U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Inspection Report 50-244/94-25 License: DPR-18

Facility: R. E. Ginna Nuclear Power Plant
Rochester Gas and Electric Corporation (RG&E)

Inspection: October 4 through November 21, 1994

Inspectors: T. A. Moslak, Senior Resident Inspector, Ginna
E. C. Knutson, Resident Inspector, Ginna

Approved by: _____ 12/12/94
W. J. Lazarus, Chief Date
Reactor Projects Section 3B

## INSPECTION SCOPE

Plant operations, maintenance, engineering, plant support, and safety assessment/quality verification.

## INSPECTION EXECUTIVE SUMMARY

### Operations

At the beginning of the inspection period, the plant was operating at full power (approximately 98 percent). No challenges to stable plant operations occurred during this reporting period.

### Maintenance

A rebuilt C-Service Water pump was installed and its associated discharge check valve was replaced with an upgraded design.

LCOs were entered to perform maintenance on components in the Residual Heat Removal and Auxiliary Feedwater Systems. These activities were effectively planned/scheduled and expeditiously completed.

Foreign material exclusion controls were examined and found to be generally good. Appropriate FME requirements are specified in work control procedures and maintenance department guidance; however, some weaknesses have been observed in implementation of these requirements. Containment vessel storage and housekeeping were adequate, although some deficiencies were noted in the implementing procedure.

### Engineering

A leaking manway on the A-steam generator was repaired using a sealant injection technique following an engineering review of the available repair options.

### Plant Support

The annual Emergency Preparedness exercise was well coordinated with no significant weaknesses identified.

### Safety Assessment/Quality Verification

Management utilized various resources to assure that work met acceptance standards and that the underlying causes of plant incidents were identified and expeditiously corrected. These resources included having comprehensive root cause analyses performed to establish the factors that resulted in failure of a service water pump. The Quality Assurance staff provided effective oversight for various maintenance and testing activities. The Plant Operations Review Committee provided excellent oversight in assessing the safety significance of off-normal incidents and procedural changes.

## TABLE OF CONTENTS

## DETAILS

### 1.0 OPERATIONS (71707)

#### 1.1 Operational Experiences

The plant operated at full power (approximately 98 percent) throughout the inspection period. There were no significant operational events or challenges during the inspection period. There were no significant challenges to stable plant operation during this period.

#### 1.2 Control of Operations

Control room staffing was as required. Operators exercised control over access to the control room. Shift supervisors maintained authority over activities and provided detailed turnover briefings to relief crews. Operators adhered to approved procedures and were knowledgeable of off-normal plant conditions. The inspectors reviewed control room log books for activities and trends, observed recorder traces for abnormalities, assessed compliance with technical specifications, and verified equipment availability was consistent with the requirements for existing plant conditions. During normal work hours and on backshifts, accessible areas of the plant were toured. No operational inadequacies or concerns were identified.

### 2.0 MAINTENANCE (62703, 61726)

#### 2.1 Preventive/Corrective Maintenance

##### 2.1.1 C-Service Water Pump Replacement

On September 20, 1994, the C-Service Water (SW) pump was declared inoperable due to excessive noise and vibration; details are discussed in inspection report 50-244/94-22. At the beginning of the inspection period, replacement of the pump and its associated discharge check valve was in progress. This work was completed on October 10, 1994. Following pump run-in and installation of the pump underwater seismic support, acceptance testing was completed on October 11, 1994.

The inspector reviewed root cause analysis report M-94-10, "C-Service Water Pump (PSW01C) Vibration." This report concluded that failure of the C-SW pump on September 20, 1994, had been caused by the combined effects of pump-motor misalignment and intermittent failure of the pump discharge check valve to close. The pump-motor misalignment was due to the motor having been installed slightly out of level. This produced a slight bow in the long (on the order of 30 feet) shaft that connects the motor to the pump, which, in turn, produced a cranking effect during operation that amplified vibrations at the pump. The intermittent failure of the pump discharge check valve to close caused the pump to rotate backwards while not in operation, causing the upper pump bushing to back out of the casing. The resultant freedom of radial shaft motion during subsequent pump operation, combined with the shaft bow, produced contact between the impeller/casing wear rings and further amplified the radial force acting on the lower pump bearing. This condition led to failure of the lower pump bearing and excessive wear of the pump wear rings. These causal factors also account for failure of the pump in May 1994, as discussed

in inspection report 50-244/94-12. Recommended corrective action included replacing the one remaining (D) SW pump swing-type discharge check valve with the nozzle-type check valve, and installing set screws in the upper pump bushings and verifying the motors level for the remaining three (A, B, and D) SW pumps during normal preventive maintenance.

The inspector concluded that the root cause analysis of the C-SW pump failure was thorough and technically sound. Recommended actions to prevent similar failure of the remaining SW system pumps were appropriate. The inspector had no additional concerns on this matter.

2.1.2 Safety System Maintenance Outages

During this inspection period, the following safety systems were taken out of service for corrective/preventive maintenance, as identified by the associated work orders (WOs):

- Residual Heat Removal (RHR) System B-Train - October 19-20, 1994
  - -- WO 19403256, Reroute instrument air line to HCV-624 valve positioner
  - -- WO 19402993, Repair leaking compression fitting on B-RHR pump
  - -- WO 19402184, Repair leaks at flow detector orifice
  - -- WO 19401148, Replace Woodruff key for valve HCV-624
  - -- WO 19440349, Bench test relief valve RV-4770B
  - -- WO 19403616, Perform Calibration Procedure Instrument and Control (CPI)-CV-624, "Calibration of RHR Heat Exchanger Outlet Valve HCV-624"
  - -- WO 19402702, Perform CPI-PRESS-629, "Calibration of RHR Pressure Loop 629"

- Turbine Driven Auxiliary Feedwater Pump (TDAFWP) - October 26, 1994
  - -- WO 19402087, Repair oil leak on TDAFWP DC lube oil pump
  - -- WO 19369847, Calibrate TDAFWP strainer differential pressure switch
  - -- WO 19403211, Perform CPI-FLO-2032, "Calibration of TDAFWP Discharge Flow Loop 2032 and Flow Indicator FI-2400"
  - -- WO 19440722, Perform CPI-PRESS-REG-5490P, "Calibration of Oil Pressure Regulator, Pressure Indicators, and Pressure Switches for TDAFWP"

The inspector verified that the duration of these system outages was less than 50 percent of the allowed outage time as permitted by Technical Specifications, and that acceptance testing adequately verified system operability.

## 2.2 Surveillance Observations

### 2.2.1 Routine Observations

Inspectors observed portions of surveillances to verify proper calibration of test instrumentation, use of approved procedures, performance of work by qualified personnel, conformance with limiting conditions for operation (LCOs), and correct system restoration following testing. The following surveillances were observed:

- Periodic Test (PT)-3M, "Containment Spray Pump Monthly Test," revision 9, effective date January 15, 1993, observed October 25, 1994

- PT-12.2, "Emergency Diesel Generator B," revision 78, effective date July 6, 1994, observed October 25, 1994

  -- With the emergency diesel generator (EDG) operating at full load, test personnel noted that fuel oil pressure was near the low end of the acceptable range. While still at full load, the fuel oil pressure regulator was adjusted to increase pressure to approximately mid-range; however, when the EDG was unloaded, it was found that the adjustment had produced a disproportionate increase in no-load fuel oil pressure, and that this pressure was now high in the required action range. This problem was immediately communicated to the technical engineering group, who verified that the no-load required action pressure had been established as a local requirement and did not affect EDG operability. As a result, the B-EDG was not declared inoperable. A temporary procedure change notice was generated to eliminate the no-load fuel oil pressure limit.

The inspector determined through observing this testing that operations and test personnel adhered to procedures, corrective action was promptly initiated if test results and equipment operating parameters did not meet acceptance criteria, and redundant equipment was available for emergency operation.

## 2.3 Foreign Material Exclusion Controls (TI 2515/125)

The inspector conducted a review to determine if the licensee's work control procedures and practices address provisions for material, parts, and tool accountability to ensure loose items are not inadvertently left inside structures, systems, or components after the work activity is complete.

Ginna station administrative procedure A-1306, "Housekeeping Control," is the licensee's basic procedure for implementing foreign material exclusion (FME) control. The stated purpose of this procedure is, "...to describe the Housekeeping Control Program at Ginna Station to meet the requirement of Regulatory Guide 1.39..." Regulatory Guide 1.39, "Housekeeping Requirements For Water-Cooled Nuclear Power Plants," states, in part, that ANSI Standard N45.2.3-1973, "Housekeeping During the Construction Phase of Nuclear Power Plants," provides a method acceptable to the NRC staff for complying with the pertinent quality assurance requirements of Appendix B to 10 CFR Part 50. The

inspector reviewed A-1306 and determined that the intent of the procedure was consistent with ANSI N45.2.3-1973 with respect to basic housekeeping requirements. The inspector noted, however, that section 3.3 of ANSI N45.2.3-1973 invokes another ANSI Standard, N45.2.2-1978, "Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants," with respect to storage requirements; storage requirements, in turn, are expanded in section 6.5 of ANSI N45.2.2-1978 to be applicable to items released from storage for installation or use. The inspector noted that A-1306 makes no reference to ANSI N45.2.2-1978 and specifies no FME requirements for in-process materials.

The inspector reviewed randomly selected maintenance procedures for safety-related components to determine the extent to which FME requirements were specified. The more recent procedures (generated by the maintenance procedure upgrade program) contained precautions to install temporary covers to prevent entry of foreign materials into unattended component openings, and required that final closeout inspections be performed by both maintenance and Quality Control personnel. The older procedures did not contain a precaution that specified in-process FME controls; however, the inspector noted that appropriate in-process FME requirements for maintenance were specified in a maintenance department guideline titled, "Foreign Material Exclusion." While this guideline was neither a part of, nor referenced by, the procedures, it is applicable to maintenance department personnel. The older procedures did require that Quality Control personnel perform a cleanliness inspection prior to closeout.

No maintenance activities in which FME was a significant factor were observed during this inspection period. The licensee has not experienced any incidents caused by foreign material during the last year, and the inspector has observed that FME requirements are generally adhered to during maintenance. However, the inspector has observed some instances of inadequate FME controls. For example, during repair of a leak in the safety injection system recirculation line in August, 1994, no caps were in place over the ends of piping during movement of a shop-fabricated section of replacement piping from the shop to the work sight. Covers on installed piping were subsequently removed for trial fitup of this piping, but were not reinstalled when additional cutting and grinding was required.

Foreign material exclusion during refueling operations was examined during the 1994 refueling outage and is discussed in inspection report 50-244/94-06. Overall, refueling FME was found to be satisfactory. Some modification of practices were implemented on the basis of inspection observations, and were planned by the licensee to be subsequently incorporated into the refueling procedures. During the current inspection, the inspector questioned the licensee as to the status of corrective action for deficiencies identified in 50-244/94-06, and found that action was not being progressed. The licensee planned to enter the action in their corrective action tracking system.

The inspector reviewed licensee Quality Assurance surveillance reports for refueling and steam generator maintenance activities during the 1994 outage. Foreign material exclusion was reported to have been good during refueling operations. Two FME deficiencies were documented during steam generator

maintenance: A material accountability log was not used for the steam generator bowls during removal of the steam generator nozzle dams; and, the procedural allowance that material accountability logging is not required when steam generator nozzle covers are in place may not satisfy the requirement of ANSI N45.2.3, section 2.1.

To determine the adequacy of equipment storage and housekeeping in the containment vessel, the inspector reviewed administrative procedure A-3.1, "Containment Storage Inspection." Section 5.1 of this procedure states, "Perform housekeeping inspection to meet zone II requirements of [A-1306, Housekeeping Control]." The inspector noted that "zone II" should actually be zone III, as specified in A-1306. Although this is an apparent typographical error, the inspector was concerned because the most recently completed A-3.1 had the step signed as completed. This suggests a weak understanding of the A-1306 zone requirements. Despite this procedural problem, the inspector considered, from observations during previous tours and inspections, that equipment storage and housekeeping in the containment are adequately maintained.

The inspector concluded that the licensee's FME controls are generally good. Appropriate FME requirements are specified in work control procedures and maintenance department guidance; however, some weaknesses have been observed in implementation of these requirements. Containment vessel storage and housekeeping was adequate, although some deficiencies were noted in the implementing procedure.

## 3.0 ENGINEERING (71707, 37551)

### 3.1 A-Steam Generator Secondary Side Manway Leak

On September 12, 1994, the secondary side manway for the A-steam generator was observed to be leaking from the gasket area between the manway cover and the steam generator; details are discussed in inspection report 50-244/94-22. On October 18, 1994, following development and licensee approval of a repair scheme, a contractor (Team Leak Repair) commenced in-plant activities to perform a temporary leak repair. The repair apparatus consisted of a pair of concentric circumferential clamps. One clamp was fitted around the manway projection from the steam generator, and served as a strongback to secure the apparatus to the steam generator. The other clamp fit around the manway cover and was bolted to the strongback clamp. A ring of metal tubing around the inner circumference of each clamp formed a seal to the steam generator or manway cover, such that the assembled unit created an enclosure around the cover-to-steam generator union. Once in place, a sealant material was pumped into the enclosure to plug the leak.

The first attempt to plug the manway leak using this apparatus was unsuccessful; the pressure required to force sealant into the leak could not be achieved, apparently due to leakage from the enclosure. The decision was made to allow the in-place sealant to harden, thereby providing a better seal of the enclosure, prior to injecting additional sealant. The drawback to this approach was that a flow path through the hardened sealant to the leak may not

be accessible from the existing injection ports. However, the high neutron radiation level in the area precluded other troubleshooting techniques, such as enclosure disassembly and reassembly.

On October 19, 1994, a second attempt was made to seal the manway leak. Just over half of the maximum volume of sealant authorized in the work package had been injected during the first attempt. After the remaining authorized volume of sealant had been injected, the leak initially persisted, but then stopped several days later.

Using the containment video monitoring system, the inspector observed portions of the A-steam generator manway temporary leak repair attempt, including installation of the leak repair apparatus and sealant injection. No deficiencies were noted during these observations.

Prior to the second sealant injection effort, the inspector attended a licensee meeting to review the status of the repair. The amount of sealant that had extruded from the enclosure was estimated and added to the remaining volume of sealant authorized for use. The inspector considered that this estimate was acceptable. The inspector observed appropriate management involvement in this meeting.

The inspector observed strong involvement by the engineering organization in support of this repair activity. Analysis of the proposed repair scheme was thorough. Probabilistic risk assessment was utilized to establish the maximum allowable duration of the repair activity.

## 4.0 PLANT SUPPORT (71750)

### 4.1 Emergency Preparedness

#### 4.1.1 Annual Plume Exposure Exercise

The annual plume exposure exercise was conducted on October 12, 1994. Prior to the exercise, the inspector reviewed the exercise scenario. The inspector concluded that the scenario was technically correct, sufficiently challenging, and would exercise all portions of the emergency response organization.

The inspectors observed the exercise at the plant simulator, the Technical Support Center (TSC), the Emergency Operations Facility (EOF), and the Joint Emergency News Center (JENC).

From these observations, the inspectors determined that there was a timely and orderly assumption of command and control responsibilities within the TSC and EOF, information was accurate and frequently presented by licensee (recovery) management to county/state emergency response organizations, there was an accurate analysis of plant (simulated) conditions and prompt implementation of diagnostic and corrective actions, offsite monitoring teams were promptly dispatched and effectively coordinated, and a site evacuation was effectively carried out. Overall, the inspectors considered that the exercise was well executed and effectively critiqued by the participants.

## 4.2 Radiological Controls

### 4.2.1 Routine Observations

The inspectors periodically confirmed that radiation work permits were effectively implemented, dosimetry was correctly worn in controlled areas and dosimeter readings were accurately recorded, access to high radiation areas was adequately controlled, survey information was kept current, and postings and labeling were in compliance with regulatory requirements. Through observations of ongoing activities and discussions with plant personnel, the inspectors concluded that the licensee's radiological controls were effective.

## 4.3 Security

### 4.3.1 Routine Observations

During this inspection period, the inspectors verified that x-ray machines and metal and explosive detectors were operable, protected area and vital area barriers were well maintained, personnel were properly badged for unescorted or escorted access, and compensatory measures were implemented when necessary. No unacceptable conditions were identified.

## 4.4 Fire Protection

### 4.4.1 Routine Observations

The inspectors periodically verified the adequacy of combustible material controls and storage in safety-related areas of the plant, monitored transient fire loads, verified the operability of fire detection and suppression systems, assessed the condition of fire barriers, and verified the adequacy of required compensatory measures. No discrepancies were noted.

# 5.0 SAFETY ASSESSMENT/QUALITY VERIFICATION (71707)

## 5.1 Periodic Reports

Periodic reports submitted by the licensee pursuant to Technical Specification 6.9.1 were reviewed. Inspectors verified that the reports contained information required by the NRC, that test results and/or supporting information were consistent with design predictions and performance specifications, and that reported information was accurate. The following reports were reviewed:

- Monthly Operating Report for September 1994 and October 1994

No unacceptable conditions were identified.

## 5.2 Licensee Event Reports

A Licensee Event Report (LER) submitted to the NRC was reviewed to determine whether details were clearly reported, causes were properly identified, and corrective actions were appropriate. The inspectors also assessed whether

potential safety consequences were properly evaluated, generic implications were indicated, events warranted additional onsite follow-up, and applicable requirements of 10 CFR 50.73 were met.

The following LERs were reviewed (Note: date indicated is event date):

- 94-010, Loss of 4160 Volt Bus 12B, Due to Defective Procedure, Results in Automatic Start of "B" Emergency Diesel Generator (September 16, 1994)

- 94-011, Short Circuit in Indicating Lamp Causes Blown Fuse, Resulting in Disabling of Automatic Actuation of Engineered Safety Features Actuation System For "B" Safeguards Logic Train Components (September 17, 1994)

- 94-012, Loss of 34.5 KV Offsite Power Circuit No. 751, Due to Fallen Tree Limb, Results in Automatic Start of "B" Emergency Diesel Generator (September 21, 1994)

The inspector concluded that the LERs were accurate, met regulatory requirements, and appropriately identified the probable cause.

## 6.0 ADMINISTRATIVE

### 6.1 Backshift and Deep Backshift Inspection

During this inspection period, deep backshift inspections were conducted on October 22, 29, and November 11, 1994.

### 6.2 Exit Meetings

At periodic intervals and at the conclusion of the inspection, meetings were held with senior station management to discuss the scope and findings of inspections. The exit meeting for inspection report 50-244/94-21 (Emergency preparedness program, conducted October 3-6, 1994) was held by Mr. David Silk on October 6, 1994. The exit meeting for inspection report 50-244/94-23 (Operator licensing, conducted October 3-7, 1994) was held by Mr. James Stewart on October 7, 1994. The exit meeting for inspection report 50-244/94-24 (Engineering programs, conducted October 11-17, 1994) was held by Mr. Alfred Lohmeier on October 17, 1994. The exit meeting for the current resident inspection report 50-244/94-25 was held on November 22, 1994.