Responsibility for the various areas discussed in the manual is defined by licensee procedures and is divided among Mechanical Engineering, Material Engineering & Inspection Services (ME&IS) and Plant Maintenance.

In addition to the above, the licensee has established an Erosion/Corrosion Management Integrated Program Plan incorporating an E/C management project team concept. The team mission, in part, is to combine interdepartmental resources to limit E/C in carbon steel piping systems at Ginna Station. The E/C integrated plan delineates the procedures and functional group responsibilities for effective management of the program.

Mechanical Engineering

Mechanical engineering has overall responsibility for the E/C program. Its responsibilities are listed by the Ginna Station Erosion/Corrosion Management Integrated Program Plan, and are further defined by Procedure No. QE-333, Revision 0, "Erosion/Corrosion Control Monitoring Program for Carbon Steel Piping." Those responsibilities include identifying and prioritizing systems which are susceptible to E/C, selecting piping locations for examination and providing the list to ME&IS for implementation, the establishment of examination schedules and acceptance criteria, initiation of corrective action and the generation and maintenance of E/C drawings. Engineering also is responsible for the evaluation analysis and disposition of inspection results and the determination of the frequency of subsequent inspections. The ALTRAN Corporation, in addition to providing the services discussed earlier, assists the engineering department in selecting and prioritizing the E/C program scope. Lead responsibility for the erosion/corrosion program has been assigned to a member of the mechanical engineering staff who is a participant in the EPRI CHECMATE Users Group (CHUG).

Materials Engineering & Inspection Services

Materials Engineering & Inspection Services is responsible for establishing component grid layouts, the performance of component inspections and reporting inspection results, providing material verification when required and the review of E/C drawings for inspection suitability. For inspection results that show thickness measurements below the threshold value established by engineering, ME&IS must initiate a Wall Thickness Report (WTR) and forward the WTR to the Plant Maintenance.

Ginna Plant Maintenance

Procedure No. M-1001, Revision 2, "Ginna Maintenance Department Erosion/Corrosion Program Requirements," describes maintenance department responsibilities associated with the E/C program. Those responsibilities include transmitting WTRs to engineering, notification to engineering of any pipe, fitting or component replacement along with pertinent information regarding material and the development of replacement material specifications/requisition based on direction by engineering. Additional responsibilities assigned to maintenance require the department to obtain engineering concurrence prior to making any change affecting component location or orientation.

In response to WTRs a Repair/Replacement Evaluation Request (RRER) is prepared by engineering if corrective action is required. The RRER, in this case, is the closeout mechanism for the WTR. Procedure No. M-1001 requires that maintenance supervision apprise the Outage Coordinator and appropriate management of the status of unevaluated E/C Wall Thickness Reports and in-progress work associated with RRERs requiring repair or replacement action during post outage plant start-up preparation. This corrects the previous apparent lack of control of WTRs as discussed in NRC Inspection Report No. 91-20. Maintenance supervision also is responsible for developing justification for continued system start-up in cases where repair or replacement is incomplete at the time the system is needed. When repair, replacement, or other corrective action specified on the respective RRER is completed, the RRER is returned for retention to the Engineering Manager.

1.5 Inspection Activities

The licensee's primary inspection method incorporates ultrasonic examination techniques for measuring pipe wall thickness. Because of difficulties encountered when attempting to ultrasonically measure small diameter piping, the licensee developed a radiographic measuring technique which has been determined to produce acceptable results when used on piping of 2" diameter and smaller.

When the piping selection is made and prioritized by engineering, the inspection sample list is transmitted from engineering to ME&IS for implementation. The information includes system and component identification, pipe size and the threshold wall thickness value below which a WTR must be initiated by ME&IS.

Wall thickness data are collected using a data logger, which appears to be an industry standard practice, and downloaded by the ME&IS E/C Coordinator to a computer data file. The E/C Coordinator processes the data using "MINWALL," a computer program developed for that purpose by the licensee. Hard copies of the data are reviewed by the E/C Coordinator and, if any thickness measurement is at or below the threshold value, a WTR is initiated. The data package, including the WTR when required, is further reviewed by the ME&IS NDE Level III and the ISI Implementation Engineer. At the same time a copy of the data package, including the WTR, is sent to Ginna maintenance for its review. Ginna maintenance assigns a number to the WTR and sends the data to engineering who evaluates and disposition the data. If further inspection is required, ME&IS is notified, a repair/replace disposition is reported to maintenance and when the repair or replacement is completed, ME&IS is notified to perform a baseline inspection of the new material. In practice, replacement piping is inspected (wall thickness measurements) when possible, when the material is in the shop and more accessible to inspection.

Defective piping is replaced in-kind or with a chromium-molybdenum alloy steel at the direction of engineering. Stainless steel is under consideration as a replacement material.

At present, the following systems are included in the Ginna E/C program:

- Condensate
- Feedwater
- Main Steam
- Moisture Separator Reheater Piping
- Extraction Steam
- Gland Seal/Pump Seal
- Steam Generator Blowdown
- Turbine Crossunder

The licensee is currently in the process of expanding the program with the inclusion of small bore piping.

During the 1992 refueling outage, 200 areas were scheduled for E/C inspection. The replacement of 40 of those areas was accomplished prior to inspection resulting in the actual inspection of approximately 160 areas plus the baseline inspection of the replacement piping.

Licensee actions resulting from the "A" preseparator drain tank rupture on June 9, 1992, including the establishment of an engineering basis for prioritizing tank inspections, evaluation of the scope of the E/C program and a determination of which tanks require inspections during the 1993 refueling outage were examined.

Conclusion

The licensee has a well-planned and documented erosion/corrosion program in place. The selection process is based primarily on the thickness measurements of the various piping obtained during previous inspections performed over a period of approximately 10 years. Replacement piping is measured prior to its being placed in service, therefore permitting more accurate wear rate calculations and trending.

The licensee has shown initiative by adding small bore piping to its E/C program and, also, by strengthening its program by adding procedural control over open Wall Thickness Reports. Other actions by the licensee to improve its E/C program include contracting a consultant experienced in E/C program development at other nuclear plants, involvement in the EPRI CHECMATE Users Group, contracting its consultant to train its engineering personnel in the use of CHECMATE and the establishment of Ginna Station Erosion/Corrosion Management Integrated Program Plan which provides additional management oversight of its E/C program. The rupture of the "A" preseparator drain tank resulted in positive action by the licensee to improve its E/C program including the addition of E/C susceptible tanks to the program.

2.0 "B" REACTOR COMPARTMENT COOLER

On 8/11/92, Nonconformance Report No. (NCR) 92-348 was initiated by the licensee to document a leaking tube on the "B" reactor compartment cooler. The cooler is on the service water system inside containment.

The disposition identified by the NCR is to perform lap joint repairs on the damaged copper tube and to perform a visual examination and a system leakage test per QCIP-15. The repair is to be performed per Brazing Procedure Specification (BPS) No. 400-16.

The activity was determined by the licensee to not constitute an ASME Section XI repair due to the tube size being less than 1" diameter as permitted by Section XI, IWA-7400. The inspector had no further questions regarding this matter.

3.0 INSERVICE INSPECTION DATA

Ultrasonic examination data related to the examination of "A" steam generator lower shell to transition weld LST-A and upper shell to head weld USH-A were selected for inspection to ascertain that the examinations were performed in compliance with code and regulatory requirements, and that the examination results were properly documented.

The examinations were performed using the I-98 automated examination system and were governed by procedure NDE-600-27, Revision 0.

Limitations to the examinations were documented and low amplitude indications were recorded. All of the indications were plotted, evaluated and determined to be acceptable per the applicable code acceptance standards.

Conclusion

The examinations complied with the applicable code and regulatory requirements. The examination results were clearly documented and the evaluations noted that the welds were acceptable for continued service.

4.0 EXIT MEETING

The inspector met with licensee representatives (denoted in Attachment 1) at the conclusion of the inspection on August 14, 1992. The inspector summarized the scope and findings of the inspection.

ATTACHMENT 1

PERSONS CONTACTED

Rochester Gas & Electric Corporation

A. Borodotsky, Mechanical Engineer
* D. Bryant, QC Engineer
* G. Geiken, Supervisor - Materials Engineering
* N. Goodenough, Ginna Maintenance
* P. Gorski, Manager - Mechanical Maintenance
* W. Green, Quality Assurance
* F. Klepacki, Inservice Inspection Engineer - Materials Engineering & Inspection Serv.
* T. Marlow, Superintendent - Ginna Production
* D. Morgan, Mechanical Engineer
* L. Rochino, Lead Mechanical Engineer
* M. Saporito, Manager - Materials Engineering & Inspection Serv.
* J. St. Martin, Corrective Action Coordinator
* P. Wilkens, Department Manager - Nuclear Engineering Services
* G. Wrobel, Manager - Nuclear Safety and Licensing

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* T. Moslak, Sr. Resident Inspector