UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-261/94-02

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 Steam Electric Plant

Inspection Conducted: January 4-6, 1994

Inspector: _____ 1/11/94
Ronald F. Aiello Date Signed

Approved By: _____ 4/12/94
Lawrence L. Lawyer, Chief Date Signed
Operator Licensing Section
Operations Branch
Division of Reactor Safety

SUMMARY

Scope:

The NRC conducted this announced AIT follow-up inspection in order to evaluate the licensee's corrective actions for certain events that occurred during the November 1993 refueling and startup of Robinson Unit 2. This inspection evaluated 8 of the 16 short term corrective actions delineated in reference 1 of Enclosure 2. The inspector grouped these eight items in three areas; Training, procedures and work practices, and managerial methods.

Results:

The inspector found the licensee's corrective actions to be adequate for each of the eight items inspected.

The inspector identified an improvement in the area of startup from refueling training (paragraph 2.b.1).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*R. Allen, Manager Simulator
C. Baucom, Regulatory Compliance
*D. Baur, Regulatory Affairs
*A. Burkhart, Director NSD Licensing
*H. Carter, Manager Licensed Operator Requalification
*C. Dietz, Vice President - Robinson Nuclear Project
*W. Dorman, Manager Regulatory Affairs
*M. Herrell, Manager Training
*C. Hinnant, Director Site Operations - Brunswick
*R. Moore, Manager Operations
*P. Morris, Manager Licensing Support Unit NSD
C. Olixek, Manager NAD
*M. Pearson, Plant General Manager
*A. Sanders, Manager Operations Training
*D. Whitehead, Manager Plant Support Services

Other licensee employees contacted included instructors, engineers, technicians, operators, and office personnel.

NRC Personnel

W. Orders, Senior Resident Inspector - Robinson
C. Ogle, Resident Inspector
J. Starefos, Project Engineer
E. Wang, Intern

*Attended exit interview

2. Discussion

a. Summary

The NRC conducted this inspection to evaluate the licensee's implementation of eight of the sixteen short term corrective actions delineated in reference one of enclosure two. The inspector grouped these eight items in three areas; Training, procedures and work practices, and managerial methods. All eight short term corrective actions were satisfactory and are closed.

b. Training

(1) Corrective Action #9 -

The facility conducted training for the operations crews, STAs, and reactor engineers assigned to the shifts performing the startup on Startup After Refueling (SAR). Operations and training management, collectively determined the crews' training

needs and designed the training to meet those needs. They designed this training to include training on the November 14, 1993, H. B. Robinson mismatch between actual and indicated reactor power, new fuel cycle core changes, importance of monitoring diverse indications, appropriate industry events which have occurred during plant startups, and simulator scenarios that included realistic equipment malfunctions and Nuclear Instrument System (NIS) errors.

The first phase of SAR training consisted of the following:

- The sequence of events that occurred during the H.B. Robinson startup event on November 14, 1993 - This included a summary of the causes of the event as stated in Adverse Condition Report (ACR) 93-284

- The diverse, redundant indications which could be used to determine core power level - This included a summary of the importance of monitoring these indications, particularly for a new core startup

- The industry events that had occurred during plant startups - This included lessons learned and how these similar events could be prevented at H. B. Robinson.

Following phase one training, the facility identified that GP-003, "Normal Plant Startup From Hot Shutdown to Critical;" GP-005, "Power Operation;" and EST-050, "Refueling Startup Procedure;" required additional improvements. Therefore, training and plant management determined that SAR training should be repeated after procedure upgrades were completed. The training department also used the feedback acquired from the operating crews during phase one to help modify the training conducted in phase two.

The second phase of SAR consisted of the following:

- Assessed the diverse, redundant indications which could be used to monitor reactor power during a reactor startup following a refueling outage

- Outlined the various types of failures which could lead to reactivity mismanagement events - These were events that could potentially cause fuel damage, extended plant shutdowns, and threaten the health and safety of the public.

The inspector confirmed that SAR training was satisfactorily conducted. The inspector also identified that the second phase of SAR training was an improvement over phase one.

(2) Corrective Action #16 -

The inspector monitored the training presented to the operators on operation of the voltage regulator. Students received handouts on the Westinghouse voltage regulator and excitation system for the main generator. Practical exercises required the operators to explain the voltage regulator operation and understand the reasons for the 1993 problems encountered with the voltage regulator. The inspector confirmed that voltage regulator training was satisfactorily conducted.

The facility did not administer written examinations following the lectures and practical exercises conducted in the classroom. However, The training staff effectively critiqued the operators actions following the simulator exercises. Furthermore, when the evaluators noted a major deficiency during an exercise, the evaluators immediately froze the simulator and discussed the deficiency with the crew. The inspector concluded that the training of the five operating crews on the startup and power ascension plan was adequate.

No violations or deviations were identified.

c. Plant Procedures and Work Practices

(1) Corrective Action #12 -

The inspector reviewed GP-005, "Power Operation," Revision 37, to ensure that the following additional instructions were included:

- Independent indications of reactor power are used to validate the Nuclear Instruments (NIs)
- Power escalation is stopped when any of the independent power indication parameters reach 20 percent
- At 20 percent reactor power, verification is made to ensure that the indications of reactor power are within 5 percent of each other
- All applicable ramp rate restrictions are applied
- Power escalation is stopped when the independent power indication parameters show a deviation greater than 5 percent when reactor power is greater than 20 percent

The inspector confirmed that the above additional instructions were included in GP-005.

(2) Corrective Action #13 -

The inspector reviewed GP-003, "Normal Plant Startup From Hot Shutdown to Critical, Revision 41;" GP-005, "Power Operation," Revision 37; and PLP-37, "Conduct of Infrequently Performed Tests or Evolutions," Revision 2; to ensure that the following additional instructions were included:

- Specify that the Management Designated Monitor (MDM) should review the fundamental priorities on nuclear safety when briefing the operating staff

- Provide guidance on how and when the MDM is expected to intervene, while maintaining a clear chain of command within the operating staff

The inspector confirmed that the above additional instructions were included in GP-003, GP-005, and PLP-37 respectively.

(3) Corrective Action #8 -

The inspector reviewed FMP-002, "NIS Post Refueling Adjustment Determination," Revision 1, to ensure that the following additional instructions were included:

- Proper methodology will be used for each core or required fuel vendor to supply excore instrumentation adjustment factors

- A means for self checking to ensure reasonableness of calculated results such as comparing expected results from Fuels or the Fuel Vendor, comparison with previous cycle results, etc.

The inspector confirmed that the above additional instructions were included in FMP-002.

(4) Corrective Action #1 -

The inspector reviewed several recent daily outage plans (Daily Schedule Report (DSR)) developed for this forced outage, to confirm that the PLP-037 Case I and II important evolutions were incorporated into the DSR. The inspector confirmed that the PLP-037 Case I and II important evolutions were incorporated.

(5) Corrective Action #2 -

The inspector reviewed the format for the outage shift turnover meetings that will ensure each shift's tasks which involve a PLP-037 case determination are identified and the MDM noted. The

inspector confirmed that each shift's tasks on the outage shift turnover sheet included the additional instructions above.

No violations or deviations were identified.

d. Managerial Methods

(1) Corrective Action #4 -

The inspector reviewed CP&L's letter dated December 22, 1993, from T. Cleary to M. Pearson and attended training both in the classroom and the simulator to confirm that an experienced Reactor Engineering (RE) staff will be available and involved in refueling outages and power ascensions. Specifically, the above letter stated that an adequately experienced RE staff will be available to support safe restart of the plant, just as it was for SAR 15. This will include adequate staffing to support startup physics testing around the clock, to be in the control room when the plant is brought on line, and to be available to support power ascension testing and power level changes. The inspector confirmed that the utility adequately assessed the necessary RE involvement in the current forced outage and power ascension activities and took appropriate actions to ensure sufficient experienced RE staff will be available.

No violations or deviations were identified.

3. Exit Interview

The inspection scope and findings were summarized on January 6, 1994, with those persons indicated in paragraph 1. The NRC described the areas inspected and discussed in detail the inspection findings. No proprietary material is contained in this report. No dissenting comments were received from the licensee.

ENCLOSURE 2

CP&L

Carolina Power & Light Company
Robinson Nuclear Plant
PO Box 790
Hartsville SC 29550

Robinson File No.: 13510
Serial: RNP/93-3228

DEC 3 1 1993

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
RESTART REQUIREMENTS

Gentlemen:

The purpose of this letter is to provide the NRC with the list of actions that Carolina Power & Light Company (CP&L) has identified as required for completion prior to restart of the H. B. Robinson Steam Electric Plant, Unit No. 2 from the current forced outage. The list, enclosed, comprises certain corrective actions from CP&L's teams formed to investigate problems related to Diesel Generator operability, Nuclear Instrumentation indication error, and Siemens fuel problems, as well as the readiness self-assessment required by Plant Procedure PLP-059, "Plan For Restart Readiness And Startup And Power Ascension," and the requirements of the November 19, 1993, Confirmatory Action Letter.

Questions regarding this matter may be referred to Mr. Jan S. Kozyra at (803) 383-1872.

Very truly yours,

Charles R. Dietz
Vice President

JSK:lst
Enclosure
c: Mr. S. D. Ebneter
Ms. B. L. Mozafari
Mr. W. T. Orders

bcc: T. A. Baxter, Esq.
Mr. R. S. Beverage
Mr. R. K. Buckles (LIS)
Mr. W. R. Campbell
Mr. J. M. Curley
Mr. C. R. Dietz
Mr. D. T. Gudger
Mr. H. W. Habermeyer, Jr.
Mr. E. M. Harris
Mr. J. D. Heidt
Mr. J. S. Kozyra
Mr. R. E. Morgan, Jr.
Mr. F. A. Murray
Mr. C. S. Olexik, Jr.
Mr. W. S. Orser
Mr. M. P. Pearson
Mr. H. A. Pollock
Mr. R. S. Stancil
Mr. R. B. Van Metre
Mr. A. R. Wallace
Siemens Pwr. Corp. c/o T. Dresser
File: RC/A-2
File: R-2- (J. S. Kozyra)

RESTART REQUIREMENTS

Requirements

The following requirements will be satisfied prior to restart of the Robinson Nuclear Plant from a forced outage which began on November 17, 1993:

1. Completion of corrective actions required to restore both Emergency Diesel Generators to an operable status.

2. Completion of the sixteen (16) short-term corrective actions recommended by the "Power Range Nuclear Instrumentation Indication Error" Event Evaluation Team (Reference 1).

3. Completion of the eleven (11) short-term corrective actions recommended by the "RNP Cycle 16 Fuel and Core Loading Problems" Event Evaluation Team (Reference 2).

4. Completion of a line management self-assessment of System Readiness to support the safe and reliable startup and operation of Robinson Unit 2 through the next operating cycle. Thirty-nine (39) systems will be evaluated in accordance with References 3 and 4.

5. Completion of a line management self-assessment of Organizational Readiness to support the safe and reliable startup and operation of Robinson Unit 2 through the next operating cycle. Six (6) organizations will be evaluated in accordance with Reference 4.

6. Completion of a line management self-assessment of Organizational Readiness by each of the five (5) Shift Operating Supervisors, in accordance with Reference 4, to determine that Robinson Unit 2 is in a condition of material readiness to support safe and reliable startup and operation during the next operating cycle and that each operating crew is in a state of readiness to startup and operate the plant in a safe and reliable manner.

7. Completion of startup required corrective actions identified through the line management self-assessments of System Readiness, Organizational Readiness, and Operational Readiness.

8. Completion of a Collective Evaluation of System Readiness, including a review of the status of plant material condition with respect to pre-established restart targets, in accordance with Reference 4.

9. Completion of a Collective Evaluation of Operational Readiness in accordance with Reference 4.

10. Completion of startup required corrective actions identified through the Collective Evaluations of System Readiness and Operational Readiness.

11. Completion of training of the Startup Organization and of the five (5) operating crews on the Startup and Power Ascension Plan, respective roles, responsibilities and expectations, and the schedule of activities to be performed from plant heatup through full power operations.

12. Completion of Assessment Hold Point #1 in accordance with Reference 4.

13. Completion of the requirements specified in NRC Confirmatory Action Letter, CAL 2-93-08, dated November 19, 1993.

References

1. Memorandum dated November 24, 1993, from Mr. C. S. Hinnant (Team Leader) to Mr. C. R. Dietz, "Recommended Corrective Actions Prior to Restart".

2. Memoranda dated December 2, 1993, and December 3, 1993, from Mr. L. H. Martin (Team Leader) to Messrs. Dietz and Habermeyer, "Recommended Corrective Actions Prior to Fuel Handling and Inspection and Plant Restart".

3. PLP-027, "System Startup Readiness Determination."

4. PLP-059, "Plan For Restart Readiness and Startup and Power Ascension".

CP&L

To: Mr. C. R. Dietz

From: Nuclear Instrumentation Incident Evaluation Team

Date: November 24, 1993

Subject: Recommended Corrective Actions Prior to Restart

Attached for your use and implementation are the Team's recommended corrective actions that should be implemented prior to H. B. Robinson's restart. This list supersedes the "Short Term Corrective Action" list transmitted to you in my letter of November 19, 1993.

If in the Team's view specific actions should be completed prior to a planned activity, this activity is identified on the list. This list provides both short term event corrective actions and any other recommendations we have developed to resolve weaknesses found by the Team during our investigation. The final Team report will only contain short and long term actions specific to prevent this and similar events from recurring.

If you have questions or concerns with the recommendations, please contact me.

C S Hinnant

C. S. Hinnant, Team Leader

Enclosure

CC: Mr. W. S. Orser
Mr. L. I. Loflin
Mr. C. S. Olexik
Mr. Marc Pearson
Mr. Tony Dobbs
Mr. Bill Lewis
Mr. Bo Clark
Mr. Max Harrell
Mr. Bill Flanagan
Mr. Tim Cleary
Mr. Dave Waters

Short Term Corrective Actions

Corrective Action #1 - Perform as soon as possible

Incorporate the PLP-037 Case I and II important evolutions into the Outage Plan developed for the Forced Outage.

Corrective Action #2 - Perform as soon as possible

Develop a format for the Outage Shift Turnover meetings that will ensure that each shift's tasks which involve a PLP-037 Case Determination are identified and the MDM noted.

Corrective Action #3 - Perform as soon as possible

Ensure that any document, calculation or work activity requiring a review be reviewed by another individual knowledgeable in the subject matter.

Corrective Action #4 - Perform as soon as possible

Assess the necessary Reactor Engineering involvement in the current Forced Outage and Power Ascension activities and take appropriate actions to ensure sufficient experienced Reactor Engineering Staff is available.

Corrective Action #5 - Perform as soon as possible

Operations Management to ensure that Operations personnel do not develop tunnel vision and only concentrate on Reactivity Management. Operations management should revisit The 3/24/93 letter from Mr. Kenneth Strahm of INPO addressed to Mr. R.A. Watson. Mr. Strahm's letter points out the need to maintain control of key primary plant parameters.

Corrective Action #6 - Perform as soon as possible

Operations Management should review with operators the basic concepts of procedural compliance when faced with challenging situations. Operators should not be so focused on an activity that a Tech Spec or administrative requirement is violated/exceeded.. More specifically, the belief of some Operations personnel that it is OK to violate the Tech Spec ramp rate limit in order to get the feedwater system in automatic and stable should be addressed.

Corrective Action #7 - Perform as soon as possible

Ensure that plant personnel clearly understand the management chain of command, and the responsibilities of the various management personnel that they interface with.

Corrective Action #8 - Perform prior to fuel load

A) Revise FMP-002 to:
   1) ensure the proper methodology is used for each core or require fuel vendor to supply excore instrumentation adjustment factors.
   2) include a means of self-checking to ensure reasonableness of calculated results such as:
      - compare to previous cycle results.
      - compare calculated BOC currents to previous BOC and EOC currents and verify change in expected direction.
      - require Fuels verification of results.
      - compare to expected result from Fuels or Fuel Vendor.

B) Use the revised FMP-002 to calculate the excore instrumentation factors.

C) Ensure the Power Range and Intermediate Range NIs are adjusted as needed.

Short Term Corrective Actions
continued

Corrective Action #9 - Perform prior to 200 degrees

Conduct Simulator and/or classroom training for operations crews, including STA and Reactor Engineers who are assigned to the shifts performing the start-up. Operations and Training management shall determine the crew training needs, and design the training to meet those needs. The following specific topics are recommended:

a) The November 14,1993 HBR mismatch between actual and indicated reactor power.

b) Fuel cycle 16 core changes and how the core, reactivity control and NIs may react differently from previous cycles. Consider having Reactor Engineering and Fuels personnel present portions of the training.

c) Stress the importance of monitoring diverse indications of Reactor Power, particularly for a new core start-up prior to the first calorimetric and adjustment of the NIs.

d) Appropriate industry events that have occurred during plant start-ups should be covered, such as those described in SOER 90-003.

e) Simulator scenarios should include realistic equipment malfunctions and NIS errors.

Corrective Action #10 - Perform prior to 200 degrees

Ensure that OST-001 and OST-006 are revised to include the new Intermediate Range Setpoints following the completion of the setpoint adjustments by the I&C technicians.

Corrective Action #11 - Perform prior to start-up

Verify valve line-ups required for start-up.

Corrective Action #12 - Perform prior to Criticality

Provide instructions in the body of procedure GP-005, Power Operation, to:

a) Use independent indications of Reactor Power, to validate the NIs. Ensure the instructions assign responsibility for comparing the NIs with the independent indications.

b) Stop power escalation when any of the independent power indication parameters indicate that the reactor power has reached 20%, or if there is a significant discrepancy between the Reactor Power indicators when below 20% power.

c) At 20% Reactor power, verify that the indications of Reactor Power are within 5% of each other.

d) If the Power Ramp Rate Restrictions apply:

   1) Increase power to less than or equal to 30% at 3% per hour, based on the highest indication of Reactor Power.

   2) Perform a Calorimetric and adjust the NIs, if applicable, prior to increasing power above 30%.

e) Stop power escalation when the independent power indication parameters show a deviation of Reactor power greater than 5% when the Reactor is above 20% power.

Corrective Action #13 - Perform prior to criticality

Identify GP-003 and GP-005 as PLP-037 Case I evolutions and:

a) specify that the MDM should review the fundamental priorities on Nuclear Safety when briefing the Operating Staff. This review should include a discussion about how the fundamental Nuclear Safety parameters can be monitored, and how specific action levels can be determined.

b) provide guidance on how and when the MDM is expected to intervene, while maintaining a clear chain of command within the operating staff.

Corrective Action #14 - Perform prior to GP-005

Provide a label for the RCS Delta-T recorder that will indicate both Degrees F and % power.

Corrective Action #15 - Perform prior to GP-005

Ensure Feedwater Flow Indication problems are resolved.

Corrective Action #16 - Perform prior to GP-005

Enhance the Operators knowledge of the operation of the Voltage Regulator.