



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

Report No.: 50-261/86-01

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

Inspection Conducted: January 11 - February 10, 1986

Inspector:	<u>P. E. Krug</u> H. E. P. Krug, Senior Resident Inspector	<u>3/5/86</u> Date Signed
Approved by:	<u>P. E. Fredrickson</u> P. E. Fredrickson, Section Chief Division of Reactor Projects	<u>3/5/86</u> Date Signed

SUMMARY

Scope: This routine, announced inspection involved 149 resident inspector-hours on site in the areas of Technical Specification (TS) compliance, plant tour, operations performance, reportable occurrences, housekeeping, site security, surveillance activities, maintenance activities, quality assurance practices, radiation control activities, outstanding items review, IE Bulletin and IE Notice followup, organization and administration, independent inspection and Systematic Assessment of Licensee Performance (SALP).

Results: Of the areas inspected, one unresolved item and one inspector followup item were identified. No violations or deviations were identified.

Unresolved item 261/86-01-01: "Challenges to Safety Systems," Paragraph 11.

Inspector followup item 86-01-02: "Loss of Offsite Power," Paragraph 12.

## REPORT DETAILS

### 1. Licensee Employees Contacted

R. Barnett, Maintenance Supervisor, Electrical  
G. Beatty, Manager, Robinson Nuclear Project Department  
A. Beckman, Principal Specialist, Planning and Scheduling  
J. Benjamin, Supervisor, Operations  
R. Chambers, Engineering Supervisor, Performance  
C. Crawford, Manager, Maintenance  
D. Crocker, Principal Health Physics Specialist  
J. Curley, Director, Regulatory Compliance  
W. Ritchie, Supervisor (Acting), Radiation Control  
J. Eaddy, E&C Supervisor  
W. Flanagan, Manager, Design Engineering  
W. Gainey, Maintenance Supervisor, Mechanical  
G. Honma, Senior Specialist, Regulatory Compliance  
F. Lowery, Manager, Operations  
A. McCauley, Director (Acting), Onsite Nuclear Safety  
P. Harding, Project Specialist (Acting), Radiation Control  
M. Marquick, Senior Specialist, Planning and Scheduling  
R. Morgan, Plant General Manager  
M. Morrow, Specialist, Emergency Preparedness  
D. Nelson, Operating Supervisor  
B. Murphy, Senior Instrumentation and Control Engineer  
M. Page, Engineering Supervisor, Plant Systems  
R. Powell, Principal Specialist, Maintenance  
B. Rieck, Manager, Control and Administration  
R. Smith, Manager, Environmental and Radiation Control  
J. Sturdavant, Technician, Regulatory Compliance  
R. Wallace, Manager, Technical Support  
L. Williams, Supervisor, Security  
C. Wright, Senior Specialist, Quality Assurance/Quality Control  
H. Young, Director, Quality Assurance/Quality Control

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

### 2. Exit Interview (30702, 30703)

The inspection scope and findings were summarized on February 10, 1986, with the Plant General Manager and the Director of Regulatory Compliance. No written material was provided to the licensee by the inspector. The licensee acknowledged the findings without exception. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Plant Tour (71707, 62703, 71710)

The inspector conducted plant tours periodically during the inspection interval to verify that monitoring equipment was recording as required, equipment was properly tagged, operations personnel were aware of plant conditions and maintenance activities, and plant housekeeping efforts were adequate. The inspector determined that appropriate radiation controls were properly established, excess equipment or material was stored properly, and combustible material was disposed of expeditiously. During tours, the inspector looked for the existence of unusual fluid leaks, piping vibrations, pipe hanger and seismic restraint abnormal settings, various valve and breaker positions, equipment clearance tags and component status, adequacy of fire fighting equipment, and instrument calibration dates. Some tours were conducted on backshifts. Plant housekeeping was observed to be good.

The inspector performed system status checks on the following systems:

- a. Vital Station Batteries
- b. Emergency Diesel Generators
- c. Emergency Electrical Switchgear
- d. Safety Injection System
- e. Residual Heat Removal System

No violations or deviations were identified within the areas inspected.

4. Technical Specification Compliance (71707, 62703, 61726)

During this reporting interval, the inspector verified compliance with selected limiting conditions for operation and reviewed results of certain surveillance and maintenance activities. These verifications were accomplished by direct observation of monitoring instrumentation, valve positions, switch positions, and review of completed logs and records.

The licensee provided an update on the phased implementation of the Radiological Environmental Technical Specification (RETS) for the Robinson station. Included was a description of ongoing coordination with NRR on the RETS as well as the status of minor corrections being implemented by the licensee.

No violations or deviations were identified within the areas inspected.

5. Plant Operations Review (71707, 62703, 61726, 61707, 61711)

Periodically during the inspection interval, the inspector reviewed shift logs and operations records, including data sheets, instrument traces, and records of equipment malfunctions. This review included control room logs, maintenance work requests, auxiliary logs, operating orders, standing orders, night orders, jumper logs, and equipment tagout records. The

inspector routinely observed operator alertness and demeanor during plant tours and observed them to be excellent. The inspector conducted random off-hours inspections during the reporting interval to assure that operations and security remained at an acceptable level.

The inspector periodically verified the reactor shutdown margin. The inspector also periodically observed the reactor axial flux difference and compared the observed values with those required by the TS. A reactor trip followed by a trip of the startup transformer occurred on January 28, 1986. The licensee then began a refueling outage which had been scheduled for February 1, 1986.

While the inspector was in the control room at 6:29 a.m. on January 17, 1986, a containment smoke alarm annunciated inside the control room. A small fire, less than one square foot, was located in "C" reactor coolant pump bay on the cold leg near the pump outlet. The licensee executed fire procedure FP-001, "Fire Emergency." At the time of the fire, the operators were performing a normal plant heatup using general procedure GP-002, "Cold Solid to Hot Subcritical at No Load T-AVG." The Shift Foreman stated that the fire was probably due to local condensation of oil vapor during the last shutdown, which then ignited during heatup when the primary system temperature reached approximately 480 degrees F.

The fire was easily extinguished by the local application of halon. The Shift Foreman announced the fire all clear at 0653.

No violations or deviations were identified within the areas inspected.

#### 6. Physical Protection (71707)

The inspector verified by observation, perimeter walkdowns and interviews that measures taken to assure the physical protection of the facility met current requirements. Areas inspected included the organization of the security force, the physical condition of gates, doors and isolation zones; the performance of access control and searches; communications procedures; and the enforcement of escorting rule.

During the inspection period, the inspector continued to monitor the progress and activities of the HBR Security System Upgrade Project. The new card readers are now in use throughout the plant and no problems were observed.

No violations or deviations were identified within the areas inspected.

#### 7. Monthly Surveillance Observation (61726)

The inspector observed portions of a number of surveillance activities of safety-related systems and components to ascertain that these activities were conducted in accordance with license requirements. On January 24, 1986, the inspector observed all aspects of operations surveillance test OST-010 (Revision 5), "Power Range Calorimetric During Power Operation."

The inspector determined that the surveillance test procedure conformed to TS requirements, that all precautions and LCO were met and that the surveillance test was completed at the required frequency. The inspector also verified that the required administrative approvals were obtained prior to initiating the test, that the testing was accomplished by qualified personnel in accordance with the current version of an approved test procedure and that the required test instrumentation was properly calibrated. Upon completion of the testing, the inspector observed that the recorded test data was accurate, complete and met TS requirements. There were no test discrepancies.

No violations or deviations were identified within the areas inspected.

8. Monthly Maintenance Observation (62703)

The inspector observed the performance of maintenance surveillance test MST-902 (Revision 6), "Battery Test" to ascertain that this test was conducted in accordance with approved procedures, TS and appropriate industry codes and standards. The inspector determined that the performance of this test did not violate any LCOs and that redundant components were operable. The inspector also determined (1) that the procedure used was adequate to control the activity, (2) that required administrative approvals were obtained prior to work initiation, and (3) that appropriate ignition and fire prevention controls were implemented. The inspector verified that this activity was accomplished by qualified personnel using an approved procedure.

No grounds were indicated on the "A" charging circuit; however, the inspector observed a 70 volt ground on the "B" charging circuit ground indicator. The inspector questioned the maintenance technician performing MST 902, who said that the ground was observed following the reactor trip on January 28, 1986. The inspector informed the licensee's Regulatory Compliance organization to insure that this information was fully available.

Additionally, the inspector reviewed several outstanding job orders to determine that the licensee was giving priority to safety-related maintenance and that a backlog which might affect its performance was not developing on a given system.

No violations or deviations were identified within the areas inspected.

9. Operational Safety Verification (71707)

The inspector observed licensee activities to ascertain that the facility was being operated safely and in conformance with regulatory requirements, and that the licensee management control system was effectively discharging its responsibilities for continued safe operation by direct observation of activities, tours of the facility, interviews and discussions with licensee management and personnel, independent verification of safety system status, LCO, and reviewing facility records.

No violations or deviations were identified within the areas inspected.

10. ESF System Walkdown and Monthly Surveillance Observation (71710, 61726, 56700)

The inspector verified the operability of the "A" and "B" vital battery system. The inspector confirmed that the licensee's system lineup procedures matched plant drawings and the as-built configuration. The inspector looked for equipment conditions and items that might degrade performance (hangers and supports were operable, housekeeping, etc.) and inspected for debris, loose material, jumpers, evidence of rodents, etc. The inspector verified that switches were in proper position and power was available. The inspector observed that the battery trouble alarm indication in the control room was illuminated, which was caused by the ground indicated on the "B" battery charging panel.

Beginning at about 11:30 p.m. on February 1, 1986, the inspector observed licensee activities associated with the execution of operations surveillance test procedure OST-162 (Revision 3) titled "Emergency Diesel Generator Auto Start on Loss of Power and Safety Injection - Emergency Diesel Trips Defeat (Refueling)." A regional inspector was also present. Prior to the test, the test director conducted a detailed briefing of what was to be accomplished, by whom, and answered questions raised by the test personnel. If needed, offsite power was quickly available via the auxiliary transformer.

At 1:38 a.m. on February 2, 1986, OST-162 was properly executed and demonstrated the features described in subsequent paragraphs.

Following initiation by a loss of power to the vital buses in conjunction with a manual actuation, both diesels automatically started and load shedding and restoration to operation of the required equipment occurred.

The diesels assumed the required load within 50 seconds after the initial starting signal. As designed, while in the "trips defeat" position, the test demonstrated that the diesel protective trip devices would not trip the diesels.

The operability of the manual block/unblock safety switches on the reactor control board was satisfactorily demonstrated, as was the operability of the emergency power supply to the pressurizer heaters.

The test was performed by qualified personnel using an approved procedure and was excellent in every respect observed.

No violations or deviations were identified within the areas inspected.

11. Onsite Followup of Events and Subsequent Written Reports of Nonroutine Events at Power Reactor Facilities (92700, 90714, 93702, 40700)

On January 15, 1986, during the performance of maintenance surveillance test MST-013 titled "Steam Generator Water Level Protection Channel Testing (Monthly)," the "A" feed water regulating valve opened overfeeding the "A" steam generator. The resulting high water level caused a turbine trip which initiated a reactor trip at 10:26 a.m. All safety equipment operated as designed.

On January 15, 1986, the Plant General Manager charged the Acting Director of Onsite Nuclear Safety with the task of evaluating the cause of the reactor trip. At 4:30 p.m. on January 16, 1986, the licensee convened a special PNSC to evaluate the cause of the trip. ONS reported its evaluation which was based on a review which included analysis of the sequence of events recorder, instrument traces, results of tests and surveillances conducted after the trip, and interviews with plant personnel. The test and surveillance activities uncovered no significant plant equipment problems. However, the licensee found a loose test terminal on level comparator LC-476, which continues to be a subject of study by the licensee.

Discussions with plant personnel disclosed that the trip occurred at a point in MST-013 where approximately five previous trips occurred, and where a recent procedure modification was implemented to prevent such trips. The PNSC concluded that, at the time of the trip, the technicians executing the surveillance were ahead of their procedure and that the evidence strongly indicated that this was the root cause of the trip; however, evaluation of the loose test terminal as a cause or contributor would continue.

Two procedure difficulties were identified. The first involved verifying that the reactor operator had placed the appropriate feed water regulating valve in manual control before proceeding further. With respect to the second, the PNSC concluded that the procedure, which includes hundreds of steps, needed to be reorganized to put those functions which could generate a reactor trip at the beginning of the procedure, rather than at the end. The inspector will continue to monitor the licensee's evaluation.

On January 21, 1986, with the reactor at 71 percent power, while licensee personnel were performing surveillance on level transmitter LT-460, voltage spikes occurred on instrument busses 2 and 7, which both caused the "B" steam generator regulating valve to open and overfeed the "B" steam generator, and also caused a main turbine runback. The resulting high-high water level in the "B" steam generator caused a turbine trip which initiated a reactor trip at 8:49 a.m. All safety systems functioned as designed.

The licensee established that the instrument bus voltage spikes on busses 2 and 7 were caused by a short resulting from the attempted reinsertion by surveillance personnel of a misaligned multi-pronged jack, back into its socket in the level transmitter module cabinet. Reinsertion of the jack required the technician to perform a contorting arm extension during which it was difficult to maintain the required jack-socket alignment necessary to

prevent an electrical fault. The licensee is evaluating ways to prevent such misalignments in the future. The inspector will continue to monitor the licensee's actions concerning this problem.

On January 22, 1986, while the reactor was at 33 percent power, technicians were in the process of resetting the nuclear instrumentation trip set points to 55 percent because of the recent axial power history (accumulation of "penalty minutes" per TS). The specific instruments, power range neutron monitors, N-41, N-42, N-43, and N-44 are arranged in a 2 out of 4 logic sequence to provide a reactor trip.

The technicians completed work on N-41. They then calibrated N-42 but did not restore it to service. When they next tripped N-43 for recalibration, the 2 out of 4 trip logic was satisfied and a reactor trip occurred at 11:27 a.m. All safety systems functioned properly. The licensee concluded that the reactor trip was the result of personnel error.

The inspector's report of the reactor trip which occurred on January 28, 1986, is included in paragraph 12 of this report.

At 11:17 a.m. on January 30, 1986, a reactor safety injection signal occurred while the licensee was cooling down the plant in accordance with general procedure GP-007 (Revision 4), titled "Plant Cooldown from Hot Shutdown to Cold Shutdown." As primary pressure was above the safety injection pump discharge pressure, no water was injected into the vessel. The safety injection signal was actuated by the generation of a high steam line differential pressure signal, which the licensee attributed to personnel error caused by an excessively rapid cooldown. The licensee also stated that it is examining procedure GP-007 to determine if an improvement will reduce the probability of a personnel error.

The recently issued NRC SALP report noted the historically higher than average trip rate at Robinson and the licensee's in-place and proposed corrective actions addressing this issue. At the time of the trip on January 15, 1986, the Robinson plant completed the longest power run in its history, 93 days and set a licensee record for energy generation. Furthermore, on January 15, 1986, the reactor was about two weeks away from the schedule refueling outage. In addition, the trip history during the recent operating cycle suggested some trend towards a reduced trip rate; which when considered along with the record run close to the end of the cycle, indicated quantitative improvement.

However, as a result of the reactor trips which occurred on January 15 and 21-22, 1986, the Plant General Manager, on January 24, 1986, convened a special management meeting to formulate and promulgate a corrective action plan. The Managers of Maintenance, Regulatory Compliance, Operations, Environmental and Radiation Control and Technical Support were present. Specific action items with associated completion dates were assigned to the attendees by the Plant General Manager.

The first three action items, completed on January 24, 1986, imposed measures designed to reduce personnel errors through the use of additional independent verification, improved component labeling and counseling of technicians responsible for maintenance and surveillance. In addition, two senior managers were tasked by the Plant General Manager to act as an ad hoc committee (AHC) to take a comprehensive look at the last three trips and initiate any appropriate non-conformance reports (NCR). Also, maintenance surveillance tests associated with steam generator level protection and control were required to be revised, to reduce personnel error, prior to their next use.

The licensee has also created a "special" trip reduction review subcommittee (SRS) to perform an analytical evaluation of recent trips and to recommend corrective action. The SRS which reports to the AHC described in the previous paragraph is composed of three Principal Engineers. One of the three, the Acting Director of Onsite Nuclear Safety at Robinson, also heads the subcommittee. The members include one representative from Corporate Nuclear Safety and one from Brunswick. The latter individual devised and participated in the trip reduction program at Brunswick. All three SRS members are trained in the use of Management Oriented Risk Tree (MORT) techniques, which they are using to perform their analysis.

Finally, at the request of the licensee, an INPO team is currently scheduled to be onsite during the first week in March to perform an evaluation of the problem.

In summary, the trip on January 15, 1986, appears to involve both an inadequate procedure and personnel error; although the question of the loose test terminal is open. The trip on January 21, 1986 involved the manually misaligned reinsertion of an electrical plug. The licensee stated that the trip on January 22, 1986, was the result of a failure to follow a procedure. Although, based on what is now known, the trip on January 28, 1986, does not appear to involve an inadequate procedure or a personnel error, the root cause of the trip has not been identified. Finally, the SI signal generated on January 30, 1986, was deemed by the licensee to be a personnel error.

Consequently, pending the outcome of additional evaluation by both the inspector and the licensee, the inspector has identified the recent challenges to safety systems as an unresolved item.

Unresolved Item 50-261/86-01-01; "Challenges to Safety Systems."

## 12. Onsite Followup of Events at Operating Power Reactors (93702)

At 9:17 a.m. on January 28, 1986, a reactor trip occurred on Unit 2 from 80 percent power due to high pressurizer pressure. The root cause of this trip is still not completely identified.

A fault occurred on emergency bus E-2 which caused a loss of voltage on instrument bus 4 - initiating a main turbine runback. The control rods were in manual. When the runback occurred, the control operator switched the rods into automatic, but rod insertion did not occur because nuclear power indicator N-44 failed low as a result of lost voltage on instrument bus 4. The resulting load reduction caused a primary pressure increase leading to a reactor trip on high pressurizer pressure. This was confirmed both by the sequence of events recorder and the first out annunciator panel. The reactor trip was normal.

At the time of the reactor trip, the "B" diesel generator was out of service in order to perform a scheduled modification to the output breaker trip mechanism to convert it to solid state actuation. The important aspects of the event as reconstructed from the sequence of events recorder and the operations log is as follows:

09:17:15        Fault on emergency bus E-2, instrument bus 4 voltage lost, main turbine run back

09:17:35        Pressurizer high pressure, normal reactor trip

09:18:35        Loss of offsite power, "A" diesel generator picked up load as designed, the "B" motor driven aux. feed pump automatically started and fed the steam generators, "B" diesel out of service for breaker modification  
 Pressurizer level dropped to 12 percent and recovered to 20 percent

Reactor coolant pumps automatically tripped, natural circulation established by procedure  
 Safety injection signal received (no injection occurred since primary pressure greater than 1500 psig)

09:35            Unusual event declared

09:46            "B" diesel generator restored  
 535 degrees F - 2000 psig - unit stable

10:52            Pressurizer heaters available

12:29            "C" steam generator PORV, which was manually opened to balance loop temperatures for natural circulation, failed open

12:32            Safety injection signal caused by high steam line delta P (no injection since primary pressure greater than 1500 psig). Pressure drops to its minimum of 1840 psig due to cool down

12:40            "C" SG PORV closed after the air supply valve was locally closed

12:42            Pressure 1920 psig  
                 Pressurizer level 22 percent  
                 Subcooling 120 degrees F

                 Condensate Storage Tank Level was 45 percent  
                 Refueling Water Storage Tank Level was 75 percent  
                 Unit stable

12:55            E1 bus connected to offsite power  
                 "A" diesel on standby

16:03            E2 bus connected to offsite power

16:07            "B" diesel on standby

16:20            "B" reactor coolant pumps restarted

16:34            Unusual event terminated

Upon reaching the control room, the inspector immediately and independently determined that the reactor core was being properly cooled, and what the cooling configuration being used at the time was, by a walkdown of the control boards and instrumentation panels. The Shift Foreman and other operations personnel provided a status summary of available plant equipment and associated problems. The Acting Site Emergency Coordinator was present in the control room and gave the inspector the status of the unusual event.

The inspector, using the Emergency Notification System (ENS) phone, then reported the status of the plant to senior NRC personnel both in Region II and Bethesda.

During the remaining time period until the licensee terminated the unusual event at 4:34 p.m., the inspector monitored the subcooling meters, the reactor coolant pump seal flows, hot and cold leg temperatures, pressurizer pressure and level, steam generator levels, operator actions, and control room personnel deliberations. At no time did the inspector observe any indication that the core was being, or had been, inadequately cooled. At all times, the reactor instrumentation indications correlated in ways characteristic of proper natural circulation.

The dose equivalent iodine-131 concentration prior to the trip was 0.00212 micro-curies per gram of reactor coolant - a concentration typical of equilibrium conditions at Robinson, and a small fraction of the TS limit. Approximately ninety minutes after the trip, the licensee used a survey meter to establish that the reactor coolant primary activity was "high-normal," indicating no fuel damage. Additionally, primary coolant leakage was within TS limits and there was negligible primary-to-secondary system leakage across the steam generator tubes, which had been replaced approximately a year and a half earlier.

In addition to the normal shift complement, the licensee quickly provided, in the control room after the reactor trip, a number of highly qualified and experienced personnel including the Operations Supervisor, the Director of Regulatory Compliance, additional shift foremen and other licensed operators, and the Manager of Maintenance - who was the Acting Site Emergency Coordinator.

As observed by the inspector, all licensee actions and activities were performed in a calm, deliberate, conservative, and highly professional manner. Licensee personnel in the control room, in every capacity, maintained the awareness, control and communications necessary for effective recovery operations. Licensee personnel kept the inspector well informed throughout the event. The licensed operator acting as the communications interface on the ENS phone, between NRC personnel and personnel in the control room, performed in an exemplary fashion.

This item is identified as inspector followup item IFI-50-261/86-01-02, "Loss of Offsite Power."

13. Organization and Administration (36700)

The inspector reviewed aspects of the on-site licensee organization to ascertain that the licensee's onsite organization is in conformance with the requirements of the TS by verifying that (1) the established organization is functioning as described in the TS and is effective, (2) personnel qualification levels are in conformance with applicable codes and standards, and (3) the lines of authority and responsibility are in conformance with TS and applicable codes and standards. .

Comprehensive discussions of current safety-related activities were conducted with plant management and technical personnel during this reporting period including, and in particular, Operations, Environmental and Radiation Controls, Quality Assurance, Regulatory Compliance and Onsite Nuclear Safety organizations. Topics discussed included licensee activities associated with plant operations activities, especially the evaluation of the causes of recent reactor trips as well as the licensee's actions and plans associated with corrective actions; plant modifications, including the security system upgrade and the work in progress on the "C" reactor coolant pump; the fire protection system; and communications interfaces.

No violations or deviations were identified within the areas inspected.

14. Plant Nuclear Safety Committee (PNSC) (40700)

The inspector reviewed certain activities of the PNSC to ascertain whether the onsite review functions were conducted in accordance with TS and other regulatory requirements. The inspector (1) attended the regularly scheduled PNSC meeting held on January 17, 1986 and observed the conduct of the meeting, (2) ascertained that provisions of the TS dealing with membership, review process, frequency, qualifications, etc., were satisfied, and (3)

followed up on previously identified PNSC activities to independently confirm that corrective actions were progressing satisfactorily.

The inspection emphasized a number of items. Recent procedure changes processed by Onsite Nuclear Safety personnel were reviewed as were immediate notifications to the NRC and TS changes being considered by the licensee.

At 1:30 p.m. on January 17, 1986, the inspector attended another regularly scheduled PNSC meeting. The routine agenda format was followed. In particular, the licensee fully discussed the fire which occurred inside containment in the "C" reactor coolant pump bay on the cold leg, at 6:29 a.m. on January 17, 1986. The PNSC concluded that the fire was not reportable because the burning area was less than one square foot, was easily extinguished, caused no damage and could not reoccur while the plant was hot.

The PNSC also reviewed fuel management procedure FMP-014, "Rod Bank Insertion Limits."

No violations or deviations were identified within the areas inspected.

15. Plant Procedures (42700, 61700)

The inspector reviewed portions of the established procedure program to ascertain whether overall plant procedures were in accordance with regulatory requirements, temporary procedures and procedure changes were made in accordance with TS requirements, and the technical adequacy of the reviewed procedures was consistent with desired actions and modes of operation. Procedures examined included general plant operating procedures, startup, operation and shutdown of safety-related system procedures, abnormal condition procedures, procedures for emergency and other significant events, maintenance procedures and administrative procedures.

No violations or deviations were identified within the areas inspected.

16. Preparation for Refueling (60705, 37700)

A refueling outage commenced on February 1, 1986. The inspector continued to review licensee preparations for refueling including the adequacy of procedures and administrative controls for the refueling activities/outage.

The inspector reviewed the licensee Cycle 11 - 10 CFR 50.59 Evaluation as prepared for review by the PNSC. Cycle 11 is similar to Cycle 10. The licensee evaluation was comprehensive and included a comparison of the Cycle 10 and Cycle 11 neutron kinetics parameters and limiting heat transfer limits. Based on the parameters presented in the evaluation, the licensee reached the conclusion that the Cycle 11 evaluation was bounded by the Cycle 10 evaluation and therefore did not represent an unreviewed safety question.

The inspector did not identify any information which would tend to invalidate the licensee's conclusions.

No violations or deviations were identified within the areas inspected.

17. Review of Information Notice IEN 85-94 (92717)

As a result of its normal review process, the licensee determined that IE Information Notice No. 85-94, entitled "Potential For Loss of Minimum Flow Paths Leading to ECCS Pump Damage During a LOCA" contained information pertinent to Robinson. Consequently, the licensee performed a review of the Robinson Safety Injection System. On January 7, 1986, a design deficiency was discovered in the SI pump minimum flow recirculation path.

The three recirculation lines for the three SI pumps connect to a common return line which leads to the refueling water storage tank (RWST). There are two isolation valves, SI-856A and B in series in the return line which are normally open, air-operated valves. The design deficiency is that these two valves fail closed on loss of air pressure or loss of electrical power. Also, the valve position indication in the control room for these valves is powered from the same breaker as the valve control circuit, so that a single failure of the breaker associated with either valve would also cause the loss of the valve position indication in the control room for the failed valve.

The SI recirculation system was designed to both provide a flow test loop for each SI pump and to prevent the pump damage which would result from SI pump operation at a zero flow rate. In addition, the licensee stated that the valves were initially designed to fail closed to help ensure that radioactive water from the containment sump would not be pumped outside containment to the RWST during the recirculation phase.

Since protection against a small break LOCA became a design requirement, a new problem was defined by the possibility, during the injection phase, of SI pump operation at primary pressures below the SI initiation setpoint but above the SI pump shutoff head pressure, i.e., SI pump operation at zero injection flow. While unlikely, closure of either SI-856 A or B under these conditions could lead to failure of all three SI pumps.

The licensee's interim corrective action was completed on January 7, 1986, and consisted of mechanically blocking open both recirculation shut off valves so that loss of electrical power or air pressure will not cause them to close. The minor changes needed to modify the procedure were also completed. The SI recirculation shut off valves are accessible in the SI pump room outside containment.

The licensee stated that the permanent modification, to be implemented in the future, will consist of a modification to convert the valves to either manual or fail-as-positioned valves, along with the removal of the mechanical block. The inspector will continue to monitor this activity.

On January 15, 1986, the licensee stated that their review of the plant safety analysis verified that the SI pumps provided sufficient flow to the primary system for all break sizes with the SI pump recirculation line valves open; so that there was no need to stop SI pump recirculation flow before the end of the post-LOCA injection phase.

No violations or deviations were identified within the areas inspected.