



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

Report No.: 50-400/90-21

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

Docket No.: 50-400

License No.: NPF-63

Facility Name: Harris 1

Inspection Conducted: October 20 - November 16, 1990

Inspectors: *J. E. Tedrow* 11/30/90
 J. Tedrow, Senior Resident Inspector Date Signed

M. Shannon 11/30/90
 M. Shannon, Resident Inspector Date Signed

Approved by: *B. Carroll* 11/30/90
 B. Carroll, Acting Section Chief Date Signed
 Division of Reactor Projects

SUMMARY

Scope:

This routine inspection was conducted by two resident inspectors in the areas of plant operations, radiological controls, security, fire protection, surveillance observation, maintenance observation, safety system walkdown, review of nonconformance reports, visit to the public document room, midloop/reduced inventory activities, review of the spent fuel shipping program, review of the boron corrosion program, operator license review, and licensee action on previous inspection items. Numerous facility tours were conducted and facility operations observed. Some of these tours and observations were conducted on backshifts.

Results:

Three violations were identified: failure to properly implement a radio-chemistry procedure, paragraph 2.b.(7); failure to perform a written safety evaluation, paragraph 9; and failure to notify the NRC upon employment termination of a licensed operator, paragraph 11.

A non-cited licensee identified violation concerning an improper change to a surveillance procedure was identified, paragraph 6.a.

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The licensee's decision to shutdown the plant and repair minor leakage was considered to be conservative, paragraph 2. Improvements were noted in the licensee's boron corrosion program, paragraph 10. Mockup training for the installation of steam generator nozzle dams reduced personnel exposure, paragraph 4.



REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *J. Collins, Manager, Operations
- *G. Forehand, Manager, QA/QC
- C. Gibson, Director, Programs and Procedures
- *J. Hammond, Manager, Onsite Nuclear Safety
- C. Hinnant, Plant General Manager
- J. Nevill, Manager, Technical Support
- *C. Olexik, Manager, Regulatory Compliance
- A. Poland, Manager, Environmental and Radiation Control Support
- *R. Richey, Vice President, Harris Nuclear Project
- *J. Sipp, Manager, Environmental and Radiation Control
- H. Smith, Manager, Radwaste Operation
- *M. Wallace, Sr. Specialist, Regulatory Compliance
- *E. Willett, Manager, Outages and Modifications
- *W. Wilson, Manager, Spent Nuclear Fuel

Other licensee employees contacted included office, operations, engineering, maintenance, chemistry/radiation and corporate personnel.

*Attended exit interview

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

2. Review of Plant Operations (71707)

The plant began this inspection period in power operation (Mode 1). On November 10, 1990, a plant shutdown and cooldown was commenced to repair a small primary to secondary steam generator leak and to perform general reliability related maintenance. At 10:55 p.m., on November 12, the cold shutdown (Mode 5) condition was reached. The plant remained in the cold shutdown condition for the duration of this inspection period.

The licensee's decision to shutdown the plant to repair the small leak, even though leakage was far below regulatory limits, was considered to be conservative and beneficial to safe plant operation.

a. Shift Logs and Facility Records

The inspector reviewed records and discussed various entries with operations personnel to verify compliance with the TSs and the licensee's administrative procedures. The following records were reviewed: Shift Foreman's Log; Outage Shift Manager's Log; Control Operator's Log; Night Order Book; Equipment Inoperable Record; Active Clearance Log; Jumper and Wire Removal Log; Shift Turnover Checklist;



and selected Radwaste Logs. In addition, the inspector independently verified clearance order tagouts.

No violations or deviations were identified.

b. Facility Tours and Observations

Throughout the inspection period, facility tours were conducted to observe operations and maintenance activities in progress. Some operations and maintenance activity observations were conducted during backshifts. Also, during this inspection period, licensee meetings were attended by the inspectors to observe planning and management activities.

The facility tours and observations encompassed the following areas: security perimeter fence; control room; emergency diesel generator building; reactor auxiliary building; reactor containment building; waste processing building; fuel handling building; emergency service water building; battery rooms; and electrical switchgear rooms.

During these tours, the following observations were made:

- (1) Monitoring Instrumentation - Equipment operating status, area atmospheric and liquid radiation monitors, electrical system lineup, reactor operating parameters, and auxiliary equipment operating parameters were observed to verify that indicated parameters were in accordance with the TS for the current operational mode.
- (2) Shift Staffing - The inspectors verified that operating shift staffing was in accordance with TS requirements and that control room operations were being conducted in an orderly and professional manner. In addition, the inspectors observed shift turnovers on various occasions to verify the continuity of plant status, operational problems, and other pertinent plant information during these turnovers.
- (3) Plant Housekeeping Conditions. - Storage of material and components, and cleanliness conditions of various areas throughout the facility were observed to determine whether safety and/or fire hazards existed.
- (4) Radiological Protection Program - Radiation protection control activities were observed routinely to verify that these activities were in conformance with the facility policies and procedures, and in compliance with regulatory requirements. The inspectors also reviewed selected RWPs to verify that the RWP was current and that the controls were adequate.

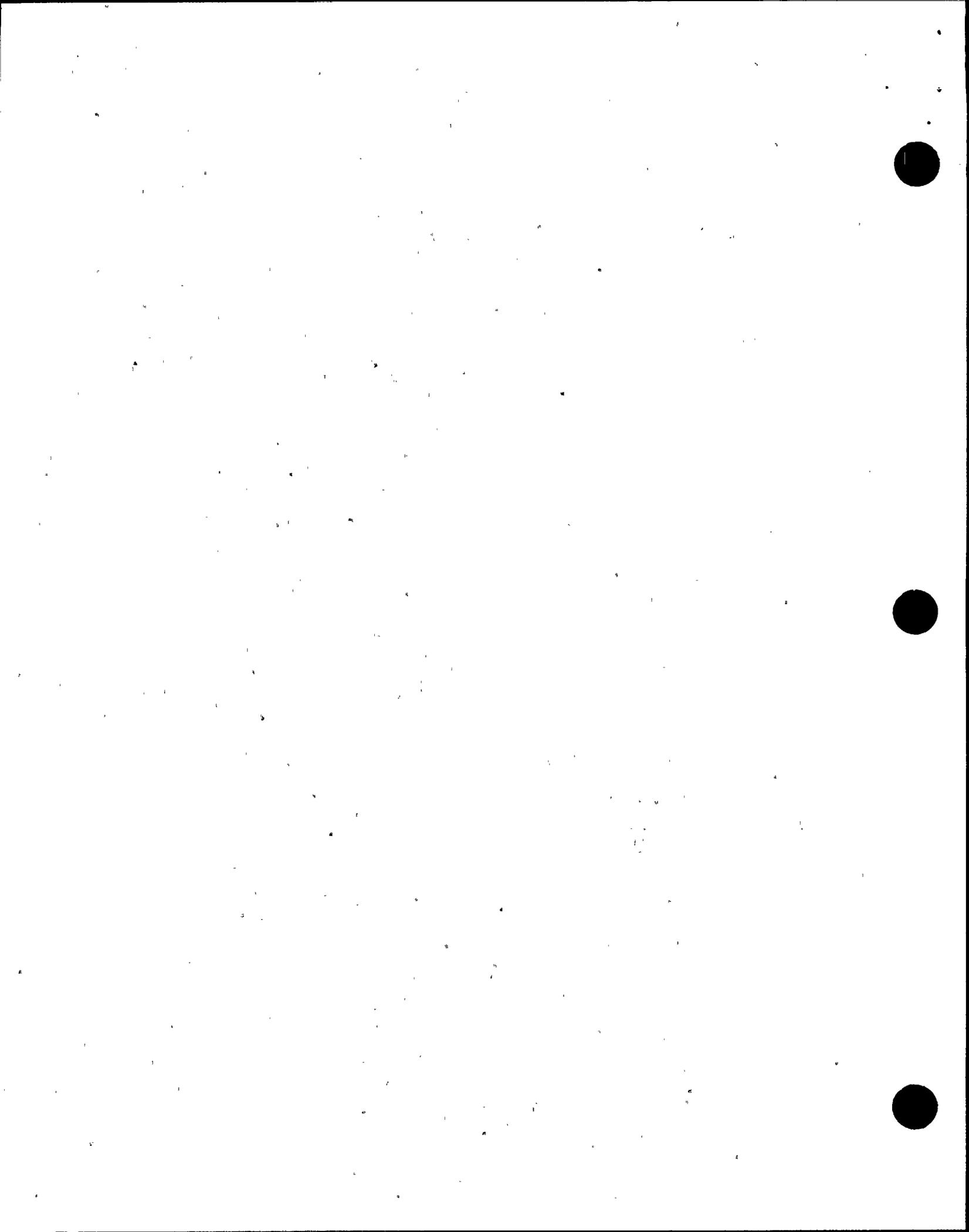


- (5) Security Control - In the course of the monthly activities, the inspectors included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of daily activities to include: protected and vital area access controls; searching of personnel, packages, and vehicles; badge issuance and retrieval; escorting of visitors; patrols; and compensatory posts. In addition, the inspector observed the operational status of CCTV monitors, the Intrusion Detection system in the central and secondary alarm stations, protected area lighting, protected and vital area barrier integrity, and the security organization interface with operations and maintenance.

On October 28, 1990, the inspector noted problems with a control room security door failing to properly latch. On three different visits to the control room the inspector noted problems with the door latching. Each time a security guard was summoned to check out the door for proper operation. The inspector discussed this matter with licensee management on the following day. Initial licensee actions did not appear to be adequate for resolving the problems. This item has been discussed with regional security personnel who will review it in more detail during a routine security inspection.

- (6) Fire Protection - Fire protection activities, staffing, and equipment were observed to verify that fire brigade staffing was appropriate and that fire alarms, extinguishing equipment, actuating controls, fire fighting equipment, emergency equipment, and fire barriers were operable.
- (7) Sampling Program - Selected performance of reactor coolant sampling and boric acid tank sampling were observed to verify that the sample taken was representative of the substance being sampled, appropriate acceptance criteria were met, test results were properly evaluated and trended, and sampling and analysis procedures were utilized and properly implemented. The deficiencies addressed below were noted.

On October 24, 1990, the inspector observed the sampling of the "A" steam generator to determine activity. This sample was performed to calculate the magnitude of a small primary to secondary leak which had developed. The inspector noticed that procedures were not routinely referenced by the technician to draw or analyze the sample. Upon sample completion, the inspector requested the technician to walk through the appropriate procedures. When procedure RCP-660, Sample Preparation for Determination of Radioactivity, was referenced by the technician, the inspector found that not all of the steps required by the procedure had been performed. Specifically step 10.3.1.2.2 required the addition of 2 ml of nitric acid to the sample prior to sample analysis for activity. When questioned



about this omission, the technician stated that he had forgotten this step but that the omission should not have negated the sample results.

On October 26, 1990, the inspector observed a routine reactor coolant system sample performed as required by TS 4.4.7. Again procedures were not periodically referenced. During the preparation of this sample for a gamma scan, nitric acid was also not added. The inspector researched procedure RCP-660 for the preparation of this sample and found that step 10.3.1.1.3 specified the addition of 0.5 ml of nitric acid prior to the activity analysis.

These two observations, which involved different samples by two different technicians, indicate the inadequate implementation of a radiochemistry procedure and are considered to be examples of a violation. Violation (400/90-21-01): Failure to properly implement a radiochemistry procedure.

One violation was identified.

3. Surveillance Observation (61726)

Surveillance tests were observed to verify that approved procedures were being used; qualified personnel were conducting the tests; tests were adequate to verify equipment operability; calibrated equipment was utilized; and TS requirements were followed.

The following tests were observed and/or data reviewed:

OST-1004	Power Range Heat Balance Daily Interval
OST-1020	Remote Shutdown Monitoring and Accident Monitoring Instrumentation Channel Check Monthly Interval
MST-I0151	Steam Generator 3C Narrow Range Level (L-0496) Protection Set III Operational Test
RST-201	Boron Concentration Surveillance of the Boric Acid and Refueling Water Storage Tanks
RST-204	Reactor Coolant System Chemistry and Radiochemistry Surveillance
EPT-167	Steam Generator Secondary Leak Test

No violations or deviations were identified.

4. Maintenance Observation (62703)

The inspector observed/reviewed maintenance activities to verify that correct equipment clearances were in effect; work requests and fire prevention work permits, as required, were issued and being followed; quality control personnel were available for inspection activities as required; and TS requirements were being followed.

Maintenance was observed and work packages were reviewed for the following maintenance (WR/JO) activities:

- Calibration of ground fault relays associated with feeder breakers for MCC-1A33-SA and MCC-1A23-SA in accordance with procedure PIC-E019, ITE GRC Ground Fault Relay Calibration.
- Repair leak on the balancing line for the "B" charging/safety injection pump.
- Installation of steam generator nozzle dams and mockup training in accordance with procedure CM-M0176, Steam Generator Primary Nozzle Dam Installation, Operation and Removal.
- Replacement of various valves associated with "A" essential chiller.

The inspectors observed licensee preparations for installing steam generator nozzle dams. A mockup of the steam generator was utilized and practice sessions held on installing and removing the nozzle dams. This training was very realistic, using full protective clothing dressout and formal communications. As a result of this training, workers were able to quickly perform the installation of the nozzle dams in this high radiation field and thereby received less personnel exposure. This type of training is considered to be a strength of the maintenance and radiological protection programs.

No violations or deviations were identified.

5. Safety Systems Walkdown (71710)

The inspectors conducted a walkdown of the cold leg accumulator safety injection system to verify that the lineup was in accordance with license requirements for system operability and that the system drawing and procedure correctly reflect "as-built" plant conditions. Also, accessible piping inside containment was walked down for the auxiliary feedwater system.

No violations or deviations were identified.

6. Review of Nonconformance Reports (71707)

S00Rs and NCRs were reviewed to verify the following: TS were complied with, corrective actions as identified in the reports were accomplished or being pursued for completion, generic items were identified and reported, and items were reported as required by the TS.

- a. S00R 90-143 reported that procedure OST-1004 was revised using unqualified or approved information. Procedure OST-1004 was changed to permit a heat balance calculation with continuous steam generator blowdown remaining in service. To account for the heat dispersed by the blowdown system, an engineering calculation was performed to



provide the method for determining this. To assist in the procedure revision process, a draft of this calculation was provided to procedure writers. Procedure OST-1004 was revised and approved on October 28, 1990, utilizing the draft calculation which had not yet been adequately reviewed and approved by engineering personnel. Upon discovery of this situation on October 29, 1990, operating personnel performed another heat balance using the previous method of isolating the blowdown system. The draft calculations were subsequently reviewed, approved, and deemed to be satisfactory. The licensee is presently performing an HPES evaluation to determine the root cause for this event. This licensee identified violation is not being cited because criteria specified in Section V.G.1 of the NRC Enforcement Policy were satisfied. NCV (400/90-21-02): Failure to use approved calculations for revising the heat balance procedure.

- b. SOOR 90-155 reported that a leak had developed on the balancing line piping of the "B" charging/safety injection pump on November 3, 1990. The pump was secured and piping was replaced to stop the leak. On November 12, another leak developed in the same general area of the balancing line. A review of work history associated with this pump revealed numerous leaks on this piping which included a cracked weld in August 1988, and a cracked pipe in January 1989. The licensee is presently performing a root cause evaluation to prevent repetition of this event. IFI (400/90-21-03): Follow the licensee's activities to prevent leaks on the "B" charging/safety injection pump.

One non-cited violation was identified.

7. Visit to the Public Document Room (94600)

The inspector visited the community's public document room on October 25, 1990. This facility is located at the Cameron Village Public Library in Raleigh, NC. The inspector examined the type of information available, the condition of this information, and the filing system used for access to this information. Selective microfiche and hardcopy files of various documents were reviewed. The public document room was found to be orderly and information accessible.

8. Midloop/Reduced Inventory Activities (71707)

In response to a NRC Region II memorandum dated July 27, 1990, the inspectors reviewed the licensee's preparations for operation of the RCS in a reduced inventory condition. These actions were previously discussed in NRC Inspection Report 50-400/90-08. Generic Letter 88-17, Loss of Decay Heat Removal, and the current revisions to plant procedures governing midloop operation were reviewed. The inspector also discussed this matter with licensee management and emphasized that due to the large number of administrative controls in place governing operator actions



while in this condition, shrewd operator diligence was essential. Licensee management stated they would review their controls and procedures with operations personnel.

No violations or deviations were identified.

9. Review of the Spent Fuel Shipping Program (71707)

As a followup to the observations mentioned in NRC Inspection Reports 50-400/90-17 and 50-400/90-20, the inspectors continued to review spent fuel shipping activities. The problems associated with the BWR fuel crud continued to grow with the receipt of two more refueling shipments.

Following the receipt and head removal of cask IF-303, the spent fuel water clarity degraded to the point where fuel transfer could not take place. The operators were unable to see the fuel and therefore fuel transfer was delayed for approximately 10 days while the cobalt and iron particulate settled out of solution.

Following the transfer of fuel from the other cask (IF-304), it was noted that approximately 18 inches of crud had settled in the bottom of the fuel cask. Radiation levels in the bottom of the cask were found to be as high as 1260 RAD using underwater detectors. By using a suction hose and pump the licensee transferred this crud to vacant spent fuel pool "D".

The inspector reviewed previously performed surveys following the last three fuel shipments and noted a steadily increasing crud loading in the shipping cask. The spent fuel cask (IF-304) surveys completed on August 8, 1990 averaged 370 RADs; on September 13, 1990, averaged 576 RADs; and on November 6, 1990, averaged 797 RADs. The second cask (IF-303) revealed similar increases and following the surveys completed on October 30, 1990, the cask averaged 483 RADs.

Following the latest BWR fuel transfer, the BWR fuel baskets were removed and replaced with PWR fuel baskets. The transfer was successful in that no personnel or area contaminations resulted. It was noted, however, that area radiation levels approached 100 MR on spent fuel pool monitors during the basket removal from the cask. The licensee took the appropriate precautions to limit personnel exposure during this evolution.

Following the loss of clarity in the spent fuel pools and transfer canals, the inspectors performed a detailed review of water chemistry requirements. The FSAR table 11.1.7-1 lists the design concentration of specific

activity (uci/gm) for various nuclides in the spent fuel pools. The following table lists, in part, the nuclide, design activity, and actual measured activity for nuclides of interest:

Nuclide	<u>FSAR Table 11.1.7-1</u>		<u>Sample on October 12, 1990</u>
	Design Activity	Concentration	Measured Concentration
MN-54	2.6 x 10 ⁻⁸	uci/gm	1.3 x 10 ⁻⁴ uci/gm
CO-58	1.0 x 10 ⁻⁶	uci/gm	1.3 x 10 ⁻⁴ uci/gm
CO-60	1.3 x 10 ⁻⁶	uci/gm	2.3 x 10 ⁻³ uci/gm

The inspector noticed that the measured values exceeded the design concentration values by as much as 5000 times. FSAR Section 11.1.1 states that design basis source terms have been used for shielding and facilities design and for calculating the consequences of postulated accidents. FSAR Section 11.1.7 states that the maximum spent fuel pool fission and corrosion product specific activities are given in Table 11.1.7-1. This section also states that the fuel pools will be used for storage of PWR and BWR spent fuel from other CP&L nuclear plants and that the spent fuel would not contribute significantly to the fuel pool fission and corrosion product activities.

10 CFR 50.59 requires the licensee to maintain records of changes in the facility. These records must include a written safety evaluation which provides the basis for the determination that the change does not involve an unreviewed safety question. The spent fuel from other CP&L nuclear plants is causing a significant increase in the fuel pool activity in that concentrations of cobalt and manganese activity have exceeded the FSAR design activity concentrations. Although this practice constitutes a change in the operation of the facility as described in the FSAR, the licensee failed to perform a written safety evaluation as required by 10 CFR 50.59. This is identified as a Violation (400/90-21-04): Failure to perform a written safety evaluation.

One violation was identified

10. Review of Boron Corrosion Program (92701).

The licensee's boron corrosion program which implements the requirements of NRC Generic Letter GL 88-05, Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR plants, was previously discussed in NRC Inspection Report 50-400/90-10. During this outage the inspector noted some improvements in the implementation of this program. A detailed upfront visual inspection of containment was performed early in the outage to identify boric acid leakage so that appropriate and timely corrective action could be accomplished within the outage schedule. This inspection identified several leaks, but no corrosion was found. Another area of improvement was a revision to procedure OST-1081, Containment

Visual Inspection. This procedure now clearly defines the requirement to identify boric acid leakage, initiate work requests for repair, and notification of the system engineer for corrective action. This procedure revision strengthens the overall boron corrosion program.

No violations or deviations were identified.

11. Operator License Review (71707)

During the week of October 15, 1990, a review of operator license applications from another nuclear facility was conducted in the NRC Region II office. It was noted that one SRO candidate (docket number 20019) had previously held an operator license at the Shearon Harris facility and had terminated employment in September 1989. Further review of the docket revealed that the licensee had not notified the NRC of this fact.

10 CFR 50.74 requires the licensee to notify the NRC within 30 days of termination of any operator or senior operator. Failure to notify the NRC of employment termination for a senior reactor operator is contrary to 10 CFR 50.74 and is considered to be a violation. Violation (400/90-21-05): Failure to notify the NRC of employment termination of an SRO.

One violation was identified.

12. Licensee Action on Previously Identified Inspection Findings (92702 & 92701)

- a. (Closed) URI 400/90-20-01: Periodic calibration check of installed thermocouples.

The licensee provided the inspector with their position on the testing of thermocouples. In an internal corporate memorandum dated August 9, 1984, the licensee stated their position that for primary sensing elements which are inherently resistant to drift, such as thermocouples, a verification of operability of the primary element and a calibration of the rest of the instrument string would suffice. The inspector discussed this reasoning with NRC Headquarters NRR personnel and Region II personnel. The licensee's current practice of periodically checking thermocouples was deemed to be appropriate. A review of the previously questioned RHR cooler outlet temperature and hydrogen recombiner temperature revealed appropriate operability verifications with the string calibrations.

- b. (Closed) Violation 400/89-34-02: Failure to adhere to the requirements of plant procedures.

This item was previously discussed in NRC Inspection Report 50-400/90-06. The licensee has revised applicable procedures to provide caution notes to prevent the establishment of inadvertent flowpaths between the RWST and the RCS or other systems.



- c. (Closed) Violation 400/90-13-03: Failure to follow plant procedures during the performance of nuclear instrumentation calibration procedures.

The inspector reviewed and verified implementation of the corrective actions as stated in the licensee's response letter dated September 6, 1990. The licensee has revised applicable procedures and counseled plant reactor engineering personnel to prevent repetition of this event.

13. Exit Interview (30703)

The inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on November 16, 1990. During this meeting, the inspectors summarized the scope and findings of the inspection as they are detailed in this report, with particular emphasis on the Violations, and the Inspector Follow-up Item addressed below. The licensee representatives acknowledged the inspector's comments and did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

<u>Item Number</u>	<u>Description and Reference</u>
400/90-21-01	VIO: Failure to properly implement a radiochemistry procedure, paragraph 2.b.(7).
400/90-21-02	NCV: Failure to use approved calculations for revising the heat balance procedure, paragraph 6.a.
400/90-21-03	IFI: Follow the licensee's activities to prevent leaks on the "B" charging/safety injection pump, paragraph 6.b.
400/90-21-04	VIO: Failure to perform a written safety evaluation, paragraph 9.
400/90-21-05	VIO: Failure to notify the NRC of employment termination of an SRO, paragraph 11.

14. Acronyms and Initialisms

BWR	-	Boiling Water Reactor
CCTV	-	Closed Circuit Television
CFR	-	Code of Federal Regulations
EPT	-	Engineering Performance Test
FSAR	-	Final Safety Analysis Report
GL	-	Generic Letter
HPES	-	Human Performance Evaluation System

IFI	-	Inspector Follow-up Item
MST	-	Maintenance Surveillance Test
NCR	-	Non-Conformance Report
NCV	-	Non-Cited Violation
NRC	-	Nuclear Regulatory Commission
OST	-	Operations Surveillance Test
PIC	-	Primary Instrument Control
PWR	-	Pressurized Water Reactor
QA/QC	-	Quality Assurance/Quality Control
RCP	-	Radiochemistry Procedure
RCS/RC	-	Reactor Coolant System
RHR	-	Residual Heat Removal
RWP	-	Radiation Work Permit
RWST	-	Refueling Water Storage Tank
SOOR	-	Significant Operational Occurrence Report
SRO	-	Senior Reactor Operator
TS	-	Technical Specification
URI	-	Unresolved Item
VIO	-	Violation
WR/JO	-	Work Request/Job Order