U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No.: 50-244/95-09

License No.: DPR-18

Licensee: Rochester Gas and Electric Corporation
89 East Avenue
Rochester, New York 14649

Facility Name: Ginna Nuclear Power Plant

Inspection At: Ontario, New York

Inspection Conducted: April 3 - 7, 1995

Inspector: _____
J. Noggle, Senior Radiation Specialist

Approved by: _____
R. Bores, Chief, Facilities Radiation Protection Section

Areas Inspected: This report documents the results of an announced inspection of the radiological controls program implementation during outage conditions.

Results: The licensee implemented an effective radiological controls program during the Spring 1995 refueling outage. Good detail in radiological controls was evident and the initial outage performance of the Radose computerized electronic dosimetry access control system was very good. The licensee identified contamination associated with both the "A" and "B" condensers. The final disposition of the old tube sheets and condenser tubes had not been determined at the time of the inspection and has been identified as an inspection follow-up item. In addition, discussions with the licensee were held with respect to soil excavation and disposition on the east side of the reactor building, where soil is known to be contaminated. No safety concerns or violations of regulatory requirements were observed.

DETAILS

1.0 INDIVIDUALS CONTACTED

1.1 PRINCIPAL LICENSEE EMPLOYEES

T. Alexander, Manager, Nuclear Assurance
A. Harhay, Manager, Radiation Protection and Chemistry
A. Herman, Health Physicist
J. Knorr, Manager, Maintenance Training
N. Leoni, Radiation Protection and Chemistry
F. Mis, Principal Health Physicist
R. McMahon, Quality Control Engineer
B. Quinn, Radiation Protection and Chemistry Consultant
W. Thomson, Health Physicist
R. Watts, Manager, Nuclear Assessment
J. Widay, Plant Manager

1.2 NRC EMPLOYEES

T. Moslak, Senior Resident Inspector

All of the above individuals were present at the exit meeting on April 7, 1995.

The inspector also interviewed other licensee and contractor personnel.

2.0 PURPOSE OF INSPECTION

The inspection was an announced inspection of the Ginna Station radiological controls program during outage conditions.

3.0 PREVIOUSLY IDENTIFIED ITEMS

3.1 (CLOSED) VIOLATION (50-244/94-29-01)

On December 5, 1994, a "B" steam generator blowdown system flange was cut from the secondary plant system, carried off site, and returned to site for reinstallation. The flange was found to be contaminated after being returned to the site. There had been no surveys performed either during removal from the plant piping system, or during release of the flange from the restricted area. This was cited in NRC Inspection Report No. 50-244/94-29 as a violation of 10 CFR 20.1501, for failure to survey. During this inspection, the inspector reviewed the corrective actions taken by the licensee and verified their completion.

The licensee reviewed the secondary plant systems and identified those that had a probability of being contaminated. In-plant surveys were also conducted to evaluate contaminated systems by a direct frisk of system components such as valve stem packings. The inspector toured the secondary plant areas and observed that the following plant systems had been identified as containing or potentially containing radioactive material and that these systems were conspicuously posted as such.

- steam generator blowdown system
- condensate polishing system
- low conductivity waste tanks and demineralizer vessels

The following secondary plant systems were surveyed by the licensee and found to be free from contamination.

- air ejectors
- moisture separator reheaters
- feedwater heaters

The licensee also revised the work package process to ensure that during the work planning process, work associated with applicable secondary plant systems would require radiological surveillance during initial system breach. The inspector reviewed the "Ginna Station Maintenance Department Guidelines for Balance of Plant Work, Rev. 1", and noted that the work package checklist had added notification of radiation protection to determine if a survey would be required. Also, in Section 3.1.4.1, the guideline was revised to indicate that the following secondary plant systems were of radiological concern: main steam system, steam generator blowdown system, steam generator sampling system, turbine sample rack area, condensate system, air ejector exhaust and turbine gland exhaust.

Another work planning procedure was also revised and reviewed by the inspector. Procedure A-1603.3, Rev. 11, "Work Order Planning", requires the planner to notify radiation protection for any intrusive work on secondary plant systems that include: main steam system, steam generator blowdown system, steam generator sampling system, turbine sample rack area, condensate system, air ejector exhaust, and turbine gland exhaust.

The inspector reviewed selected outage work packages from the pipefitter's office and noted the inclusion of the new procedural requirements mentioned above. The inspector also reviewed secondary plant work in progress during the outage and noted increased radiation protection surveillance of the work areas. In summary, the inspector verified that the licensee had revised the work planning process to require radiation protection surveillance of selected secondary plant system maintenance and that radioactive material postings had been added to the affected secondary plant systems as a warning to plant workers. Satisfactory corrective actions have been implemented to prevent recurrence of the event. This violation is closed.

4.0 ORGANIZATION

The licensee provided additional radiation protection (RP) personnel to support outage requirements. Nine permanent station RP technicians were assigned lead RP positions over approximately 40 temporary RP senior technicians and 11 temporary RP junior technicians. Upon inspector review, appropriate RP personnel resources were available and were effectively supervised by the permanent RP staff.

5.0 TRAINING AND QUALIFICATIONS

The inspector reviewed the licensee's training and qualification program for the temporary RP technicians. The inspector verified that selected senior RP technician résumés met the experience requirements of American National Standards Institute, Inc. (ANSI) N18.1-1971. The inspector verified documentation demonstrating that temporary RP technicians were administered an entrance examination to test their knowledge of generic RP subject matter. The inspector also reviewed training lesson plans and reviewed applicable training attendance records. Approximately 16 hours of site-specific RP technician training were provided. Selected training and qualification records were found complete with no discrepancies noted.

6.0 AS LOW AS IS REASONABLY ACHIEVABLE (ALARA)

The licensee chartered a Station Outage Exposure Reduction Committee in October 1994 with a mission to focus on maintenance and outage scheduling methods that could result in exposure reductions. Results of this committee's efforts that affected this outage included:

- plans to replace "B" steam generator blowdown piping only outside of containment until after steam generator replacement (scheduled for next outage);
- waiver of sludge lancing of the steam generators this outage since the steam generators will be replaced during the next outage; and
- rescheduling of work on the "B" reactor coolant pump (RCP) motor and containment vessel spray ring header work until after the reactor head is replaced into the cavity.

The inspector considered this increased management attention to outage exposure reduction as a very good licensee initiative.

The licensee had previously established a 100 person-rem goal for the Spring 1995 outage. Due to detailed outage work scope review that indicated an ALARA estimate of 138 person-rem, the earlier goal was readjusted to a 125 person-rem goal and 160 person-rem total for 1995. By April 6, 1995, 54 person-rem had been accumulated during the outage (day 10 out of 34 days total), and 60 person-rem total for the year to date. ALARA dose estimates were based on historical records and included dose reductions due to shielding expectations. These estimated doses were plotted over time, using the original outage schedule as a basis. The estimated dose plot served as a standard to compare the daily dose results that were provided from the Radose access control electronic pocket dosimeter (EPD) results. The ALARA tracking generally represented a good measure of exposure performance, however, it was not directly tied to the schedule. Consequently, when schedule changes were made, the estimated exposure curve no longer fit the schedule and needed to be adjusted in order to continue to represent an accurate measure of plant exposure performance. The licensee has adopted a more flexible

scheduling software system and the HP department is becoming trained in its use. Further scheduling enhancements are needed to provide a more effective and accurate exposure tracking method.

The inspector reviewed the ALARA shielding packages and made in-field observations. The licensee processed nine shielding packages for this outage, which resulted in approximately 4,400 pounds of lead installed. This is considered a reasonably good effort for this station. The areas shielded included the "A" sump incore area, pressurizer spray line, pressurizer No. 431 valves, "B" loop crossover drain, "B" RCP platform, CVCS V-427 valve, and the primary sample delay coil. The shielding packages consistently included a work exposure estimate and a cost benefit analysis based on exposure to install shielding versus the exposure saved. All of the shield packages also include comparisons of estimated and actual dose rates for future repeat use. Aside from the general exposure reduction evaluation techniques mentioned, the licensee demonstrated a few unique approaches mentioned below.

- For the pressurizer spray line area, a time and motion study was made in an attempt to consider transit exposure of a major access path that was not actually a work destination.

- For the installation of permanent shielding for the pressurizer spray line, besides considering the exposure costs to install the shielding, the material and labor costs were also included.
- For an evaluation considering decontamination of an area, the licensee considered the number of entries expected into the area and considered the cost of laundering protective clothing versus establishing the area as a clean area.
- For installing permanent shielding around the regenerative heat exchanger, the exposure savings were viewed for the life of the plant rather than only the immediate outage workscope. This particular evaluation approached a representation of the true exposure savings of a shielding evaluation and shows promise as a model for all shielding evaluations.

The above unique exposure reduction considerations were valid and contributed to making better exposure reduction decisions. These ideas were not documented in any ALARA program element. The inspector discussed with the licensee the documentation of these considerations so that they might contribute to the further development of the ALARA program. The licensee stated that this would be evaluated.

The ALARA program continues to progress toward better licensee understanding of where in the station exposures are accrued. Currently, work packages generally are not specific enough to determine the location and occupancy times for work locations, staging areas and transit paths to make these determinations. Once this information is available, outage and annual exposures can be plotted for specific station locations and appropriate exposure reduction priorities and

efforts can be realized. Licensee discussions have begun to develop "area management" concepts, and this should benefit the ALARA program development.

In summary, the licensee's ALARA program continues to make good efforts to reduce personnel exposures, however, continued program development is warranted to determine where station exposures are accrued and to ensure all costs and life of the plant exposure savings are considered in station ALARA decisions.

7.0 EXPOSURE CONTROLS

The licensee had streamlined the access control point and implemented a real-time computerized dosimetry system that was mentioned in previous inspection reports. This outage was the first full-scale implementation of the system use. The access control point provided an area where approximately three different HP/worker interfaces could occur simultaneously. The dress-out area proximity to the HP access point also allowed HP observation of the adequacy of the donning of protective clothing. This improved access to workers for briefing and availability for observation and correction of protective clothing dressout were very good enhancements to exposure control in general.

The use of the Radose access control system appeared to work very well during the outage. The licensee continued to run the old existing exposure control computer system in tandem with the Radose system as a conservative measure and as a backup in case the Radose system was not capable of handling the outage throughput demands. The Radose multi-badge application was implemented just after the outage started and was observed to work adequately in conjunction with dosimetry authorized exposure permits (jump tickets). The inspector reviewed most of the radiation work permits issued for the outage and determined that they were easy to read and contained a good level of specific radiological controls for individual jobs. The HP checkpoints provided good radiological briefings and oversight of jobs in their areas. Postings were adequate and informative.

One tool monitor (SAM 9), was found in the turbine building basement and later at the access control point and was available for use. No operation or calibration procedure was written or approved for the instrument and no evaluation of the instrument's use limitations or setpoint for the unrestricted release of equipment had been determined. The HP technicians stated that it was not being used for the unrestricted use of materials, but was being used in on an informal basis to gain experience with it during the outage. The inspector was concerned that there were no written restrictions posted to prevent any worker or uninformed HP technician from using the instrument for the release of equipment from the restricted area. The licensee agreed and promptly posted a sign on the instrument stating, "Attention for RP technicians use only. Not for releasing tools or equipment". The

inspector was satisfied that the issue had been effectively resolved. No discrepancies were noted with respect to HP job coverage of outage activities or of the control of radioactive material.

Continued work is in progress to develop internal dose assignments based on representative air samples for individual workers in given areas over specified time intervals. The inspector determined that the licensee had adopted a very good conservative approach and was working on software to assist in this process. The inspector reviewed air sample results during this outage and determined that on average, approximately 30 air samples were taken each day. The results for almost all of them fell below the definition of an airborne radioactivity area. A few air samples indicated airborne radioactivity areas associated with decontamination of the reactor cavity and inspection of the fuel transfer slot in the auxiliary building. Due to the prescribed respiratory protection equipment worn, there were no internal exposures assigned from these air samples. The licensee's records indicate a maximum accumulated DAC-hour assignment to an individual for 1995 of 10.6 DAC-hours or 21.5 mrem committed effective dose equivalent. The inspector determined that the licensee has had very low internal exposures during the outage and has effectively controlled the radiological hazards that result in internal exposures.

8.0 TURBINE BUILDING RADIOLOGICAL CONTROLS

The inspector reviewed the licensee's sensitivity to the possible presence of radioactive material in the secondary plant systems. As mentioned in Section 3.0 above, the licensee had performed external piping surveys of secondary piping systems and had identified and posted several systems as containing or potentially containing radioactive material. During this outage, HP technicians were assigned to the turbine building and provided HP surveillances during initial secondary system breaches and effectively evaluated most secondary system areas as clean work areas. As secondary systems were opened, HP technicians systematically surveyed for contamination. At the time of this inspection, the licensee had surveyed and had not detected any contamination on the following components: main feed pump impellers, secondary system eddy current equipment, turbine manways, 5A high pressure heater, and the heater drain tank. Although no smearable contamination was detected, some level of fixed contamination had been found on some "B" condenser tubes and on the tube sheets of both the "A" and "B" condensers.

During this outage, the Admiralty Brass main condenser tubes were being replaced with titanium tubes. From each 3-foot by 3-foot by 4-foot carton full of flattened 8-inch tube sections, the licensee took approximately 12 tube pieces for surveying purposes. Smearable, fixed, and gamma spectroscopy counts were taken of these samples. The gamma spectroscopy counting was not a calibrated geometry, and was not used for quantifying the amount of radioactivity in the samples, however, it was used for informational purposes to indicate the identity of gamma-emitting isotopes and the percentages of each. The results indicated

the following: iodine-131, 62.3%; iodine-133, 14.5%; cesium-137, 14.5%; cobalt-60, 8.7%; xenon-133, 1.45%; antimony-125, 1.45%. The inspector discussed with the licensee that the presence of noble gases may indicate that some condenser atmosphere had been captured in the condenser tube sample bottles during sample collection. The licensee indicated that further sample analysis would be conducted. Of the smear samples, none indicated detectable activity. Work area smear surveys throughout the tube removal work activity confirmed the lack of smearable contamination. The fixed contamination monitoring of tube samples for the 150 cartons of flattened tubes, indicated most were <1000 dpm/100 cm^2. Approximately one sample in ten indicated contamination of 2,000 - 3,000 dpm/100 cm^2 with a maximum of 14,000 dpm/100 cm^2 reported. In addition, the "A" and "B" condenser tube sheets were measured to contain between 1,000 - 2,000 dpm/100 cm^2 with no smearable contamination detected. The licensee packaged each of the cartons of old condenser tubes and tube sheets in plastic and marked them with radioactive material postings. They were temporarily stored in a controlled area at the meteorological tower, protected from the weather by a tarpaulin. The licensee had not initially planned for disposition of the condenser tubes as radioactive material. The inspector determined that the licensee had provided effective work area radiological surveillance for the secondary plant system work, however, the surveillance and disposition of condenser tubes remains to be completed. The final radiological surveillance and condenser tube disposition is identified as an inspection follow-up item (IFI 95-09-01).

9.0 STEAM GENERATOR REPLACEMENT SOIL REMOVAL

During the Spring 1996 refueling outage, both of the steam generators will be replaced through top openings in the containment dome. The removal and replacement will be accomplished by a large crane that will be positioned on the east side of the plant. In order to provide an appropriate base for the crane and to provide for steam generator laydown, concrete pads will be poured. Approximately 1650 $yards^3$ of soil must be excavated on the east side of the reactor building to accommodate the concrete pads. Some soil samples have been taken that confirm the presence of radioactivity in the soil. The licensee stated that this activity was likely deposited on the ground in 1982 during a steam generator tube rupture event. After that event, station surveys had confirmed an eastward spread of contamination due to the wind direction at the time. The results of the licensee's preliminary scoping soil survey indicated up to 2 pCi of cesium-137 per gram of soil (surface) in the area east of the reactor building from which soil needs to be excavated. Since disposition of the contaminated soil may constitute radioactive waste disposal, the inspector discussed with the licensee options including application to the State of New York for the appropriate approvals prior to performing any soil excavation or disposition on the east side of the reactor building.

10.0 EXIT MEETING

The inspector met with licensee representative (denoted in Section 1.0) on April 7, 1995. The inspector summarized the purpose, scope and findings of the inspection. The licensee acknowledged the inspection findings.