UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report No.: 50-261/92-27

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

Docket No.: 50-261 License No.: DPR-23

Facility Name: H. B. Robinson Unit 2

Inspection Conducted: September 5 - October 9, 1992

Lead Inspector: _____ 11/4/92
L. W. Garner, Senior Resident Inspector Date Signed

Other Inspector: C. R. Ogle, Resident Inspector

Approved by: _____ 11/4/92
H. O. Christensen, Chief Date Signed
Reactor Projects Section 1A
Division of Reactor Projects

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of operational safety verification, surveillance observation, maintenance observation, and meeting with local officials.

Results:

Two violations were identified concerning inadequately established procedures and failure to implement procedures for reduce RCS inventory operations. In addition, a number of weaknesses and deficiencies were identified with reduced inventory operations. These included inadequate technical knowledge, inadequate communications, an ineffective Operating Experience Feedback program, and incomplete logkeeping (paragraph 3).

A violation was identified for failure to secure a containment penetration with a deactivated closed containment isolation valve within four hours as required by limiting condition for operation of Technical Specification 3.6.3. (paragraph 3).

A non-cited violation was identified for failure to establish as adequate maintenance procedure in that the procedure identified the incorrect isolation amplifier to be installed in a safety-related circuit (paragraph 5). The licensee's emergency preparedness response to an Alert condition associated with a CO_2 release in a vital area was good (paragraph 3).

Insufficient procedural precautions and poor configuration control resulted in the inability to remotely reopen the shutdown cooling isolation valve during inservice inspection testing (paragraph 3).

Operations conducted a less than thorough RCS leak check (paragraph 4).

REPORT DETAILS

1. Persons Contacted

*R. Barnett, Manager, Outages and Modifications
*C. Baucom, Senior Specialist, Regulatory Compliance
*R. Chambers, Plant General Manager, Robinson Nuclear Project
B. Clark, Manager, Maintenance
T. Cleary, Manager, Technical Support
C. Dietz, Vice President, Robinson Nuclear Project
R. Femal, Shift Supervisor, Operations
W. Flanagan, Manager, Operations
*W. Gainey, Manager, Plant Support
*G. Grant, Acting Manager, Operations
*W. Hammond, Engineer, Quality Assurance
*J. Harrison, Manager, Regulatory Compliance
*R. Howell, Senior Specialist, Nuclear Assessment Department
P. Jenny, Manager, Emergency Preparedness
D. Knight, Shift Supervisor, Operations
A. Padgett, Manager, Environmental and Radiation Control
D. Seagle, Shift Supervisor, Operations
*D. Stadler, Onsite Licensing Engineer, Nuclear Licensing
G. Walters, Operating Event Followup Coordinator, Regulatory Compliance
*A. Wallace, Shift Operations Coordinator
D. Winters, Shift Supervisor, Operations

Other licensee employees contacted included technicians, operators, engineers, mechanics, security force members, and office personnel.

NRC Managements Visits

S. Ebneter, Regional Administrator - Region II, E. Merschoff, Division Director - DRP, E. Adensam, Director - Project Directorate II-1, R. Trojanowski - Regional State Liaison Officer, and H. Christensen, Section Chief - DRP Section 1A were onsite September 24 to visit the facility, present the SALP to the licensee, and meet with local officials.

*Attended exit interview on October 14, 1992.

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Status

The unit began the report period in cold shutdown for removal of foreign material from the SI system and associated safety-related components. On September 6, decay heat removal was interrupted for a longer period than anticipated during RHR-750 valve stroke time surveillance testing. Once closed, the RHR-750 valve could not be reopened remotely due to an open permissive unknowingly being defeated by the system clearance established for RWST foreign material inspection activities. The RCS temperature increased from 136 to 140 degrees F in the time, approximately 35 minutes, required to manually reopen RHR-750.

Inspection, flushing, and cleaning activities of the SI system were completed on September 10. Modification and SI system performance tests were also satisfactorily completed on September 10. After management review, the A and B SI pumps and the SI system was declared operable on September 12. Excessive seal leakoff from the B RCP resulted in reduced inventory operation from September 12 to 17 while the seal package was repaired. Bonnet-to-body leak repairs to the CVCS letdown isolation valves CVC-460A and B and replacement of the control room ventilation compressor for WCCU 1A subsequently delayed restart until September 23. The turbine generator was placed in service on September 24 and 100% power operation was obtained on September 26. At 3:33 a.m. on September 30, an Alert was declared due to a slow release of carbon dioxide fire suppressant (considered a toxic gas) into pipe alley (mechanical CV penetration area). Later that morning, at 9:01 a.m., the Alert was exited after the supply of carbon dioxide to the leak was depleted and oxygen levels in the immediate vicinity of the leak, as well as adjacent areas, were verified to be normal. The unit continued full power operation for the remainder of the report period without further significant operational events.

3. Operational Safety Verification (71707)

The inspectors evaluated licensee activities to confirm that the facility was being operated safely and in conformance with regulatory requirements. These activities were confirmed by direct observation, facility tours, interviews and discussions with licensee personnel and management, verification of safety system status, and review of facility records.

To verify equipment operability and compliance with TS, the inspectors reviewed shift logs, Operation's records, data sheets, instrument traces, and records of equipment malfunctions. Through work observations and discussions with Operations staff members, the inspectors verified the staff was knowledgeable of plant conditions, responded properly to alarms, adhered to procedures and applicable administrative controls, cognizant of in-progress surveillance and maintenance activities, and aware of inoperable equipment status. The inspectors performed channel verifications and reviewed component status and safety-related parameters to verify conformance with TS. Shift changes were observed, verifying that system status continuity was maintained and that proper control room staffing existed. Access to the control room was controlled and operations personnel generally carried out their assigned duties in an effective manner. Control room demeanor and communications were typically adequate.

Plant tours and perimeter walkdowns were conducted to verify equipment operability, assess the general condition of plant equipment, and to verify that radiological controls, fire protection controls, physical protection controls, and equipment tagging procedures were properly implemented.

Foreign Material Removal From The SI System

Foreign material in the SI system and associated components has previously been discussed in IR 92-21 and 92-24. During this report period, the licensee completed implementation of their SI System Recovery Plan and returned the SI system to service on September 12, 1992. Activities completed included: installation of M-1134, Install Permanent Strainers In SI Pump Recirculation Lines, for the A and B SI pumps; inspection of selected SI and RHR piping and components; and, perform system tests to demonstrate operability. In addition, as required by Confirmation Of Action Letter, dated September 1, 1992, a meeting was conducted with Region II management to discuss results of recovery plan activities and root cause of the event. This meeting was conducted in the Region II Office on September 8, 1992. After review of the licensee's presentation, regional management determined that the actions taken to remove foreign material from the safety-related systems and components and the inspections performed of these systems and components provided a reasonable level of confidence that these systems and components would perform their safety functions if required. Also, it was determined that the licensee had complied with the conditions of the Confirmation Of Action Letter and thus could proceed, when ready, above hot shutdown conditions. During the meeting, the licensee committed to perform, during the next refuel outage, additional flushes (or inspections) of piping sections which were deemed impractical to flush with fuel in the core.

The inspectors inspected selected activities associated with the SI System Recovery Plan. The inspection activities included: observation of video camera inspections; verification that foreign material controls were implemented around open systems, review of post maintenance test requirements to ensure that reassembled components would function properly; and, observation of maintenance and modification work activities. In particular, the inspectors observed the disassembly and inspection of the A SI pump recirculation line orifice. No foreign material was found in the line or orifice. The licensee's review of previous recirculation flow data revealed that the data point used to determine that a 10% flow reduction had occurred in the A SI pump recirculation flow was abnormally high. The licensee provided no explanation for the abnormity. The inspectors agreed that the data was approximately 2 to 3 gpm higher than normal. However, since both the A and B SI pump data was offset by about the same amount and the same measuring equipment was utilized, it is possible that one of the other SI system test valves, such as SI-895K or SI-895U, was not fully closed when the higher than normal data was obtained. The inspectors also reviewed the material presented during the September 8 meeting and have no further questions at this time.

Unanticipated Extension Of Loss Of Decay Heat Removal During Testing

On September 6, 1992, during valve stroking per of OST-703, ISI Primary Side Valve Test, the shutdown cooling supply line isolation valve, RHR-750, could not be reopened using the RTGB control switch. The valve was

subsequently manually opened by an operator who had been stationed at the valve to observe stem travel. During the approximate 35 minutes it took to reopen the valve, the observed RCS coolant temperature rise attributed to the inability to remotely open the valve was approximately 4 degrees F, i.e., 136 to 140 degrees F. For comparison, the similar temperature rise attributed to securing RHR shutdown cooling was approximately 13 degrees F.

Subsequent investigation revealed that an open permissive interlock associated with the RHR pumps' RWST suction isolation valves, SI-862 A and B, was not present due to the control circuits for these valves being de-energized. These valve control circuits had been de-energized to establish a clearance boundary for foreign material inspection activities of the RWST and associated ECCS pumps' supply piping.

ACR 92-339 was issued to address the root causes of this event. Immediate corrective actions to preclude this particular event included identification of a procedure change request to provide a precaution note in OST-703 to address the valve interlocks associated with RHR-750 and RHR-751 (the redundant isolation valve to RHR-750).

During clearance development, personnel did not identify that the SI-862 A and B control circuit de-energizations would open opening permissive contacts in the RHR-750 control circuitry. The inspectors verified that a thorough review of CWD B-190628 sheets 248 and 249 (SI-862A and B control circuits respectively) would have identified that the opening control circuit on sheet 212 (RHR-750) was disabled by de-energizing the SI-862 A and B control circuits. Failure to identify adverse equipment impacts during the clearance development process was an example of poor configuration control. The inspectors plan to review the final ACR package, when available, to verify that adequate corrective actions are taken.

Reduced Inventory Operation

The inspectors' observations and review of reduced inventory evolutions revealed several deficiencies. Each of these items are discussed in more detail in subsequent paragraphs. Associated with the inventory reduction of September 12, the identified deficiencies included: 1) inadequate procedures to preclude loss of decay heat removal during inventory reduction; 2) inadequate technical knowledge to analyze the consequences of draining the RCS with the PRT pressurized; 3) failure of the pre-evolution shift briefing to define under what conditions the RCS inventory was to be accomplished; 4) inadequate communications between management levels which allowed the inventory reduction to be performed in a manner other than that envisioned by the Acting Operations Manager; and, 5) an ineffective OEF program which failed to familiarize Operations personnel with industry events involving level instrumentation errors associated with inventory reduction with the RCS pressurized. On September 13, a subsequent inventory reduction from -25 inches to -34 inches demonstrated a lack of sensitivity by the operating shift to potentially violating procedure requirements, in that, the

inventory reduction was accomplished utilizing only one instrument channel. In addition, refilling the PRT on September 16 resulted in the following findings: 1) the procedure failed to provide precautions concerning the potential impact of pressurizing the PRT if the PRT is refilled too rapidly; 2) incomplete logkeeping was demonstrated, in that, the logs did not record that the initial operator response to an unexpected reactor vessel water level increase due to the PRT pressurization was to add more water to the vessel; and, 3) the Operations corrective action program was poorly implemented in that the initial response by the operator was not entered into the program for subsequent analysis and management review. Although a number of deficiencies were identified during specific reduced inventory evolutions, no safety significant plant transients resulted from these items.

ACR 92-343 was issued to document the event sequence associated with the September 12 inventory reduction and to determine root causes and required corrective actions. The event sequence as extracted from the ACR, relevant documentation, and from inspectors' observations of evolutions in progress follows. On September 10, while performing preliminary checks to support starting the B RCP, it was discovered that the no. 1 seal leakoff flow exceeded the 5 gpm procedure maximum limitation of OP-101, Reactor Coolant System And Reactor Coolant Pump Startup And Operation. Subsequent attempts to correct the condition were unsuccessful. On September 11, plant management, after consultation with the NSSS, determined that the seal should be removed and repaired. Seal removal required the RCS system inventory to be reduced to below the pump flange, i. e., -25 inches below the reactor vessel head flange. On September 12, prior to the 7:15 a.m. shift briefing, the inspectors discussed with the Acting Operations Manager the problem experienced at another utility with vessel water level instrumentation accuracy due to the RCS being pressurized. The inspectors were shown the procedure steps which would be used to vent the RCS system to the CV atmosphere during system draining. At the end of the shift briefing, the Acting Operations Manager conducted a Case I briefing, as designated in PLP-037, Conduct Of Infrequently Performed Test and Evolutions, concerning the scheduled RCS partial draining. The briefing emphasized that draining the RCS system too rapidly would result in instrumentation errors. However, the PLP-037 briefing did not inform the operating crew that the draindown was to be performed with the RCS vented to the CV atmosphere nor did it include the industry event discussed by the inspectors. Subsequent to this briefing, discussions among the operating crew and a chemistry technician resulted in the decision by the SS to draindown with 5.0 psig nitrogen pressure on the PRT, an option allowed by GP-008, Draining The Reactor Coolant System. The decision was based on the desire to minimize corrosion product formation due to increased oxygen concentrations. The Acting Operations Manager was not informed of this decision. In preparation for draining the RCS, the PRT level was lowered to a point at which the PZR relief line discharge nozzles inside the PRT were uncovered and the PZR PORVs were blocked open. This allowed the PZR to be vented directly to the PRT gas space.

At 9:40 a.m., draining of the RCS was initiated in accordance with GP-008. At approximately 4:30 p.m. with PZR water level at 15%, the draindown was stopped while the loop 2 and 3 RCS water level instruments, LT-403 and LT-404, were placed in service. At this time, the shift SRO expressed concern to the SS that having nitrogen pressure on the RCS with the standpipe instrumentation (LT-403 and LT-404 which feed RTGB level indicators LI-403 and LI-404 respectively) vented to the CV atmosphere would force water up the standpipes and provide erroneous indications. He was aware of the rule of thumb that 33 feet of water is equal to 15 psig. Several people on shift, including the SS, did not remember that there had been large variations between the instrument readings when nitrogen pressure was used and when the pressure was subsequently vented off. The fact that the procedure allowed the system to be drained in this manner was further construed as evidence that this would not be a problem. The decision was made to resume the draindown with 5 psig nitrogen pressure on the PRT and verify that LI-403 and LI-404 would come on scale (zero reading) when vessel level decreased to the vessel flange top as by indicated RVLIS (flange top is 83.3% on RVLIS). Shortly after 5:00 p.m., the inspectors, while verifying that the inventory reduction was being accomplished in accordance with GP-008, noted that the RCS vent valve to the CV atmosphere, RC-572, was closed and the alternate method with 5.0 psig nitrogen pressure on the PRT was being utilized. At this time, the cold calibrated PZR water level instrument, LI-462 was off-scale low and LI-403 and LI-404 were not yet on scale. The inspectors discussed the observation with the Acting Operations Manager who was in the control room at the time. He was unaware that the PRT and, consequently, the RCS was pressurized. The inspectors re-iterated that pressurization of the RCS would non-conservatively effect LI-403, LI-404 and their associated tygon tube indicators inside the CV since these were vented to the CV atmosphere. Initially, the inspectors were informed that hydraulic losses between the PRT and the instrumentation would reduce the effect of the pressure in the PRT and that previous experience had indicated that there was little difference between level readings taken with the system pressurized and the system vented. The inspectors indicated that hydraulic losses would be small and that the system should be considered a static system. The inspectors requested the licensee to provide the correction and the basis for the correction which would be used to adjust LI-403 and LI-404 readings. Subsequent discussions among the Acting Operations Manager, the SS, the SRO, and I & C technicians resulted in the decision to stop the draindown, secure nitrogen to the PRT, and vent the RCS to the CV atmosphere. During the venting process, the tygon tubes associated with LI-403 and LI-404 were observed to determine the effect the pressurization had on this instrumentation. The indicated water level in the vessel was observed to decrease from approximately 15 feet above the vessel flange to approximately 5 feet above the vessel flange when the RCS was fully depressurized. The draindown was then resumed. Later that evening, the licensee discovered that WR/JOs 92-ANNW1 and 92-ANNX1 which had calibrated LI-403 and LI-404 level indicators prior to initiating the draindown had failed to specify, as required by GP-008 step 5.1.8, that the associated alarm switches also be calibrated. The complete instrumentation loops were

subsequently calibrated. Draindown to -25 inches was completed on the morning of September 13.

As noted above, inspection activities identified several significant deficiencies associated with the evolution. The inspectors noted that with RVLIS not required to be inservice per TS or by GP-008, draining of the RCS with 5.0 psig of nitrogen on the PRT in accordance with GP-008 would result in loss of decay heat removal. With a 10 foot non-conservative error in the indicated level verses the actual RCS level, LI-403 and LI-404 would not come onscale until the actual RCS water level reached -120 inches below the vessel flange top. However, the RHR pump providing decay heat removal would cavitate and have to be shutdown before that level would be reached since the middle of the loop is at -72 inches below the vessel flange. The planned evolution was to stay about -36 inches so that the provisions concerning midloop operations (as committed in the licensee's responses to GL 88-17, Loss Of Decay Heat Removal) would not be required to be implemented. Subsequent NAD review of previous GP-008 revisions revealed that a typographical error had apparently occurred during revision 13 (issued April 29, 1988). Earlier revisions to GP-008 had specified 0.5 psig nitrogen pressure be used. There was no documentation that the change to 5.0 psig had been intentional. The fact that GP-008 was inadequately established so that compliance with the procedure could potentially cause a significant operational event is a VIO: Failure To Adequately Establish GP-008 To Preclude The Loss Of Decay Heat Removal During RCS Inventory Reduction, 92-27-01.

Significant deficiencies were also identified in the OEF program. The inspectors reviewed the outstanding change request to GP-008 and the current revision being processed. There was no indication that lessons learned from the industry event described in IN 92-16 supplement 1, i.e., a February 1992 loss of decay heat removal event due to inventory reduction with the PRT pressurized, had been identified to be incorporated in GP-008. A review of the OEF process revealed that IN 92-16 supplement 1 had been received onsite on June 10, 1992, and at the time of the inspection, had not been reviewed for applicability to the site and distributed for action. The large backlog of OEF items had previously been identified as an issue in June 1992 by the Regulatory Compliance subunit, which is responsible for the OEF program implementation. NAD had also previously identified this as a program weakness and ACR 92-314 had been initiated on August 17, 1992. However, due to resource limitations, a plan to correct the problem was not submitted to management until October 8, 1992. At the end of the report period, the licensee had not established a schedule to work off the backlog.

The inspectors reviewed training records which revealed, via personnel initials, that the operating shift involved in the draindown had read about the industry event as part of the real time training process. A Westinghouse letter, detailing the event which was later the subject of IN 92-16 supplement 1, had been included with the reading material associated with IN 92-16. This material had been distributed during

April and May to licensed personnel for their onshift review. An interview with the SS revealed that he had no previous recollection of the IN 92-16 supplement 1 event. The procedure writer, who holds an NRC license and was assigned the preparation of the GP-008 revision 25, had also reviewed the real time training material. Thus, the OEF program was demonstrated to be ineffective in familiarizing personnel with a significant industry event.

As described in the event narrative above, LT-403 and LT-404 and their associated alarms were not calibrated as required by GP-008 step 5.1.8 prior to placement in service. This constituted a failure to implement procedures as required by TS 6.5.1.1.1.a and is a VIO: Failure To Implement GP-008 In That RCS Water Level Instrumentation Loops Were Not Calibrated As Required, 92-27-02.

The shift's inability to correctly resolve a technical question concerning the impact of RCS pressurization on instrumentation demonstrated a lack of technical expertise, especially in the area of hydraulics. Furthermore, the failure to request assistance from other organizations such as Technical Support or to consult the next management level to resolve a technical difference of opinion among licensed crew members was considered a weakness.

Communications of management's expectations were not successfully accomplished. Communications between the SS and the Acting Operations Manager were inadequate in that the Acting Operations Manager assumed that the SS knew that the draindown was to be performed with the RCS vented to the CV atmosphere. When the decision was made to use nitrogen pressure in the PRT, the SOM was informed but Operations management was not notified of the decision. Also, the shift PLP-037 briefing was inadequate, in that, when GP-008 provided instructions for different methods to be used for inventory reduction, the specific method to accomplish the task was not discussed. Also, the PLP-037 briefing failed to discuss significant industry events such as that described in IN 92-16 supplement 1.

On September 13, it was necessary to further reduce RCS level to allow additional inspection of the B RCP pump shaft for possible scoring. This additional draindown involved lowering water level approximately to a level just above -36 inches, the trigger point for entering midloop operation. Midloop operation required additional procedural controls and equipment to be in service. For example, 2 independent RCS level channels, one SI pump, and midloop CV integrity were required for midloop operation. Because meeting these requirements would extend the outage and level reduction below -36 inches was not necessary, the decision was made to maintain RCS water level above this trigger value. At the time of the additional reduction in RCS inventory, LI-403 was inoperable, reading low by approximately 10 inches, and RVLIS with an error tolerance of 6% was not sufficiently accurate to perform the draindown. The draindown was accomplished with use of only one instrument channel, LI-404. During the morning, the inspectors observed that RCS inventory as indicated on LT-404 was approximately -33 inches.

When the inspectors asked what the indicated RCS level was on the tygon tubes attached to the LT-403 and LT-404, operating personnel were unaware of their present reading. Since the tygon tube readings were known to be approximately 2 inches lower than LT-404, the inspectors were concerned that midloop operation may have inadvertently been entered. The SS directed that the tygon tube readings be obtained. Both tygon tubes were reported to be slightly below -35 inches. The tygon tubes were not monitored when the draindown was performed. The inspectors noted that the control operator's log had recorded at 0:05 a.m. that RCS level had been lowered to -34 inches by LI-404. Thus based on the fact that at -33 inches on LI-404 the tygon tubes were below -35 inches, it was possible that at -34 inches on LI-404, the tygon tubes could have been below -36 inches. However, do to accuracy of the data it was not possible to say that midloop operation had been entered for a limited time without the procedural requirements for midloop operation being met. However, Operations' reliance on one instrument channel, which was non-conservative relative to other available indications, to perform an inventory reduction near to a procedural limitation reflected a lack of sensitively to the potential to violate procedural requirements.

On September 16, during preparations to refill the RCS, the PRT was filled from 12% to 70%. During the PRT filling, one and/or both PW pumps were used. Rapid filling caused the gas volume to be reduced and the PRT to pressurize. After the PRT high pressure alarm was received, the PRT vent was opened. However, due to the small size of the vent path, the control operator also adjusted the fill rate to control the pressure increase. Approximately 12 minutes after securing the PRT fill, the control operator observed that LI-404 indicated that RCS level had changed from -24 increased to -12 inches. Believing that RCS water level needed to be increased, he opened HCV-121. Within approximately 2 minutes, while observing VCT level and discussing his actions with the SRO, he realized that HCV-121 should be closed to decrease RCS inventory. He subsequently restored RCS level to -17 inches, the level designated by the SS. The event review determined that the PRT pressure had been allowed to increase to the point at which the elevation difference between the PRT and PZR was overcome and water had been forced out of the PRT back into the PZR through the blocked opened PORVs. The inadvertent water addition to the RCS reflected a lack of technical knowledge and a failure to pursue the implications of an observed phenomena. Procedure reviews revealed that precautions or notes were not provided to warn of this potential consequence when the PRT is refilled. In addition, the inspectors noted that the initial operator action which could have compounded the causality was not logged or entered into a corrective action program. Failure to log the initial operator action represents inadequate logkeeping. Furthermore, the failure to capture the operator's response in the Operations corrective action program for subsequent analyses and management review was considered a weakness.

Containment Spray Relief Line Leak

On September 25, 1992, while performing routine inspection activities, the inspectors observed leakage from the CS piping. This was reported to Operations personnel who determined that the leak, approximately 1 drop per 5 seconds, originated at a weld on relief valve SI-871 tailpipe. The tailpipe was repaired on September 26. The inspectors verified that TS 3.3.2.2.b LCO was entered and that TS 3.3.2.2.c provisions were complied with when the repair was performed. Furthermore, the inspectors verified that OST-355, Containment Spray System Integrity Test (Annual) was successfully performed prior to returning the system to service.

Failure To Implement TS Action Within Required Time

On October 2, 1992, at approximately 1:30 p.m., while performing OST-701, Inservice Inspection Valve Test (Quarterly), RC-553, a 3/8 inch air diaphragm operated CV isolation valve on the gas analyzer sample line from the PRT, failed to open. The valve was left in the closed position and WR/JO 92-AQGB1 was initiated at 3:59 p.m. to repair the valve. At approximately 9:00 p.m. on the same day, the SS while performing a review of the completed OST-701 identified that this valve was a CV isolation valve and TS 3.6.3 LCO action statement should have been performed. TS 3.6.3 required that with one or more automatic containment isolation trip valves inoperable, either: a. restore the inoperable valve(s) to operable status within 4 hours, or b. isolate the affected penetration(s) within 4 hours by use of a deactivated automatic valve(s) secured in the isolation position(s), or c. isolate the affected penetration(s) within 4 hours by use of a closed manual valve(s) or blind flanges(s), or d. be in cold shutdown within the next 36 hours. At 9:16 p.m., the penetration was isolated as required by TS 3.6.3, in that, RC-553 and RC-516 (the redundant CV isolation valve) were verified to be closed and the power was removed from the valves to deactivate them in the isolated position. ACR 92-363 was issued on October 2 to investigate the event and determine corrective actions to preclude recurrence. Failure to isolate the gas analyzer sample CV penetration (designated as P-1) with deactivated isolation valves within 4 hours as required by TS 3.6.3 is a VIO: Failure To Isolate Gas Analyzer CV Penetration Within 4 Hours With Deactivated Isolation Valves As Required By TS 3.6.3, 92-27-03.

Alert Due To CO_2 Release In Pipe Alley

On September 30, 1992 at 3:33 a.m. an Alert was declared due a slow leak of fire suppressant, CO_2 gas, into pipe alley. The Alert was terminated at 9:01 a.m. that same day after the effected CO_2 bottles were verified to be empty and the oxygen concentrations in pipe alley and adjacent spaces were verified to be normal. The CO_2 gas was discharged to the plant stack via means of the normal auxiliary building ventilation system. Oxygen concentrations measured a few feet away from the leak location never decreased to more than approximately 90% of the normal oxygen concentration in air.

The event was initiated when personnel reconnected a refilled CO_2 bottle into slot 1 of the north and south cable vault fire suppression system. The CO_2 bank for these areas was located in the south pipe alley. When a pilot head discharge hose containing a stuck open solenoid valve, CD-13, was sufficiently reconnected to the pilot head to open the spring loaded outlet check valve, the fire technician heard the CO_2 discharge into the header and immediately attempted to loosen the connection. However, this attempt was abandoned when the fire technician heard the discharge valves on other bottles in the CO_2 bank open. The other non-pilot head CO_2 bottles opened when the discharge header pressure exceeded their outlet check valve setpoint. Since there was no valid fire suppression system actuation signal, the discharge valves into the north and south vault area remained closed. Therefore, the only release points from the pressurized system was from leakage associated with the discharge piping components, i.e., the partially engaged hose connection. The fire technician left the area and reported the event to the control room. Actions were then taken to secure the area, evaluate the potential impact on plant equipment and operations, monitor the oxygen concentrations within the affect and potentially affected areas, establish required fire watches, and develop recovery actions. At 8:44 a.m., by using a specially assembled pressure gage (none was available on the discharge header) each effected CO_2 bottle was verified to be depleted. ACR 92-358 was initiated on September 30 to investigate the solenoid valve failure and the resultant event. The inspectors will review the completed ACR, when available, as part of the routine inspection program.

The Alert was declared in accordance with OMM-031, Emergency Action Level Procedure User's Guide, step 5.1.17 which defines CO_2 as a toxic gas. This step states that the decision to declare an Alert for a toxic gas release should be based upon factors such as the release rate and the effected area's volume with the intent to determine whether the release would endanger personnel that require access to equipment required to safely operate the plant. It was prudent to consider this event as an Alert since the effected area was the mechanical CV penetration area and under some plant conditions, personnel would require rapid access to this area for manual equipment operation. Also, it was uncertain whether the partially disengaged coupling would remain together or become separated, i.e., release rate would substantially increase.

The overall response to the event was good. The OSC and TSC were activated at 4:30 and 4:43 a.m., respectively. Shift turnover among OSC and TSC organizations were successfully performed when day shift personnel arrived at approximately 7:00 a.m.. The initial state and counties' notifications were issued within 15 minutes (at 3:45 a.m.) and subsequent followup messages were issued at approximately one hour intervals (at 4:43, 5:33, 6:43, 7:45, and 8:36 a.m.). The state and counties were notified at 9:07 a.m. of the event termination. The NRC was notified of the event within one hour, at 4:17 a.m.. A press release was issued at 6:35 a.m. which resulted in several calls to the

main switchboard from the general public. Public relations personnel in the victors center were utilized to help respond to these inquires.

The South Carolina Emergency Preparedness Department activated a portion of their facility at 5:42 a.m. and a South Carolina Department Of Health And Environmental Control representative arrived onsite at 7:30 a.m.. He was briefed by the licensee and visited the effected area. The inspectors asked the state representative if he had any concerns. He indicated that he had none.

The inspectors were notified at approximately 3:45 a.m., via the licensee's beeper system, that an Alert had been declared and that the TSC and OSC was being activated. The inspectors arrived in the control room at approximately 4:05 a.m. and monitored the licensee's response to the event from either the control room or TSC until the Alert was terminated. The inspectors verified that: the event was properly classified; notifications were timely and adequate; appropriate measures were taken to ensure equipment and personnel were not adversely affected by the release; the TSC was adequately staffed; appropriate communications were maintained among both onsite and offsite emergency response organizations; recovery actions were developed considering ALARA and contingency actions as necessary; and, recovery actions were properly implemented.

Management Changes

During the inspection period a number of organizational reassignments became effective. The Technical Support Manager was assigned to NED in the corporate office. His position was filled by the Technical Support engineering support supervisor. The NED and NAD onsite unit managers were transfered to the Brunswick facility. The Technical Support mechanical supervisor assumed the NED site unit manager position. Until the NAD site unit manager position is filled, the NAD site unit engineering assessment manager has been designated as acting manager.

Three violations were identified. Except as noted above, the area/program was adequately implemented.

4. Monthly Surveillance Observation (61726)

The inspectors observed certain safety-related surveillance activities on systems and components to ascertain that these activities were conducted in accordance with license requirements. For the surveillance test procedure listed below, the inspectors determined that precautions were adhered to and the required administrative approvals were obtained prior to test initiation. Upon test completion, the inspectors verified the recorded test data was complete, accurate, and test discrepancies

were properly documented and rectified as appropriate. Specifically, the inspectors witnessed/reviewed portions of the following test activity:

OST-052 RCS Leakage Test And Examination Prior To Startup Following An Opening Of The Primary System

OST-052

On September 21, 1992, the inspectors conducted a CV housekeeping and RCS leakage inspection, as well as, observing Operations personnel perform part of OST-052. Miscellaneous debris (paper, tape, paint chips, rubber gloves, etc.) observed by the inspectors were removed by the HP accompanying the inspectors. Approximately one-quarter cubic foot of debris was collected. Operations personnel identified and initiated work requests to repair the following items: pipe cap leak on A accumulator piping drain line, boric acid buildup on primary sample valve PS-954A packing gland, boric acid buildup on the connector to the B loop RCS flow instrument root isolation valve RC-513, and boric acid buildup on a seal table isolation valve. In addition to these, the inspectors also noted a pipe cap leak on the C accumulator piping drain line and a packing leak on FW-45, B S/G wide range level instrument LT-487 root isolation valve. The FW-45 packing leak had caused a small puddle of water under the B hot leg piping. Based upon the puddle size and the leak rate, this water puddle was there when Operations personnel performed their leak check. Failure to detect the puddle indicated that a less than thorough inspection had been performed by Operations. In addition, the inspectors observed several areas in which there were water on the floor due to OSTs and maintenance activities which had been performed earlier. Since small leaks are easier to detect by the presence of water on the floor, performing a leak check with water on the floor due to other activities could easily result in small leaks not being detected. Thus, the failure to wipe up spilled water prior to performing a leak check constituted a poor work practice. Primary leakage is typically maintained low at the site, 0.05 to 0.1 gpm.

No violations or deviations were identified. Except as noted above, the area/program was adequately implemented.

5. Monthly Maintenance Observation (62703)

The inspectors observed safety-related maintenance activities on systems and components to ascertain that these activities were conducted in accordance with TS, approved procedures, and appropriate industry codes and standards. The inspectors determined that these activities did not violate LCOs and that required redundant components were operable. The inspectors verified that required administrative, radiological, and fire prevention controls were adhered to. In particular, the inspectors observed/reviewed the following maintenance activities:

WR/JO 92-AMWN1 Support To Video Inspection Of SI Piping

WR/JO 92-AMRB2 Install SI Pump Recirculation Strainers

Installation Of Incorrect Isolation Amplifier

On September 24, 1992, power increase was stopped at 40.5% due to the high steam line flow bistable FC-495 actuating. Initial troubleshooting by I & C indicated that the channel had spiked and would not reset due to loop width at this load. Load was reduced approximately 1% to clear the bistable. At 41% power, FC-495 again actuated. Investigation revealed that a recently replaced isolation amplifier, PM-447D, associated with AMSAC was the incorrect model. This had placed an additional 200 ohm resistor into the current loop; thereby, causing the entire loop to be adversely affected. The isolation amplifier will be replaced when the correct model can be obtained from the vendor. During instrumentation data sheet preparation associated with the AMSAC installation modification, the isolation amplifier model number had been incorrectly entered on the data sheets for AMSAC modules PM-446D, PM-447D, LM-474B, LM-485B and LM-496B. The correct model number was EIP-E013DD-37 whereas EIP-E013DD-1, the model number for all other isolation amplifiers used at the site, was provided on the MMM-006 Appendix B data sheets. The licensee has initiated procedure changes to correct the data sheets, as well as, update EDBS with the correct model numbers. Failure to specify the correct model number on the data sheets constituted a violation for failure to adequately establish procedures. This violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in Section VII.B of the Enforcement Policy. Hence, this item is identified as an NCV: Failure To Adequately Establish Maintenance Procedures For Replacement Of AMSAC Isolation Amplifiers, 92-27-04.

One NCV was identified. Except as noted above, the area/program was adequately implemented.

6. Meeting With Local Officials (94600)

On September 24, 1992, the Regional Administrator, the DRP Division Director, the Regional State Liaison Officer, the Section Chief responsible for the site, and the inspectors met with local officials representing the cities of Darlington, Florence, and Hartsville, the town of Bishopville, and the emergency preparedness organizations for the State of South Carolina, Chesterfield, Darlington, Florence, and Lee counties. The local officials expressed no concerns about the operation of the facility.

7. Exit Interview (71701)

The inspection scope and findings were summarized on October 14, 1992, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings listed below and in the summary. In response to the inspectors' conclusion involving inadequate logkeeping (see paragraph 3), the

licensee indicated that recent emphasis on logkeeping had resulted in an improving trend in this area. Also, the licensee stated that the root cause determination to be developed for OMM-027 no. 92-046, inadvertent vessel level increase associated with the PRT repressurization, would capture the operator's response. The inspectors did not agree that investigation into why an event occurred would necessarily address the response to an event. Excluding these items, no additional dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

Item Number	Description/Reference Paragraph
92-27-01	VIO - Failure To Adequately Establish GP-008 To Preclude The Loss Of Decay Heat Removal During RCS Inventory Reduction (paragraph 3)
92-27-02	VIO - Failure To Implement GP-008 In That RCS Water Level Instrumentation Loops Were Not Calibrated As Required (paragraph 3)
92-27-03	VIO - Failure To Isolate Gas Analyzer CV Penetration Within 4 Hours With Deactivated Isolation Valves As Required By TS 3.6.3, (paragraph 3)

The following NCV was identified and reviewed during this inspection period.

Item Number	Description/Reference Paragraph
92-27-04	NCV - Failure To Adequately Establish Maintenance Procedures For Replacement Of AMSAC Isolation Amplifiers (paragraph 5)

8. List of Acronyms and Initialisms

a.m.	Ante Meridiem
ACR	Adverse Condition Report
ALARA	As Low As Reasonably Achievable
AMSAC	ATWS Mitigating System Actuation Circuitry
ATWS	Anticipated Transient Without Scram
CFR	Code of Federal Regulations
CS	Containment Spray
CV	Containment Vessel
CVC	Chemical & Volume Control
CVCS	Chemical and Volume Control System
CWD	Control Wiring Diagram
DRP	Division of Reactor Projects
EDBS	Equipment Data Base System
ECCS	Emergency Core Cooling System
FC	Flow Control

gpm	Gallons Per Minute
F	Fahrenheit
GL	Generic Letter
GP	General Procedure
HCV	Hand Control Valve
HP	Health Physics
i.e.	That is
IE	Inspection and Enforcement
I&C	Instrumentation & Control
IN	Inspection Notice
ISI	Inservice Inspection
LCO	Limiting Condition for Operation
LI	Level Indicator
LM	Level Module
LT	Level Transmitter
MMM	Maintenance Management Manual
NAD	Nuclear Assessment Department
NCV	Non-Cited Violation
NED	Nuclear Engineering Department
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam System Supplier
OEF	Operating Experience Feedback
OMM	Operations Management Manual
OP	Operations Procedure
OST	Operations Surveillance Test
p.m.	Post Meridiem
PLP	Plant Program
PM	Pressure Module
PORV	Power Operated Relief Valve
PRT	Pressurizer Relief Tank
Psig	Pounds per square inch - gage
PW	Primary Water
PZR	Pressurizer
RC	Reactor Coolant
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RTGB	Reactor Turbine Generator Board
RVLIS	Reactor Vessel Level Instrumentation System
RWST	Refueling Water Storage Tank
SALP	Systematic Assessment of Licensee Performance
SI	Safety Injection
SOM	Shift Outage Manager
SRO	Senior Reactor Operator
SS	Shift Supervisor
TS	Technical Specification
TSC	Technical Support Center
VIO	Violation
VCT	Volume Control Tank
WR/JO	Work Request/Job Order
WCCU	Water Cooled Condensing Unit