U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	50-244
License No:	DPR-18
Report No:	50-244/96-09
Licensee:	Rochester Gas and Electric Corporation (RG&E)
Facility:	R. E. Ginna Nuclear Power Plant
Location:	1503 Lake Road Ontario, New York 14519
Dates:	August 25 - October 5, 1996
Inspectors:	P. D. Drysdale, Senior Resident Inspector, Ginna C. R. Thomas, Acting Resident Inspector, Ginna G. S. Vissing, Project Manager, NRR
Approved by:	Lawrence T. Doerflein, Chief Projects Branch 1 Division of Reactor Projects

EXECUTIVE SUMMARY

R. E. Ginna Nuclear Power Plant

Inspection Report No. 50-244/96-09

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a six week period of resident inspection, and includes the results of an announced inspection by the NRR project manager for Ginna.

Operations:

Although the licensee's actions to troubleshoot the safety injection (SI) system accumulator leakage and perform repairs were not initially aggressive, appropriate actions were taken to initiate a plant shutdown to repair the SI system accumulator leakage.

Operators maintained good control of the plant during the shutdown and throughout the outage period. The downpower and cooldown periods were completed without incident. Operators also demonstrated good overall plant control during the subsequent startup. Due to an unexpected opening of a steam generator atmospheric relief valve, additional operator training for reactor coolant system (RCS) temperature and pressure control was appropriate to help maintain stable RCS temperatures and pressures during transition periods on and off the grid.

The quarterly NSARB meeting was professionally conducted and contained good discussions on well developed topics. The outside members were particularly active. The NSARB performed its independent safety oversight function in an excellent manner.

Maintenance:

Overall, maintenance activities were performed effectively and were well coordinated with all site organizations. Maintenance technicians demonstrated good technical abilities and performed their work in accordance with procedural requirements. Surveillance activities were also well controlled and coordinated with other site organizations. Testing was performed in accordance with procedural requirements and technicians demonstrated good technical understanding of the functional requirements of equipment being tested.

The licensee's decision to disassemble and repair a leaking feedwater system block valve (V-3984) was warranted given the uncertainty of successfully completing online repairs. The repairs were completed satisfactory and in accordance with plant procedures. Better oversight and closer monitoring of the licensee's contractor during the last refueling outage when this valve was reconditioned may have prevented this problem. The licensee developed a new generic maintenance procedure which should help preclude a recurrence of this condition on similar valves.

Executive Summary (cont'd)

The testing performed on the refurbished A-service water pump motor was a well coordinated effort. Engineering was thorough in providing a detailed scope of work and defining technical boundaries for different testing procedures and methods.

RG&E technicians working on offsite transformer 12B were highly skilled and knowledgeable about high voltage transformers. The maintenance was adequately coordinated with the Power Control Center and the Ginna main control room. The licensee's improvements in work coordination between the Ginna electrical shop and Power Control Center technicians should help prevent the scheduling of potentially conflicting work assignments between the on-site and off-site maintenance organizations.

The technical staff acted promptly in investigating the potential generic consequences of a degraded output breaker on the B-EDG. A problem with the breaker's alarm spring was promptly diagnosed and corrected, and post maintenance testing was effective in demonstrating operability of the diesel generator. The system engineer displayed a high level of technical competence in resolving this issue in an expeditious and thorough manner.

The licensee responded in a timely manner to a potential safety-related environmental qualification (EQ) problem regarding a sealant used on the new power cables for MOV-852A and MOV-852B. The licensee's analysis was thorough with a well supported technical basis for concluding that an EQ problem did not exist.

Zebra mussels were effectively kept out of the circulating and service water flow stream and did not effect the plant's safety-related heat exchangers during cleaning of the intake structure.

The licensee's actions in identifying a surveillance not performed as scheduled and to implement corrective actions were appropriate and timely. Although the surveillance was properly completed within the 125% time limits permitted by the Improved Technical Specifications (ITS), this incident represented another occurrence where requirements of the ITS were not adequately understood by the plant staff.

The licensee's maintenance rule expert panel was comprised of technically competent individuals who had a good understanding of the maintenance rule.

<u>Engineering</u>:

The licensee's attention to detail reflected good planning that resulted in minimized radiological hazards during the steam generator carryover test. Mockup training and lessons learned from other nuclear stations were incorporated into the test procedure. The final test results demonstrated good steam quality from the new steam generators.

Design modification documents for the circulating water intake heater transfer switch were of good quality, thorough, and well supported with design basis technical information.

Executive Summary (cont'd)

The near term impact of the engineering reorganization caused some delays in ongoing support to plant operation and maintenance. The lack of a turnover of responsibilities by individuals who left the company resulted in additional delays in engineering support and in establishing work responsibilities and priorities in the new organization. Many of the work assignments for each new group and its individuals were not determined until after the reorganization occurred. Some confusion existed among the engineering staff as to their actual responsibilities. The engineering department reorganization resulted in an overall decrease in engineering resources but a net increase of system engineers, and there appeared to be a larger presence of engineering support to the day-to-day operation of the plant.

Replacement of the MOV-4007 and MOV-4008 valve disks with a design more suited to a throttling application improved the reliability of automatic auxiliary feedwater (AFW) system flow. A lack of coordination in the licensee's MOV program, and the lack of a turnover of responsibilities from the previous to the new AFW system engineer resulted in little progress to date on the ongoing design issues associated with MOV-4007 and MOV-4008.

<u>Plant Support</u>:

Radiation Protection technicians were diligent in their efforts to implement recently enhanced survey policies and procedures at Ginna Station. Thorough surveys effectively identified contaminated valve testing equipment and a radioactive material shipping container whose contact dose rate exceeded regulatory requirements, before they were brought onsite.

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Report Details

I. Operations

O1 Conduct of Operations[1]

O1.1 General Comments (Inspection Procedure (IP) 71707)

The inspectors observed plant operations to verify that the facility was operated safely and in accordance with licensee procedures and regulatory requirements. This review included tours of the accessible areas of the facility, verification of engineered safeguards features (ESF) system operability, verification of proper control room and shift staffing, verification that the plant was operated in conformance with technical specifications and appropriate action statements for out-of-service equipment, and verification that logs and records were accurate and properly identified equipment status or deficiencies.

O2 Operational Status of Facilities and Equipment

Summary of Plant Status

At the beginning of the inspection period, the plant was operating at full power. The safety injection (SI) accumulator leakage and the main feedwater (MFW) block valve leakage that occurred during the last inspection period continued into the early part of the current period. At 8:49 p.m. on September 6, 1996, the licensee shut down the reactor to perform maintenance repairs of the SI and MFW valve leakage, and also to replace the valve plugs in the auxiliary feedwater (AFW) discharge throttle valves. The SI, MFW, and AFW maintenance repairs were completed by the morning of September 10, 1996, and the plant was returned to critical operation at 12:45 p.m. At 2:51 p.m. that afternoon, the plant was synchronized to the grid.

On September 10, while synchronizing to the grid, difficulties with steam dump valve operation caused an RCS temperature control problem that led to an unexpected increase in RCS pressure. This caused the A-steam generator atmospheric relief valve (A-ARV) to open. The valve did not reseat when RCS pressure decreased and it could not be closed from the main control room. Auxiliary operators manually isolated the valve. The event did not affect overall plant operations, and the ARV failure was diagnosed and repaired in less than one-half hour. The plant continued to escalate power throughout the remainder of the day and the following morning. At approximately 5:30 p.m. on September 11, 1996, the plant achieved full power. The plant continued to operate at full power without incident throughout the remainder of the inspection period.

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[1] The NRC inspection manual procedure or temporary instruction that was used as inspection guidance is listed for each applicable report section.

02.1 Safety Injection (SI) System Accumulator Leakage

a. Inspection Scope (71707)

The inspector reviewed the safety injection (SI) accumulator leakage that continued into the current inspection period from the previous period (see NRC Inspection Report 50-244/96-07) and the licensee's actions to evaluate its impact on plant operations.

b. Observations and Findings

During a previous plant startup on August 7, 1996, RCS system pressure leaked by the SI system header check valves (V-867A and V-867B) and lifted the B-SI accumulator test line relief valve (RV-887) when pressure exceeded the relief setpoint (1575 psig). The licensee determined that the SI check valves did not seat tightly and permitted backleakage into the SI header when RCS pressure was slowly increased. A high enough differential pressure (d/p) did not develop across the check valves to cause them to seat tightly. When RV-887 lifted, it did not reseat tightly, but continued to leak with accumulator discharge pressure ($\approx$ 760 psig) on its upstream side.

At the beginning of this inspection period, the accumulator leakage was approximately 0.75 gpm, and continued to increase into the early part of the period up to a maximum of approximately 0.96 gpm. The leakage caused a continuous drop in accumulator water levels and required starting an SI pump approximately once every eight hour shift to restore the accumulator levels. When the leakage reached its maximum rate, the SI pump starts were required twice per shift, or approximately once every four hours. The maximum and minimum accumulator levels required by the technical specifications are 82% and 50%, respectively. However, the respective high and low alarm setpoints are 75% and 57%. Operators typically started an SI pump when levels approached the low end of the alarm band; however, on several occasions, the alarm came in before they could aligned a pump to the accumulators and start it. Each pump run required approximately 5-6 minutes to restore the level in both accumulators since the total water volume between the high and low alarm points is approximately 113 gallons per accumulator.

The licensee evaluated the quantity of SI flow that was being diverted to the accumulators, and concluded that the minimum required flow to the reactor for accident conditions would be available if a safety injection was required while refilling the accumulators. The fill lines to the accumulators are 1 inch in diameter and are orificed to limit the total flow. Both lines could be isolated from the main control board in the event that a safety injection occurred.

The licensee shared NRC concerns that the frequent SI pump starts had a potential for degrading pump performance, and a potential for creating pump damage. By the beginning of the inspection period, the licensee had developed and installed a temporary pump (Temporary Modification 96-032) in the SI system that could be

used exclusively for restoring accumulator water levels. The temporary pump had a much smaller output, and would have required approximately one-half hour of operation per accumulator and the attendance of an auxiliary operator. Operator training was planned for this pump after it was installed. However, the pump was not used.

In the time period between August 25 and September 3, 1996, the licensee continued to troubleshoot the accumulator leakage in an effort to identify all leak paths between the accumulators and RV-887. By September 3, the leakage had increased to approximately 0.96 gpm and the licensee determined that it had approached a level that required additional action. With other equipment problems occurring in the plant (i.e., MFW block valve leakage and unreliable AFW automatic throttling) the licensee decided to shut down the plant so that these systems could be removed from service for repairs.

c. Conclusions

Although the licensee's actions to troubleshoot the accumulator leakage and perform repairs were not initially aggressive, the inspector concluded that initiation of a plant shutdown to repair the SI system was appropriate. The inspectors physically monitored the SI pumps for high temperature and noise during pump operation. No apparent SI pump damage occurred during the total 4 week period that the leakage occurred.

O2.2 Plant Shutdown to Repair SI and MFW Leakage, and to Replace Valve Plugs in MOV-4007 and MOV-4008

a. Inspection Scope (71707)

The inspectors reviewed the licensee's operation of the plant during a power reduction and shutdown to perform plant maintenance.

b. Observations and Findings

At 8:43 p.m. on September 6, 1996, operators initiated a planned power reduction and proceeded toward cold shutdown so that maintenance repairs in the SI and MFW systems, and modifications in the AFW system could be made. The plant was offline by 1:09 the next morning and the reactor was subcritical in Mode 3 by 1:19 a.m. A plant cooldown to Mode 5 (< 200 degrees Fahrenheit (°F)) was planned so that the SI, MFW, and AFW systems could be taken out of service. The cooldown proceeded normally, and operators maintained good control of the plant during all mode transitions. The plant was placed on shutdown cooling, and later entered Mode 5 at 10:36 p.m. on September 7, 1996. No unanticipated operational events occurred during the shutdown process.

In anticipation of the shutdown, the licensee initiated a modification of the A-AFW throttle valve MOV-4007 and removed the A-AFW train from service on September 3. The valve was disassembled and its plug replaced by the following day. After the plant entered Mode 4 on September 6th, MOV-4008 was disassembled for the same modification. Both valves were satisfactorily tested during the outage and demonstrated reliable throttling when the plant returned to hot shutdown.

With the plant in cold shutdown, the licensee also replaced the SI accumulator test line relief valve RV-887, and repaired the MFW discharge header block valve V-3984 (see sections M2.1 and E8.1 below).

c. Conclusions

During the plant shutdown and throughout the outage period, operators maintained good control of the plant. No significant operational events occurred during the downpower and cooldown periods. The planned maintenance was performed in a timely manner and the plant was prepared for heat up within three days.

O2.3 Plant Startup and Return to Full Power Operation

a. Inspection Scope (71707)

After the maintenance outage to perform repairs to the SI, MFW, and AFW valves, the plant was returned to full power. The inspector observed plant operations during the plant heatup and return to power operations.

b. Observations and Findings

Plant heatup commenced on September 9, 1996, and Mode 4 was entered at 6:22 a.m. At 10:54 that evening, the plant entered Mode 3. With RCS temperature above 450 °F and pressure above 1000 psig, operators opened the SI system recirculation line to relieve pressure in the header. The depressurization allowed RCS pressure to tightly seat the SI discharge check valves and prevented lifting RV-887 (see section O3.1 below). During the continued plant heatup, the replacement valve RV-887 was not challenged by RCS pressure leaking back through the SI check valves, and the SI discharge header remained at the accumulator pressure of approximately 760 psig. Also, while the plant was in Mode 3, AFW throttle valves MOV-4007 and MOV-4008 were dynamically tested under 1475 psid in accordance with the Generic Letter 89-10 MOV program requirements. Both valves functioned as required.

The plant entered Mode 2 at 12:05 p.m. on September 10th, 1996. The reactor was critical by 12:45 p.m. and Mode 1 was achieved at 1:50 p.m. Plant power was taken to approximately 20% power in preparation for placing the generator on the grid. After the second main output breaker was closed, operators encountered difficulty with steam dump valves when they all went full closed prematurely. The turbine load pickup at that time was higher than normal, causing control rods to withdraw automatically. Operators placed the turbine in manual control and reduced the load, but the steam dumps did not respond properly to the increase in secondary plant pressure. RCS temperature and pressure also increased, and before rods were driven in, the A-SG atmospheric relief valve (A-ARV) lifted. The A-ARV failed to re-close when SG pressure dropped, and auxiliary operators immediately responded by closing the manual isolation valve within four minutes. I&C technicians investigated the ARV controls and determined that the set and reset pressure band had drifted below their normal settings. Although the pressure band was still within the calibration specification, plant operators expected the lift pressure to be higher. The I&C technicians reset the ARV control band within a half-hour, and the valve closed normally. The manual isolation valve was subsequently opened and the plant power increase continued. The event had little overall effect on the primary and secondary plant; however, operators indicated that steam dump valve control difficulties have been a recurring problem. One recent example was on August 3, 1996, when the A-ARV lifted unexpected following a reactor trip (see IR 50-244/96-07). The licensee initiated an ACTION Report to investigate the steam dump control circuity and sequencing functions. The operations manager also indicated that RCS pressure control is a more delicate operation when transitioning on and off the grid with a higher moderator temperature coefficient. He further indicated that additional operator training would be provided to enhance their skills for this operation.

When plant power reached approximately 50%, both of the heater drain tank pumps failed to start on demand and a white breaker fault light illuminated on the main control board. I&C technicians performed troubleshooting on the pump control circuits and discovered a faulty limit switch on the pump recirculation inlet valve. Although each heater drain pump has a different power supply, both have a common interlock that prevents a pump start if the pump recirculation line is not available before the discharge valves are opened. The limit switch was replaced and power ascension was resumed shortly thereafter.

The plant reached 100% power at approximately 5:30 p.m. on September 11, 1996. It remained at full power for remainder of the inspection period without further problems.

c. Conclusions

Operators maintained good overall control of the plant during the return to power operations. The unexpected lifting of the A-ARV and failure of the heater drain tank pumps did not have a significant effect on the plant. Further operator training to enhance RCS temperature and pressure controls during transitions on and off the grid were appropriate.

O3 Operations Procedures and Documentation

O3.1 Plant Heatup From Cold Shutdown to Hot Shutdown

a. Inspection Scope (71707)

The inspector reviewed Revision 17 to the plant heatup procedure O1.1, "Plant Heatup From Cold Shutdown to Hot Shutdown."

b. Observations and Findings

Due to the problems with SI accumulator leakage noted above, the licensee revised plant heatup procedure O1.1, "Heatup From Cold Shutdown to Hot Shutdown," to add specific instructions to ensure that positive seating of SI check valves V-867A and V-867B occurred and prevented SI system pressure from exceeding the lift setpoint of RV-887.

The procedure change formalized a process to depressurize the SI injection header when RCS pressure was 1000 - 1400 psig. This action created a differential pressure of 600 - 700 psi across the check valves and allowed them to seat tightly. The procedure required that RCS pressure not be raised above 1400 psig if SI header pressure could not be maintained below 1000 psig. After increasing the RCS pressure above 1400 psig, the SI discharge header pressure remained equal to accumulator pressure ($\approx$ 760 psig) and well below the relief setpoint for RV-887. Valves V-867A and V-867B remained leak tight for the remainder of the plant heatup and the escalation to power operation. This revision was a permanent change to the heatup procedure, and this action will be performed during every heatup from cold shutdown to ensure the check valves seat properly.

c. Conclusions

The revision to procedure O1.1 included appropriate precautions and specific instructions for operators to prevent excessive SI system check valve backleakage. The change was implemented during the plant's return to power, and effectively assured that check valves V-867A and V-867B were properly seated and leak tight. The procedure steps successfully seated the check valves and prevented lifting of RV-887.

O7 Quality Assurance in Operations

O7.1 Nuclear Safety Audit and Review Board (NSARB) Quarterly Meeting

a. Inspection Scope (40500)

The NRR project manager for the R. E. Ginna Plant attended the quarterly NSARB meeting on August 28, 1996, observed the board's proceedings, and assessed its overall results.

b. Observations and Findings

The NSARB convened under the direction of the Chairman, with a complement of 9 members and one observer from the RG&E Board of Directors. The topics of discussion included: operational issues, current plant performance, a review of outages, Licensee Event Reports, NRC Inspection Reports, and Quality Assurance/Quality Control.

Several significant issues were discussed in depth, and resulted in recommendations and follow-up actions. The issues included:

1) An assessment of the forced outages since the plant restarted after the 1996 refueling outage.

2) Control rod misalignment issues reported in LER 96-007.

3) Person-rem exposures during the 1996 refueling outage were slightly higher than the projected goal.

4) The NRC Notice of Violation concerning the inoperability of the power-operated relief valve (PORVs).

5) The status of the Corrective Action Program including the ACTION Report process.

6) The apparent inoperability of the RHR core deluge valves (MOV-852A and MOV-852B) under postulated pressure locking conditions.

7) Recent RG&E engineering organizational changes.

The Board Chairman, requested feedback and a critique from the outside Board members. Several constructive comments were received and noted.

c. Conclusions

The NSARB meeting was professionally conducted with good indepth discussions that demonstrated a questioning attitude. Topics on the agenda were well developed, and were discussed in depth by all the members. The outside members were particularly active in the discussions and stimulated further questions. Their participation had a very positive impact on the Board. The NSARB performed its independent safety oversight function in an excellent manner.

O8 Miscellaneous Operations Issues

O8.1 <u>(Open) LER 96-009, Revision 1: Leak Outside Containment, Due to Weld Defect, Results in Leak Rate Greater Than Program Limit.</u>

Revision 1 to LER 96-009 was submitted to the NRC on September 19, 1996 to supplement the information previously submitted on an unisolable containment spray (CS) system leak outside containment on July 22 - 23, 1996 (see IR 50-244/96-07). The supplemental LER included additional information regarding the leakage and its significance, as follows:

a. The CS system leakage was not a maintenance preventable functional failure as defined in industry guidance.

b. ITS Section 5.5.2 ("Primary Coolant Sources Outside Containment Program") requirements were always met, and entry into LCO 3.0.3 was not required by the ITS since 3.0.3 is only applicable to Section 3 requirements.

c. Further assessment of the leak concluded that there were no operational or safety consequences because 1) the pinhole leak did not degrade the structural integrity of the affected pipe joint, 2) the pinhole would not have increased in size, 3) the affected pipe joint would not be subjected to appreciable dynamic loading during testing or post accident conditions, and 4) a recent Westinghouse analysis calculated offsite doses from CS leakage outside containment during a small break loss of coolant accident (LOCA), and concluded that up to 30 gallons per hour (gph) leakage from the affected pipe joint was acceptable since the joint would be isolated during a large break LOCA.

   The revised LER further indicated that the program limit for CS and SI system leakage outside containment would be revised. The administrative procedure that directed entry in LCO 3.0.3 would also be revised to prevent inappropriate entries into LCO 3.0.3, and the ITS bases for LCO 3.6.1, "Containment," would be revised so that new CS and SI leakage limits could be defined by their effect on containment operability.

The inspector noted that Revision 1 to LER 96-009 did not address the following areas relative to the CS leakage:

a. The "Primary Coolant Sources Outside Containment Program" requirements were not always met in that approximately 20 hours transpired before the licensee made an accurate measurement and determined that the leakage exceeded the program limit (2 gph). The program requirement to enter LCO 3.0.3 was not met during this time.

b. The supplemental LER incorrectly stated that the leaking CS pipe joint is only susceptible to carrying radioactive containment sump fluids following a small break LOCA during high head recirculation. However, emergency procedure ES-1.3, "Transition to Cold Leg Recirculation," directs plant operators to realign

the CS and SI suction paths to the residual heat removal (RHR) system during low head recirculation after a large break LOCA. This realignment would subject the affected CS joint to RHR pump discharge pressure and to radioactive containment sump fluids following a large break LOCA.

Since the technical and safety issues associated with the CS system leakage are still unresolved (URI 50-244/96-07-01), this LER remains open.

O8.2 (Closed) LER 96-010: Latching Main Turbine While in Mode 4, Due to Defective Procedure, Results in Automatic Start of Auxiliary Feedwater Pump.

LER 96-010 was submitted on September 5, 1996, and reported an engineered safety feature (ESF) actuation that occurred on August 6, 1996 as a result of maintenance performed on the plant's main turbine (see IR 50-244/96-07). The main turbine was "latched" for control valve testing while the main feed pump (MFP) power supply breakers were open, and while the auto-start feature of the auxiliary feedwater (AFW) system was enabled. Latching the turbine with these conditions initiated an auto-start of the A-AFW pump. The LER attributed this event to an inadequate maintenance procedure that should not have been used under the existing plant conditions. Other associated causal factors identified in the LER were a lack of sufficient interdepartmental coordination, work organization, and job planning.

This event represented one of several inadvertent ESF actuations in recent months that resulted from insufficient configuration controls and operator knowledge of the effects of testing on other plant equipment. The licensee currently plans to submit an ITS amendment to delete the requirement to enable the AFW auto-start feature in Mode 2. This would prevent an AFW auto-start with the MFP breakers open while in Mode 2. Also, the licensee planned to revise the subject maintenance procedure to ensure that latching the main turoine is properly controlled with respect to AFW pump concerns. The inspector considered that the LER adequately described this event and appropriately addressed the root causes and corrective actions. This LER is closed.

O8.3 (Closed) LER 96-011: Improper Configuration of Circuit Breaker, Due to Undetected Interference, Results in Automatic Start of Both Auxiliary Feedwater Pumps.

The licensee submitted LER 96-011 on September 5, 1996 to report an ESF actuation that occurred on August 7, 1996, when an AFW pump auto-start bypass switch on the main control board was placed in the "Normal" position with the plant in Mode 3 (see IR 50-244/96-07). This caused both AFW pumps to start unexpectedly due to both MFP power supply breakers being open at the time. The licensee has prevented an AFW auto-start in Modes 2 & 3 by configuring one of the MFP breakers in the "test" position so that the auto-start logic does not detect two open MFP breakers. However, a MFP breaker was not properly configured in the test position, and the auto-start logic was made up when the bypass switch was placed in the normal position. The LER indicated that personnel error caused the

event in that a plant electrician did not detect an internal interference when he attempted to place a MFP breaker in the test position.

The LER indicated that the licensee will pursue a license amendment to delete the requirement to enable the AFW auto-start feature while in Mode 2. Also, the plant startup procedure was identified as needing enhancement to address potential interferences that could prevent the MFP breakers from being properly racked out in the test configuration. The inspector considered that the LER adequately described this event and appropriately addressed the root causes and corrective actions. The licensee also planned to conduct training for plant electricians to ensure that proper MFP breaker configuration can be identified and maintained within the skill of the craft. This LER is closed.

O8.4 (Closed) LER 96-012: Feedwater Transient, Due to Closure of Feedwater Regulating Valve, Causes a Lo Steam Generator Level Reactor Trip

LER 96-012 was submitted on September 19, 1996 to report an ESF actuation and automatic reactor trip on August 20, 1996, with the plant operating in Mode 1 at full power (see IR 50-244/96-07). This event occurred when the B-feedwater regulating valve (B-FRV) received a control signal to go full shut, causing the water level in the B-steam generator (B-SG) to decrease below the reactor trip setpoint (< 17%). Both AFW pumps automatically started when the B-SG level fell below 17%. Both MFPs continued to feed the A-SG and its level increased to the SG isolation setpoint (> 85%). All plant safeguards equipment functioned normally during this event.

The LER documented the root cause of the reactor trip as a loss of the input demand signal to the B-FRV positioner due to a missing screw and a subsequent loss of electrical continuity in its current-to-pressure transducer. The event was attributed to personnel error since I&C technicians had not replaced the screw during previous maintenance on the transducer. The omission was allowed under a previously accepted maintenance practice; however, the event met the definition of a maintenance preventable functional failure.

The LER described corrective actions that included replacement of the missing screw and rewiring of the transducer, inspection of similar transducers for missing components and electrical continuity, training of all I&C technicians on lessons learned from the event, and revision of the calibration procedure for these transducers to ensure that all screws and wires are properly configured with their respective terminal points. The inspector considered that the LER adequately described this event and appropriately addressed the root causes and corrective actions. This LER is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance Observations

a. Inspection Scope (62703)

The inspectors observed portions of plant maintenance activities to verify that the correct parts and tools were utilized, the applicable industry code and technical specification requirements were satisfied, adequate measures were in place to ensure personnel safety and prevent damage to plant structures, systems, and components, and to ensure that equipment operability was verified upon completion of post maintenance testing.

b. Observations and Findings

The inspectors observed portions of the following maintenance activities:

Installation of Motor Driven Oil Pumps and Coolers for the A- and B-Main Feedwater Pump Lube Oil Coolers

During September 3 - 30, 1996, the inspectors observed the partial installation of a modification to the MFPs to install new motor driven oil pumps and coolers. The modification will permit circulation and cooling of oil from the feedwater pump motors' front and rear journal bearings through an oil cooler and back into the bearing housing. Each bearing will have a separate oil pump and cooler. This modification was designed to resolve high bearing temperature problems that have occurred on each main feedwater pump motor during summer months, when ambient temperatures are higher.

The installation and workmanship were of a high quality. Personnel properly adhered to design installation and safety procedures. Engineering provided good support in developing the modification package.

Maintenance on The A-Intake Heater Breaker

During August 27 - 30, 1996, the inspectors observed the overhaul and shop test of the A-Intake Heater 600 volt metal clad circuit breaker. The breaker was dissembled and each component checked for wear and tear, and excess lubrication buildup on moving parts. The inspector observed the following post maintenance test activities:

1) Functional testing of the breaker's solid state protective device (AMTECTOR).
2) Testing of the primary breaker.
3) Inspection of the primary and secondary contacts, and arc-chutes.
4) Cleaning and alignment of the breaker contacts.
5) Megger testing of the trip coil and shunt trip coil.

6) Resistance testing of the secondary contacts

The electrical technician showed an in-depth understanding of breaker maintenance and displayed good technical ability in performing a variety of tests using different testing equipment and testing methods required to maintain and prove breaker operability.

c. Conclusions

Overall, the inspectors concluded that the maintenance activities were performed effectively and were well coordinated with all site organizations. Maintenance technicians demonstrated good technical abilities and performed their work in accordance with procedural requirements.

M1.2 Surveillance Observations

a. Inspection Scope (61726)

The inspectors observed portions of surveillance tests to verify proper calibration of test instrumentation, use of approved procedures, performance of work by qualified personnel, conformance to limiting conditions for operation (LCOs), and correct post-test system restoration.

b. Observations and Findings

The inspectors observed the following surveillance tests:

Quarterly Test of the A-Component Cooling Water Pump

On August 26, 1996, the inspectors witnessed the quarterly testing of the A-component cooling water (A-CCW) system in accordance with performance test (PT) procedure PT-2.8Q. The total system flow, pump differential pressure, and the stroke time of MOV-738A were measured during the test, and were all within the licensee's IST program acceptance criteria. Vibration measurements were taken on the motor and pump bearing and were acceptable. Thermographic readings were also taken, and indicated no adverse trends in temperature hot spot patterns.

The testing activities were thorough, well controlled, and personnel properly adhered to the test procedure.

Surveillance Testing of Undervoltage Relays - 480 Volt Safeguard Buses 14 and 16

On August 30, 1996, the inspector witnessed the monthly surveillance testing of the loss of voltage and degraded voltage relays on the 480 volt Safeguard Buses No. 14 and No. 16. The licensee's setpoint requirements for these relays were in accordance with ITS 3.3.4.2. The surveillance test verified the trip setpoints, time delays, and calibrated tolerances for the following relays:

Safeguard Bus 14: 1) Loss of voltage relays 27D/14 and 27D/B/14
2) Degraded voltage relays 27/14 and 27B/14

Safeguard Bus 16: 1) Loss of voltage relays 27D/16 and 27D/B/16
2) Degraded voltage relays 27/16 and 27B/16

The Results and Test technician showed good knowledge in the use of special testing equipment required for testing the undervoltage relays. The testing was thorough and performed in a professional manner.

Surveillance Testing of A- and B-Motor Driven Auxiliary Feedwater (MDAFW) Pumps

Quarterly testing of the A- and B-MDAFW pumps was performed on August 29 - 30, 1996, respectively. These tests required the automatic throttling of MOV-4007 and MOV-4008 to 200 - 230 gpm. However, MOV-4007 and MOV-4008 automatically throttled to 55 and 95 gpm, respectively, and the valves had to be manually throttled. When the MOVs did not meet the throttleback requirements specified in procedure PT-16Q-A, the technician put an administrative hold on the test until clarification was received from operations and licensing to proceed. A decision was made to finish procedure PT-16Q-A, but to remove the automatic throttling requirement from both procedures.

By manually throttling, the flow and differential pressure were satisfactory on both pumps. Vibration measurement readings were also taken on both motors and pump bearings and all were within acceptable limits. Thermographic readings were taken on the motor and pump bearings, and no adverse trends in temperature hot spot patterns were noted. The motor and pump performance were within the established acceptance criteria.

The technician exhibited good awareness when MOV-4007 did not automatically throttle as required per procedure PT-16Q-A, and showed good judgement in putting an administrative hold on the procedure until he received authority to proceed. When the technician found that the procedure was not accurate, he took appropriate steps to have it revised.

Surveillance Testing of A-Station Battery

On September 16, 1996, the inspector witnessed quarterly surveillance testing of the A-station battery. This surveillance tested the as-found float voltage condition, the battery charger's output current and voltage, and the average cell voltage for each battery bank. The temperature and specific gravity of battery pilot cells, and the average temperature of each battery bank were also measured. Electrolyte levels for all battery cells were taken and distilled water was added to low cells. The battery undervoltage alarm was also tested. All battery cell parameters were within acceptable limits. Maintenance and testing performed was thorough, well coordinated and performed in a professional manner.

Surveillance Testing of the B-EDG

On August 26, 1996, the inspector witnessed the monthly surveillance testing of the B-Emergency Diesel Generator (B-EDG). The monthly test demonstrated the ability of the EDG to produce 2000 Kw output at a .9 lagging power factor (PF) as part of its operability requirements. The diesel was started and achieved rated speed and voltage within ten seconds, as required. The diesel ran at no-load conditions for ten minutes as specified in procedure PT-12.2. The EDG was loaded in 500 Kw load increments every 30 seconds until it reached 2000 Kw and ran at that loading for one hour. No discrepancies were noted. The EDG testing activities were adequately controlled, and the testing was accomplished in accordance with the specified procedures.

Test of the C-Standby Auxiliary Feedwater Pump

On September 26, 1996, the licensee performed preventive maintenance on the C-SAFW pump and motor that included replacement of the lubricants in the motor and pump bearing assemblies. The pump was then tested under procedure PT-36-Q-C. However, the pump stop check isolation valve (MOV-9704A) did not operate as designed during the test. MOV-9704A was closed, but a duel indication was received on the main control board (MCB), and the MOV breaker was opened. The actuator motor was subsequently disassembled and the "tripper finger" assembly was found out of adjustment. After the tripper fingers were adjusted, operations cycled the valve and verified proper operation. The valve was stroked three times for repeatability and was considered satisfactory by the licensee. Vibration readings were taken on the pump and motor and found to be within acceptable limits.

The maintenance and testing was thorough, well coordinated and performed in a professional manner. The electrical technicians showed a good understanding of the maintenance and testing required to return the breaker to service.

c. Conclusions

Overall, the inspectors concluded that the surveillance activities were well controlled and coordinated with other site organizations. Testing was performed in accordance with procedure requirements and technicians demonstrated good technical understanding of the functional requirements of equipment being tested.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Maintenance Repair of Main Feedwater Header Block Valve V-3984 Leakage

a. Inspection Scope (62703)

The inspectors reviewed the ongoing steam leak in the pressure seal of MFW valve V-3984 and the licensee's evaluation of its safety significance. The inspectors also witnessed the disassembly and repair of the valve.

b. Observations and Findings

During startup from the 1996 refueling outage, a small steam leak developed in MFW header block valve V-3984. The leakage continued into the early part of this inspection period after one attempt was made to perform an online leak repair using a pressure injected sealant. The first repair attempt was not successful, and the licensee considered that the success of further online repairs was uncertain. The specific leak path could not be determined and the extent of valve damage could not be determined. However, the leakage did not increase significantly after the first online repair. The licensee made preparations to repair the valve during the next outage and provided protective covers around the leakage to prevent a personnel hazard from the leak.

On September 7, 1996, the inspector witnessed the repair of main feedwater (MFW) valve V-3984. After the valve was dissembled, it was determined that during the last refueling outage, the valve seat ring area inside the valve body received several dings or nicks when it was reassembled. There were several indications in the seat ring area of the valve body not being properly machined and/or damaged, thereby causing several leak paths. These conditions were documented in ACTION Report 96-0850 after the valve was disassembled and inspected. Welders filled in the indication areas, and ground and polished them smooth. The sealing surfaces on the gate wedge were cleaned and inspected for wear or damage, none was observed. A maintenance contractor found both surfaces of the wedge and valve body to be in good condition. A seal check was performed and found to be acceptable. The contractor cleaned the remaining valve internals, bonnet and yoke assembly. The knock-out ports were reamed and cleaned, and a new pressure seal and valve stem were installed. The licensee developed a new generic maintenance procedure for this type valve (Crane-Chapman Model 900) to ensure that valve body inspections are performed and damage is corrected before the valves are rcassembled. After V-3984 was reassembled, the bonnet and yoke bolting was torqued to 600 ft/lbs. The discrepancies outlined in the work orders were effectively corrected as evidenced by the lack of leakage from the valve during the subsequent plant startup and return to power.

c. Conclusions

The inspector concluded that the licensee's decision to disassemble and repair V-3984 was warranted given the uncertainty of performing further online repairs, and the unknown location and extent of the existing valve damage. The maintenance performed was satisfactory and in accordance with plant procedures. However, better oversight and closer monitoring of the licensee's contractor during the last refueling outage when this valve was reconditioned could have prevented this problem. The new generic maintenance procedure appeared adequate to prevent a recurrence of the problem on similar valves.

M2.2 Installation and Testing of Repaired A-Service Water Pump Motor

a. Inspection Scope (62707)

The inspector assessed the installation of the repaired A-service water (A-SW) pump motor.

b. Observations and Findings

The repaired motor was received on September 6, 1996, from Schultz Electric and was installed in accordance with the licensee's Procedure SM-95-073.2. The licensee performed on site testing of the motor for installation and turnover.

From September 17-23, 1996, the inspector observed the following commercial dedication tests of the motor:

1) Resistance testing on the motor windings
2) Megger testing and D.C. Hi-Pot testing
3) Surge testing on all phases
4) The motor was run coupled to collect motor data such as voltage, current, power factor, vars, and volt-amps readings to obtain a power profile for the motor.
5) Vibration testing with the motor uncoupled
6) Vibration testing with the motor coupled

The final test data showed that the motor performance was within acceptable limits and was considered satisfactory by the licensee.

Thermography testing was performed to mark where hot spots are located on the motor. These hot spots will be monitored on a quarterly basis to provide trending data for RG&E engineering. Testing of the A-SW motor was completed on September 23, 1996, at which time the system engineer indicated that the A-SW train was acceptable.

The licensee initiated a 10 CFR Part 21 evaluation on the SW motors that were purchased from U.S. Motors. This evaluation was initiated because poor workmanship and manufacturing defects of these motors would have lead to premature motor failures preventing them from performing their design function (see NRC IR 50-244/96-07). The licensee is also revising its safety-related motor commercial grade item engineering evaluation (CGIEE) program to include steps for the inspection of windings and overall workmanship to ensure that newly procured motors are constructed with acceptable quality.

c. Conclusions

The inspector concluded that the testing activity was a well coordinated effort between the Results and Test shop, the electrical shop, and system engineering. Engineering was thorough in providing a detailed scope of work and defining technical boundaries for different testing procedures and methods.

M2.3 Maintenance on Station Auxiliary Transformer 12B

a. Inspection Scope (62707)

On September 20, 1996, the inspector witnessed the annual preventive maintenance testing of the 12B transformer.

b. Observations and Findings

RG&E's maintenance personnel from the Power Control Center performed annual preventive maintenance on transformer 12B at Ginna Power station. The transformer was taken offline to perform insulation testing on the primary and secondary transformer windings. A "Doble" Test was conducted to measure transformer power factor and dielectric-loss, moisture, carbonization and other forms of contamination of windings, bushings and insulation. The transformer and accessories were tested for presence of combustible gases. There was no combustible gas present. All testing data from this transformer was collected and stored in RG&E's historical database which was begun when the transformer was modified in 1989. New data was compared to historical data to look for any trends in transformer degradation. RG&E's testing of transformer 12B found the results to be within acceptable limits and in accordance with the manufacturer and industry standards, ANSI C-57, "Liquid-Immersed and Dry-Type Transformers", and EPRI EL-5036, Volume 2, "Power Transformers."

Preventive maintenance checks were performed on the transformer fans, tap changers, and insulator and porcelain bushings. These components were found in acceptable condition and no replacement components were required. An operational check of transformer gauges and alarms was conducted and found to be satisfactory. Transformer oil samples were taken for dielectric and laboratory testing. Test results show that the oil was satisfactory with no anomalies. The inspector reviewed RG&E's maintenance and testing procedures and found that they adequately reflected the manufacturer's recommendations and provided sufficient detail to perform maintenance and testing on 34 Kv transformers.

The licensee initiated ACTION Report 96-0881 because a Ginna station work order was not initiated for the 12B transformer maintenance. The maintenance planners at Ginna Station did not initiate a work order since the technicians performing the preventive maintenance utilized their own work order from the Power Control Center, which is a separately controlled department under RG&E that maintains and tests offsite power systems. Both transformers 12A and 12B are considered an "offsite" power system at Ginna Station. The inspector noted that Ginna Station operators properly issued and performed the necessary equipment isolations and tagouts for the 12B transformer work.

The licensee took corrective action and added a note on all Power Control Center work requests for Ginna station that requires technicians to follow Ginna Station work order packages for either preventive or corrective maintenance performed inside the protected area. The electrical planner assigned the electrical shop as the lead group for any transformer or switchyard work on the Ginna site.

c. Conclusions

The inspector concluded that RG&E maintenance technicians were highly skilled and knowledgeable about high voltage transformers. Maintenance and testing was adequately coordinated with the Power Control Center and Ginna main control room. The licensee's additional requirements for assigning the electrical shop as the lead group for all transformer testing by RG&E Power Control Center technicians were placed into the revised work package. Also, a note in the Power Control Center's procedure requiring its technicians to use Ginna work orders will help prevent the scheduling of potentially conflicting work assignments between the onsite and offsite maintenance organizations.

M2.4 Inoperability of The B-Emergency Diesel Generator

a. Inspection Scope (62707)

The inspectors reviewed the licensee's actions to investigate and correct a faulty condition in the B-EDG output breaker.

b. Observations and Findings

On September 26, 1996, during a periodic test, a circuit breaker alarm spring was found out of place on the B-EDG output breaker (Westinghouse Type DB-75) on Safeguards Bus 16. The licensee initiated ACTION Report 96-0890 to determine the cause of this problem. The electrical shop investigated and determined that the retaining clip and washer that holds the alarm spring had broken from apparent fatigue and fallen off, but that operability of the breaker had not been lost. If the breaker had experienced an overcurrent trip or a lockout signal with this alarm spring not functioning, the breaker would have functioned properly since the main relays are independent of the spring. The breaker would have functioned to either open or closed under accident conditions, as designed. Loss of the alarm spring did cause the loss of an audible alarm in the control room for an overcurrent trip and a lockout for Bus 16-14 tie breakers (annunciator L-13). Consequently, the licensee declared the B-EDG inoperable and entered a 7 day LCO. The electrical shop subsequently fixed the alarm spring holder and functionally tested the breaker. Operations performed a surveillance test on the B-EDG and returned it to service later the same day.

The licensee verified that the A-EDG breaker did not have a similar problem. All other Westinghouse Type DB-75 breakers were inspected for this problem, and no anomalies were found.

c. Conclusions

The inspector concluded that the technical staff acted promptly in investigating all like breakers to determine if a common problem existed with the EDG breakers and related switchgear. The problem was properly diagnosed, and corrected. Testing effectively demonstrated that the breaker satisfied all appropriate acceptance criteria before being declared operable. The system engineer displayed a high level of technical competence in resolving this issue in an expeditious and thorough manner.

M2.5 Use of Non-Qualified Material on EQ Splices For RHR Valves MOV-852A & MOV-852B

a. Inspection Scope (62707)

From September 27 to October 3, 1996, the inspectors reviewed a potential safety concern regarding environmental qualification (EQ) of the RHR core deluge valves MOV-852A & MOV-852B modification.

b. Observations and Findings

On August 27, 1996, the licensee initiated an ACTION Report (AR 96-0827) stating that plant change request PCR 96-085 directed the application of a non-EQ qualified sealant (RTV-133) to complete the EQ splices on the new cables for MOV-852A & MOV-852B at their containment penetration. The AR stated that RTV-133 was purchased as non safety-related, but was used for the Containment Recirculating and Fan Cooling Units A through D. The inspector reviewed the licensee's material safety data sheet (MSDS) and checked the warehouse for sealants other than RTV-133 that may have been available for use as an EQ qualified sealant on this penetration. No other sealant of this type was found. The licensee did have RTV-133 in stock for non-safety applications, and this was consistent with AR 96-0827 and PCR 96-085.

During RG&E's design verification process, a review of penetration drawings found the penetration's EQ qualification fully adequate without the use of any auxiliary sealant. This sealant had no impact on qualification of the penetration or its cables since it did not perform a safety function, was not required for EQ qualification of the MOV cables inside containment penetration, and its failure would not prevent the MOVs from performing their intended safety function. Therefore, the licensee concluded that this sealant did not pose a safety problem to the plant.

The licensee sent a sample of RTV-133 to an independent laboratory for testing as required by its commercial grade item engineering evaluation (CGIEE) program procedure CGIEE 91-063. When laboratory tests are completed, the licensee

anticipated having a qualified safety-related sealant. However, the licensee intends to remove the existing sealant from stock and re-procure RTV-133 as an EQ qualified sealant.

c. Conclusions

The inspector concluded that the licensee responded prudently and in a timely manner to a possible safety-related problem. The licensee's analysis was thorough with a well supported technical basis. The licensee's testing by an independent laboratory was in accordance with the requirements set forth in the RG&E CGIEE program.

M2.6 Underwater Inspection and Maintenance of the Circulating & Service Water Intake Water System

a. Inspection Scope (62707)

The inspector monitored the licensee's to cleaning of zebra mussels from the circulating and service water intake tunnel.

b. Observations and Findings

On October 1, 1996, the divers began cleaning zebra mussels from the circulating and service water intake structure. This effort focused primarily on the removal of mussel colonies on the interior walls at the inlet of the structure. The licensee concentrated efforts on the one quadrant and found the development of zebra mussels to be minimal relative to other power plants on Lake Ontario. During the removal process, most mussels fell out of the main intake flow path, but others that were caught in the main flow were removed by the screen wash on traveling screens in the screen house. The licensee also cleaned the vertical and horizontal channel in other sections, and documented the process on video camera as a baseline for evaluating future mussel growth. The inspector performed regular checks on the differential pressure (d/p) of the service water to the component cooling water (CCW) and emergency diesel generator (EDG) heat exchangers. The d/p for both the CCW and EDG heat exchangers were within their normal ranges and remained acceptable throughout the cleaning period.

c. Conclusions

The inspector concluded that the zebra mussels were effectively controlled and did not effect the plant's safety-related heat exchangers. The cleaning work was satisfactorily performed and prevented a buildup of mussels that could potentially produce a flow blockage.

M3 Maintenance Procedures and Documentation

M3.1 Surveillance PTT-23A on Containment Isolation Valves Inside Containment

a. Inspection Scope (61725)

The inspectors reviewed the circumstances surrounding a technical specification surveillance test that was not performed as scheduled.

b. Observations and Findings

Shortly after the plant entered Mode 4 on September 9, 1996, the licensee discovered that Improved Technical Specification (ITS) surveillance requirement (SR) 3.6.3.3 to verify the correct status of containment isolation boundary valves inside containment was not performed prior to leaving Mode 5. The SR must be completed prior to entering Mode 4 unless it was performed within the past 92 days. However, on September 9, 95 days had transpired since the surveillance test was last performed. The licensee immediately performed the surveillance procedure (PTT-23A), and verified that the containment boundary valves were in their correct positions. This was accomplished within the allowable 125% frequency and additional 24 hour allowances permitted under the ITS to successfully accomplish the surveillance. No instances of improperly positioned containment isolation valves were found.

The licensee initiated ACTION Report 96-0855 to investigate this incident, and subsequently attributed it to a communications failure between the operations and outage planning departments. It was also attributed to unfamiliarity with the requirements of SR 3.6.3.3. The operations procedure (O-1.1C) for the change from Mode 5 to 4 had been marked "N/A" by plant operators. PTT-23A was scheduled, and had been entered on the outage schedule as a required surveillance to be performed between 6:00 and 8:00 a.m. on September 9, 1996. The licensee further indicated that the mode change procedure, which noted the required surveillance test, was not reviewed by management prior to the actual mode change.

The licensee determined that procedure O-1.1C should be changed to indicate that PTT-23A should be performed when entering Mode 4 from Mode 5. The licensee also determined other O-1.1 series procedures needed to be changed to reflect the need for operations management to review which steps can be marked "N/A."

c. Conclusions

The inspector considered that the licensee's actions to identify that the surveillance test was not performed when scheduled and to implement corrective actions were appropriate and timely. Although the surveillance was properly completed within the time limits permitted by the ITS, this incident represented another occurrence where requirements of the ITS were not adequately understood by the plant staff.

M7 Quality Assurance in Maintenance Activities

M7.1 Maintenance Rule Expert Panel Meeting

a. Inspection Scope (40500)

The inspector observed the licensee's regularly scheduled panel meeting to evaluate equipment performance under maintenance rule criteria.

b. Observations and Findings

On September 6, 1996, the inspector observed the licensee's expert panel meeting to discuss component ranking issues with regard to the maintenance rule (10 CFR Part 50.65). The board chairman and staff members provided sound technical judgements with regard to component failures and their ranking factors. The panel members were all responsible for closely monitoring equipment performance over the past year and had thoroughly evaluated different component failures on a regular basis. Where component or maintenance preventable functional failures have occurred, the panel took action to increase the monitoring frequency.

c. Conclusions

The inspector concluded that the expert panel was comprised of technically competent individuals who had a good understanding of the maintenance rule.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 New Steam Generator Moisture Carryover Test

a. Inspection Scope (37551)

As part of the steam generator (SG) replacement project, the licensee performed a moisture carryover test to ensure that the SGs can meet the requirements of less than 0.10 percent moisture in the steam coming from the replacement SGs.

b. Observations and Findings

On October 4, 1996, the inspector attended a pre-job briefing for the SG moisture carryover test, and reviewed station modification (SM) procedure SM-10034-7.24. This procedure provided guidance for injection of a radioisotope tracer (Sodium-24, half-life = 15 hours) into the chemical addition tank of the main feedwater system to permit a precise measurement of moisture carryover. The licensee performed this test to ensure that the SGs could meet the warranty requirements of less than 0.10 percent moisture delivered to the main turbine. The tracer would not dissolve in the steam, but would be evenly disbursed to provide a direct measure of moisture carryover.

The procedure provided various contingency plans for mishaps that could occur during insertion of the radioisotope. The test procedure required that secondary plant piping be pressurized and inspected for leaks prior to injection of the tracer. The radioisotope would be well diluted so that any fluid leaks from the secondary systems (other than chemical injection lines) and the SG blowdown piping would not contain any significant contamination. Radiation Protection (RP) technicians were prepared to deal with any small leaks that could occur in the chemical injection and blowdown piping. Larger leaks would be stopped and the area roped off to allow for adequate decay and cleanup. The licensee incorporated industry events and lessons learned from other nuclear plants into the training for this evolution. Over the past month, RP technicians conducted extensive mockup training on the proper techniques for insertion of the radioisotope using special tools. The procedure required RP personnel to monitor secondary plant areas during the test. The licensee positioned cameras and lead shield curtains around the area to minimize exposure to personnel. The procedure required that areas subjected to dose rates higher than 2mr/hr be posted, monitored, and roped-off prior to the insertion of the radioisotope.

The test began late in the afternoon of October 4, 1996 (Friday) so that a minimum number of people would be in the turbine building when the test was performed. Once the radioisotope was mixed with water in the chemical addition tank, area dose rates decreased because of shielding provided by the tank. The licensee monitored for moisture carryover by taking samples from SG blowdown, main steam, heater drain tank, and main feedwater. The test results were later analyzed and indicated that the average total moisture carryover from both generators based on feedwater samples was 0.0154%, and was 0.0151% based on heater drain tank samples.

c. Conclusions

The inspector concluded that the licensee's attention to detail reflected good planning that resulted in minimizing radiological hazards, and provided effective radiological work coverage. The licensee aggressively practiced mockup training exercises using lessons learned from other nuclear stations and incorporated them into its training program. The licensee's personnel and equipment requirements in the radiological controlled area were well planned with sufficient resources available to perform the required radiological monitoring requirements for the SG carryover test. The final test results demonstrated very good steam quality from the new steam generators.

E3 Engineering Procedures and Documentation

E3.1 Review of the Circulating Water Intake Heater Manual Transfer Switch Modification Package

a. Inspection Scope (37551)

The inspector reviewed the design modification package for manually switching the circulating water intake heaters from 240 VAC to 480 VAC.

b. Observations and Findings

The inspector reviewed the design modification package for installation of manual 240 VAC to 480 VAC double throw transfer switches for each of the circulating water intake heaters. The modification was designed to allow operators to perform a timely manual switching transfer from the lower voltage to the higher voltage to alleviate frazil ice formations on the intake heaters. Each switch was rated at 600 VAC and has a three position switch "ON-OFF-ON". No discrepancies were noted in the modification package. The inspector performed a post modification walkdown of the intake heater transformers in the screenhouse and found the equipment to be consistent with the design change drawings.

The inspector discussed the design input requirements and design drawings with the system engineer. The licensee planned to amend the UFSAR Section 10.6, Circulating Water System, to reflect the manual transfer switch modification on each of the circulating water intake heaters.

c. Conclusions

The inspector concluded that the design modification documentation was of good quality, thorough, and well supported with design basis technical information. The system engineer displayed a high level of technical competence during the review.

E6 Engineering Organization and Administration

E6.1 Nuclear Engineering Services Department Reorganization

a. Inspection Scope (37551)

On September 10, 1996, the licensee implemented a major reorganization of the engineering & technical functions (ETFs) for the Ginna plant. The inspectors reviewed the new organization and evaluated its potential impact on the ETF support to the line organizations on site.

b. Observations and Findings

Prior to the reorganization, ETF activities were roughly divided between the corporate engineering design groups and the onsite system engineering groups.

Most of the major engineering activities requiring indepth design reviews, modifications, and analyses were conducted by the corporate groups, while the day-to-day engineering support to the line organizations was provided through system engineering. After the ETF reorganization, both engineering groups were consolidated under the manager of Nuclear Engineering Services (NES). The new ETF organization consisted of three onsite system engineering groups covering the major engineering disciplines, and three corporate groups covering licensing, design, and strategic functions. The licensee indicated that the realignment was designed to accomplish several objectives. These included 1) revising the ETF mission after completing the steam generator replacement project, 2) optimizing the engineering and technical support to plant maintenance and operations, 3) maximizing organizational flexibility, and 4) evolving a self-directed team approach to ETF activities.

Since the licensee has no major modifications planned for the remaining life of the plant, a significant reduction in the engineering design activities supporting major modifications appeared warranted approximately one year ago. Consequently, the reorganization was designed to significantly reduce the corporate design function, and to enhance the engineering presence onsite. Also, the need to increase direct engineering involvement in support of operations and maintenance has been a longstanding need at the plant. One of the licensee's objectives for the new ETF organization was to establish a focus on the plant's design basis requirements within the operations and maintenance organizations. This objective was partly implemented when several lead engineers and managers from the corporate groups were reassigned to responsible positions within the operations and maintenance line organizations. Other corporate engineers were reassigned directly into the system engineering functions. Under the new ETF organization, individuals with design basis experience will directly support daily activities at the plant.

The most significant and direct result of the ETF reorganization was an immediate reduction in the total number of people within the technical organizations. The overall size of the total ETF complement was reduced by approximately 36%. The inspector considered the size of this reduction to be significant, and that it may potentially create an adverse impact on the ongoing technical support of the plant. Several engineering personnel with considerable responsibility and expertise in specialized areas left the company after the ETF reorganization. Also, several system engineers who left were working to resolve current technical issues, and had detailed knowledge of issues that were being resolved through Technical Service Requests, Engineering Work Requests, ACTION Reports, etc. Some engineering personnel reassigned to the system engineering groups had no prior experience as system engineers, and/or experience with the systems for which they were given responsibility. The inspector considered that the existing engineering backlog on the date of the reorganization would not be resolved or reduced in a timely manner since the individuals leaving the company did not have an opportunity to turnover their ongoing work assignments to their replacements. The status of several ongoing technical work activities could not be determined by the licensee two weeks after the ETF reorganization. Also, many of the new work assignments for each of the new groups and individuals were not well defined for several weeks after the reorganization occurred. This resulted in some confusion among the engineering staff as to their actual responsibilities. Most system engineers who kept their same positions after the reorganization maintained the same responsibility for the systems they had prior to the reorganization; however, the system engineers for several important plant systems (e.g., auxiliary feedwater, component cooling water, and spent fuel pool) were replaced. This caused ongoing system engineering projects such as the spent fuel pool water losses and the design issues associated with MOV-4007 and MOV-4008 to be delayed. The licensee has expressed a need to review the current engineering work backlog to assure that the most important technical issues are properly prioritized and resolved in a timely manner.

The inspectors reviewed the functional responsibilities of the new ETF groups and noted that major program activities such as MOVs, service water heat exchanger performance, maintenance rule, and ISI/IST were defined prior to the reorganization. Also, several of the ETF tasks and processes that were common to all groups were predefined. It did not appear that any previous major programs were deleted under the new organization.

c. Conclusions

The inspectors concluded that the overall objectives of the ETF reorganization were positive; however the near term impact of the engineering reorganization caused some delays in ongoing support to plant operations and maintenance. Major ETF program activities were maintained within the new organization, but the lack of a turnover of responsibilities by individuals who left the company resulted in delays in engineering support to the plant. Although the licensee has expressed the need to resolve issues related to prioritizing the engineering backlog, the inspector considered that the establishment of clear work responsibilities and priorities in the new ETF organization will be a long term effort. The primary objectives of the reorganization did not appear to be achievable before time permits the new ETF activities and processes to mature.

E8 Miscellaneous Engineering Issues

E8.1 (Update) URI 50-244/96-06-03: Modifications to AFW Discharge Throttle Valves MOV-4007 and MOV-4008

a. Inspection Scope (37700)

During September 3 - 8, 1996, the licensee replaced the "standard" valve disk in valves MOV-4007 and MOV-4008. Replacement of the standard valve disks with "throttle" valve disks was to provide better throttling capability to the MDAFW pumps. On September 9, 1996, throttleback testing was conducted on both MOV-4007 and MOV-4008.

b. Observations and Findings

During the 1996 refueling outage, the licensee discovered that base material behind the valve plug guides was eroded in both MOV-4007 and MOV-4008, possibly due to throttling conditions. Consequently, the licensee initiated a work order to replace the valves. Due to the unavailability of identical replacements, valves thought to be "equivalent" in all aspects except the stop check feature were substituted. The licensee evaluated the change and concluded that the stop check feature was not required since other check valves already existed directly upstream of the MOVs. However, it was not fully understood that the existing stop check valves had a non-standard plug design, i.e., a "throttling" plug.

Following startup from the refueling outage, the licensee experienced problems obtaining repeatable automatic throttling of both MOVs. The valve controls were designed to automatically throttle flow on an MDAFW pump start to between 200 gpm and 230 gpm. This was accomplished by a bistable setpoint from a flow instrument which de-energized the MOV closing coil when a pre-set stem position was achieved as the valve moved in the close direction. Coasting the valve into its final stem position caused some variations in the final flow achieved that depended on the d/p across the valve when the motor tripped. The throttle feature was successfully set and tested when the plant was at hot shutdown conditions. However, during quarterly testing at full power conditions, the valves throttled to less than 200 gpm and the control setpoint had to be readjusted. This in turn resulted in unacceptable throttling at greater than 230 gpm when later tested at hot shutdown conditions. The licensee performed a safety evaluation which concluded that it was acceptable for the valves to throttle to less than 200 gpm at full power conditions provided operator actions could produce the minimum AFW flow requirements within 10 minutes of a plant trip. The inspectors opened an unresolved item (UNR 50-244/96-06-03) based on the potential design issues with these valves and their ability to throttle the AFW flow properly.

The licensee continued to investigate long term corrective actions to improve throttling reliability in the auxiliary feedwater flow. Their discussions with the valve manufacturer indicated that a non-standard "throttling" plug was available for the valves and could improve their control characteristics. The licensee decided to procure and install these plugs during the next scheduled shutdown. Both valve plugs were replaced after the plant was shut down on September 6, 1996.

During valve testing following plug replacement, the licensee noted the following anomalies: 1) packing friction load was about 50 percent of the historic value, and 2) on the close stroke the valve/actuator inertia was approximately double its previous value. The much higher inertia when added to the required torque to close the valve under full d/p conditions caused the total torque on MOV-4008 to exceed the actuator's torque limit of 230 ft-lbs. (234.8 ft-lbs. actually achieved). The licensee prepared a modification to correct this problem which included an actuator gear change to decrease the speed of the valve. An engineering analysis indicated that the number of cycles on the overtorqued actuator should be limited to prevent damage. Engineering determined that a maximum of 188 close/open cycles would

be acceptable, but that a safety factor of 5 should be applied for engineering conservatism. Consequently, engineering imposed an operational restriction of 36 total valve strokes permitted before the actuator is overhauled or replaced. Plant operators are to maintain a log of each stroke of MOV-4008 and are to notify engineering before the limit is approached.

The gear change proved sufficient for MOV-4008, but MOV-4007 could not be set up with sufficient closing torque (to fully close the valve) without jeopardizing the total torque limit. Therefore, a limit switch modification was performed on MOV-4007 to rewire the close limit switch in series with the torque switch. This modification allowed stopping the actuator motor early enough to prevent excess inertia from causing an overtorque condition. The licensee noted that it was not a safety-related function to fully close these valves; however, full closure capability was more desirable from an operational standpoint. The licensee planned to reconfigure the limit switch on MOV-4008 to make it close on stem position instead of motor torque during a future outage.

The licensee continued with an existing Technical Service Request to further evaluate these valves and to provide long term corrective actions to an apparently inadequate design. Options being evaluated included: replacement of the valves with ones having better control characteristics, installation of a more optimum actuator gear ratio and, improvements in the valve control circuitry. The licensee was evaluating these options for final resolution and implementation during the next refueling outage. However, little progress has been made to date, due partly to the recent engineering reorganization, and to an overall lack of coordination within the MOV program. The reorganization assigned a technical manager to take over primary mechanical system engineering functions which included a special emphasis on MOVs. A new system engineer for the AFW system was also assigned. This item remains unresolved pending NRC review of the licensee's resolution of the design issues on these valves.

c. <u>Conclusions</u>

Replacement of the valve plugs with a design more suited to throttling improved the reliability of automatic AFW flow. However, a lack of coordination in the licensee's MOV program, and the lack of a turnover of AFW system engineer responsibilities have resulted in little progress to date on the overall design issues associated with MOV-4007 and MOV-4008.

IV. <u>Plant Support</u>

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 <u>Incoming MOVATS Equipment Shipped as Clean Had Contaminated Components</u>

On September 5, 1996, a radiation protection (RP) technician performed a survey of incoming "non-radioactive" valve testing (MOVATS) equipment for contamination as

part of RG&E's required surveys. During the survey, fixed contamination was identified on one piece of the equipment that was above the allowable limit (500 dpm/100 cm^2. The RP technician informed his management of the contamination and began an investigation to determine the origin of the shipment. Information from onsite MOVATS personnel indicated that the equipment was shipped from an ITI MOVATS clean facility in Kennesaw, Georgia, and could have been at a number of other nuclear plants or facilities prior to shipment to Ginna Station. The licensee started the decontamination process and notified the NRC inspector who witnessed the resurvey of the item. The licensee also notified the NRC Region I senior radiation specialist of the incident. The licensee documented this incident on ACTION Report 96-0848.

c. Conclusions

The inspector concluded that the RP technician was diligent in his efforts in implementing the recently enhanced survey policies and procedures at Ginna Station. The survey performed by the RP technician was thorough and effectively identified the contaminated equipment before it was brought onsite.

R1.2 Shipping Container Contact Dose Rate Greater Than Department of Transportation (DOT) Limits

On August 19, 1996, an empty radioactive material container radioactive material was shipped to Ginna Station from the University of Missouri. The licensee surveyed the container prior to accepting it, and noted a radioactive contact reading of 0.8 mr/hr. The DOT limit for an empty radioactive container is 0.5 mr/hr on contact. The licensee has in place an enhanced RP policy to conduct survey tests on any equipment entering the site. A procedure is also in place to augment the licensee's procurement process, requiring notification to RP of all equipment being brought into the Ginna site. The licensee subsequently placed the container into another larger container, so that contact radiation levels would be below DOT limits, and returned it to the University of Missouri.

c. Conclusions

The inspector concluded that the RP surveys were well implemented, and adhered to established RP policy. The surveys performed by the RP technician were very thorough.

V. Management Meetings

X1 Exit Meeting Summary

At periodic intervals and at the conclusions of the inspection, meetings were held with senior station managers to discuss the scope and finds of the inspection. An exit meeting for this report period was held on October 18, 1996.