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 REGION II  
 101 MARIETTA STREET, N.W.  
 ATLANTA, GEORGIA 30323

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

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License No.: NPF-63

Facility Name: Shearon Harris

Inspection Conducted: March 1-5, 1993

Inspector: J. S. Mellen 3/11/93  
 J. S. Mellen, Team Leader Date Signed

Team Members:

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Approved by: R. V. Crlenjak 3/11/93  
 R. V. Crlenjak, Chief Date Signed  
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SUMMARY

Scope: This was a routine, announced inspection in the area of training and qualification effectiveness. The inspection included the non-licensed operator, reactor operator, senior reactor operator, licensed operator requalification, and shift technical advisor training programs. Its purpose was to ensure that personnel have qualifications commensurate with their job performance requirements and to ensure training improvement programs were effective. The inspection also ensured active and inactive license control by verifying that all reactor control manipulations were made by properly licensed personnel.

Results: The team identified one strength and three weaknesses in the training programs reviewed. The strength was shift change usage during simulator scenarios (paragraph 5). The weaknesses included operators and instructors not consistently receiving comment resolution notification (paragraphs 2, 4, and 5), requisite licensed



operator knowledge (paragraph 3), and STA Job Task Analysis (paragraph 6).

The team concluded that further SAT process evaluation as applied to these functional areas is not warranted. The team concluded that operators have qualifications commensurate with their job performance requirements and training improvement programs were effective. The team also concluded that active and inactive license control ensured reactor control manipulation by properly licensed personnel.

## REPORT DETAILS

### 1. Persons Contacted

- \*J. Collins, Operations Manager
- \*R. Garner, License Training Manager
- \*M. Hamby, Manager - Regulatory Compliance
  - C. Hinnant, Plant General Manager
- \*L. Martin, Manager - Nuclear Training
- \*A. Powell, Harris Training Unit Manager
  - R. Richey, Vice President, Shearon Harris Nuclear Plant
  - D. Tibbets, Shift Operations Manager
- \*G. Vaughn, Vice President - Shearon Harris Nuclear Plant
- \*M. Verrilli, Specialist - Regulatory Compliance
- \*G. Ward, Harris Training Unit Staff

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

#### NRC Representatives

- J. Tedrow, Senior Resident Inspector
- \*D. Roberts, Resident Inspector
- \*N. Le, NRR, Project Manager
- \*R. Watkins, Resident Inspector Intern

#### \*Attended Exit Interview

Appendix A contains a listing of abbreviations.

Appendix B contains a listing of reviewed procedures.

### 2. Non-licensed Operator Training Program Review

The team interviewed eight NLOs, four AOs, and four RWOs. The team also interviewed three NLO instructors and observed an RWO and an AO perform their normal shift duties. The team reviewed the scope and content of requalification training recently administered to NLOs. Since the facility was not conducting NLO classroom training during the inspection week, the team questioned NLOs on recently administered training topics and observed their plant performance to infer training effectiveness.

The team concluded that RWO training program administration was satisfactory and has exhibited an improving trend in the last several months. This was evident in the recent training time increase from 2 to 3 weeks per year; although, the licensee still did not use all of the available training weeks. The HTU included new instructors in the continuing training program. Previously, one instructor administered all RWO requalification training. RWOs stated that incorporating new instructors into the program has invigorated old topics and brought fresh perspectives to the training the RWOs receive. The team observed that the lack of a comprehensive system training course for RWOs who qualified



during plant initial licensing, was a self-identified shortcoming. Instead of readministering a comprehensive systems course, the facility has incorporated system overviews into the RWO requalification training program.

The team concluded that AO program administration was also satisfactory and has exhibited an improving trend. AO training has increased from 3 to 4 weeks per year. The training topic distribution was broad, and incorporated systems reviews as well as new topics. AOs attended licensed RO training to enhance their integrated plant knowledge.

The team also concluded that the training staff was responsive to inputs from NLOs and incorporated inputs from plant groups to determine the training curriculum. Although the licensee addressed NLO course completion evaluations and NLOs' comments, NLOs were often not informed of comment resolutions. The team considered this a weakness and concluded the facility needed to improve the NLOs course completion comment resolution feedback.

Additionally, the facility could have improved presentation of the basis for the NLO requalification training program. Discussing the NLOs' input would improve the curriculum development process and their ownership of the requalification training program.

The team did not identify any weaknesses when NLOs were questioned on recent training topics. The team concluded that the recent NLO training was effective.

The team reviewed the process by which NLO instructors maintain their familiarity with plant operations and training needs. Internal facility training guidance requires the NLO training staff to spend forty hours per year in the plant. The NLO training staff met the minimum requirements; however, the NLO instructors informed the team that they rarely exceeded the minimum hours due to instructor workload.

The team also reviewed the interaction between the training department and RWO operations staff. An RWO rotation program between the operations department and the training department does not exist. The licensee did not use experienced plant RWOs in lesson plan development and training program administration. This was a common practice in licensed operator training programs, where the licensee assigned a licensed operator to assist the training department in revising and developing training material.

Based on the above reviews and discussions, the team concluded that further SAT process evaluation, as applied to the NLO program and instructor training, retraining, and certification, was not warranted. Furthermore, the team concluded that NLOs and NLO instructors have qualifications commensurate with their job performance requirements.

### 3. Reactor Operator Training Program Review

The team interviewed several ROs, RO training instructors, and one license training supervisor. The team reviewed the records, course material, and the most recent class of ROs under instruction's simulator performance. The team also observed the normal duty performance duties for two on-shift ROs.

During the interviews and performance observations, the team determined that the overall work quality consistently met job performance requirements. However, many ROs displayed knowledge weaknesses in the reactor coolant loop flow detection system, AMSAC actuation logic, and the use of TS 3.3.1, Table 3.3-1, Functional Unit 2, Action 2. Furthermore, many ROs could neither define nor differentiate between an ATWS and an RPS failure. These items constitute basic RO knowledge that should be reinforced during the requalification program. The team identified these shortcomings in RO knowledge as a weakness.

10 CFR Part 55.4 required learning objective derivation from the analysis that described the desired performance after training. The licensee developed most learning objectives used for initial RO training in the mid-1980's. Only the recently revised lesson plans reflected the above regulation. However, the facility training department was taking aggressive action to change the remaining lesson plans and learning objectives to meet code requirements. The training staff was revising all lesson plans and learning objectives.

Based on the above reviews and discussions, the team concluded that further SAT process evaluation, as applied to the RO program, was not warranted. Furthermore, the team concluded that ROs and RO instructors have qualifications commensurate with their job performance requirements.

### 4. Senior Reactor Operator Training Program Review

The team reviewed the SRO training program using Inspection Procedure 41500 and NUREG 1220 guidance. The team interviewed six SROs, observed several SROs performing their normal duties, and observed SRO training at North Carolina State University. The HTU did not conduct classroom and simulator training at the HEEC during the inspection period. Accordingly, the team did not observe simulator operations and classroom training sessions at the HEEC. The team observed the SRO-instant training in progress at the North Carolina State University Scaled PWR Facility.

The SROs interviewed stated that the training received during initial and continuing training was adequate and that both programs had improved. Several SROs stated that the instructors, while capable as instructors, could be more current on plant operations. However, the team observed that instructor knowledge of current plant operations was adequate.

Over the course of a year, 10 weekly periods were available for continuing training. The SROs interviewed indicated that of the training time available, 1 week was for generic training (e.g., emergency plan training,



general employee refresher training), 1 week was for requalification examinations, several weeks were for providing plant support (e.g., procedure review, procedure revision, assisting in plant operations), and 4 to 5 weeks were for licensed operator continuing training. A continuing training week consisted of four 10-hour days split evenly between classroom and simulator sessions. The HTU designed simulator scenarios to support and reinforce the training received in the classroom sessions. All SROs interviewed stated it would be beneficial if the time spent providing plant support could be used to provide additional operationally oriented training. However, the team concluded that the training exceeded the minimum time requirements.

The SROs interviewed stated that the HTU was more involved with operator performance evaluation rather than in training the operators to perform better. The SROs felt that constant evaluation of their performance during simulator training sessions did not allow SROs to determine and exercise alternative success paths. Discussions with training management indicated they were evaluating methods of providing licensed operators with risk-free training sessions on the simulator.

SROs interviewed stated that additional initial training, for both ROs and SROs, should be provided in routine daily operations, (e.g., the administration and control of work orders, clearances, and Limiting Conditions for Operations application). The SROs stated they felt overwhelmed when first having to deal with these important functions when first assigned to watch standing as either the SS-N or SS-D. Discussions with training management indicated that administrative requirement instruction would be incorporated into the SRO training program.

SROs indicated that they felt that training critique forms (HTU Form AI-11-B-1, revision 1) submitted to the HTU were not always effective in improving the training program. In several cases, SROs indicated that to get attention focused on a training concern, personal contact and follow-up with the HTU was necessary. All SROs interviewed stated that they had never received a reply from the HTU with regard to training critique items submitted. The team reviewed the training critique forms for requalification cycle NO7C01H. Training management had reviewed and evaluated the critique sheets and where the comments were considered to have a valid basis and an effective action could be taken, the HTU recommended corrective actions. The HTU reported completed corrective actions results to training and operations management. However, due to a breakdown in the feedback loop, actions taken were not consistently reported to the comment initiator. The team concluded that consistent lack of feedback to the comment initiator was one reason the interviewed SROs felt their comments did not receive appropriate attention.

One SRO stated that following the requalification examination review, a training instructor conducted a review of previous training critique forms and corrective action status. The SRO felt this method was effective and satisfied the desire for feedback on operator input to the training revision process and should be continued. The HTU management told the team that training critique forms to replace HTU Form AI-11-B-1 that allow

the comment initiator to request a reply were being pilot-tested. Additionally, the licensee told the team that training management was taking actions to ensure the comment initiator received feedback. The team felt that responding to the operators will improve the comment quality. The team considered that comment initiators not consistently receiving comment resolution notification was a weakness and concluded the facility needed to improve the process that notifies SROs of course completion comment resolution.

SROs interviewed stated the HTU was not sufficiently staffed to accomplish its mission. The SROs interviewed stated this resulted in instructors not providing the highest quality training due to limited preparation time. The team evaluated the instructors workload and concluded that while the HTU had a small instructional staff, they met the minimum training requirements.

The SROs interviewed viewed the real time training conducted on-shift by the operations department as effective in dealing with training issues important to the day-to-day plant operation. SROs stated that real time training was the vehicle they relied on to get information related to equipment and procedure changes. Typically this training was better than the continuing training provided by HTU. The SROs interviewed stated that HTU continuing training was more focused on licensed operator evaluation and on the introduction of topics deemed important by other organizations.

Two SROs displayed a weakness in the knowledge of the reactor coolant loop flow detection system. Additionally, neither SRO could define nor differentiate between an ATWS and an RPS failure. The team considered this a weakness in requisite operator knowledge.

Observation of SRO performance in the MCR yielded no significant deficiencies. Communications were generally clear, concise and effective. In most cases, operators provided repeat backs. Procedural compliance was good. Evolutions to be conducted later in the shift were discussed by the MCR team, and alternatives were considered in discussions led by the SS. The team felt that discussing contingency actions was appropriate and provided the on-shift crew with real time training.

During MCR observation the team noted blue bars used to mark annunciators anticipated during testing were on the incorrect annunciator lights. On receipt of the first alarm associated with the test, the operator noted and corrected this error. Additionally, when operating steam dump control switches in preparation for maintenance, the operator manipulated both switches simultaneously. The team concluded these minor discrepancies did not constitute a weakness in operations.

In a briefing of personnel preparing to enter the containment at power to perform various predetermined jobs, the team had the following observations:

AP-545, Section 5.3.6 required a pre-entry brief that included a discussion of radiation levels and expected temperature in the

containment. The briefing did not include anticipated radiation levels (available on the RWPs) or containment ambient temperatures. The pre-entry brief covered all other areas required by AP-545.

The individuals were offered ice vests for heat stress management. During the pre-brief, it was unclear that the use of ice vests was not required due to the low containment temperature (85-88 degrees). According to AP-522, stay time resulting from actual containment temperature should be about 120 minutes for active individuals to no limit for moderately active individuals.

Some informality in communications was evident during the briefing as the containment was called the "can," the "tin-can," and the "roundhouse" by the Job Coordinator.

The team concluded the job pre-briefing was adequate.

Based on the above reviews and discussions, the team concluded that further SAT process evaluation, as applied to the SRO program was not warranted. Furthermore, the team concluded that SROs have qualifications commensurate with their job performance requirements.

#### 5. Licensed Operator Requalification Training Program Review

The team reviewed Training Instruction TI 200. This instruction's purpose was establishment of requalification program requirements for all NRC licensed operators, certified SRO instructors, and STAs.

The team reviewed all the TI 200 attachments and had comments on the following:

Attachment 1, Return to Active Status Checklist - The team reviewed Attachment 1 for two licensed operators and determined that all the requirements were met.

Attachment 7, Training Curriculum Development Input - These forms were submitted to the Manager-Training by November 1 for inclusion in next year's program. Input forms may be provided by the SF and appropriate plant supervisors and managers. The team reviewed Attachment 7 submittals for the 1993 LOR which showed input from an SF, the Manager of Shift Operations, and two SSs. The team also reviewed the input for the preparation of the requalification program for 1993 that indicated that all comments submitted in Attachment 7 were considered when developing the curriculum. The team determined that feedback was not provided to all individuals providing input. The licensee agreed to provide this feedback.

Training Unit Internal Instruction 24 provided guidance for preparation of training feedback reports and was the mechanism that gave guidance to provide feedback to the HTU for those situations or conditions that required HTU attention. The team reviewed training feedback reports and found that the HTU kept a report index that assigned an individual to

resolve action items and listed the date of any resolutions. The instruction stated in item 20 that when a TFR was resolved or closed out, the TFR would be sent to the originator by the reviewer. The team determined that the licensee closed several TFRs without returning them to the originator. The team identified failure to provide feedback for TFRs as a weakness.

TFR 26 identified possible weaknesses in Emergency Plan Training. The Emergency Communicators received only LOR training for the Emergency Communicator position. LOR training covered the emergency communications procedures but did not look at emergency communications equipment or allow practice. An instructor suggested that TSC training cover the use of procedures and equipment. The HTU revised the emergency plan training to provide both orientation and position-specific training and qualification for all emergency response organization positions. The team identified that due to a TFR input the licensee had appropriately assigned an instructor to develop a JTA for all emergency response organization positions.

The team identified that the licensee planned to extend the length of several simulator scenarios to include shift changes. The instructors would take a simulator snapshot for prolonged scenarios. The scenario would then be available for additional recovery actions or shift turnover training. The team considers this a strength because it allows the operators to practice the whole scenario.

Section 6.8 of TI-200 stated that instructor personnel will spend time working in or observing plant operations in the area of their instructional specialty. Administrative Instruction 18B, Section VIE, required 40 hours of observation annually. The team reviewed the instructor in-plant hours for 1992 and determined that the licensee met these requirements.

The team reviewed the course completion summary for the first week of LOR training. The team noted that there was a positive feedback from most students for the instructor's innovative use of a "jeopardy" type game as an instructional technique for the lesson on clearances.

The team interviewed ROs and SROs who were in the LOR program. These licensed operators stated that the LOR program provided them with an acceptable level of refresher training. The team concurred with this position.

Based on the above reviews and discussions, the team concluded that further SAT process evaluation, as applied to the LOR program was not warranted. Furthermore, the team concluded that licensed operators have qualifications commensurate with their job performance requirements.

#### 6. Shift Technical Advisor Training Program Review

The team reviewed TI-601 that delineated STA training requirements. The training requirements ensured STAs could provide advanced technical

assistance to the operating shift during normal and abnormal operating conditions and make objective evaluations concerning plant safety.

The team interviewed all station STAs. The team accompanied four STAs during the performance of normal duties. The duties for these four STAs included: changes to the EOPs using VE-PROMS and responsibility for the 18 month surveillance program. The team found that the supplementary duties occupied most of the STAs' time. However, the team felt the STA was cognizant of all significant MCR activities.

The team reviewed the STA training TS requirements, FSAR commitments, and NUREG 0737 requirements. The team interviewed STAs and their supervisors and trainers, and observed STA tasks in progress. The team found that based on the experience level and the STAs background, the STAs could perform their duties adequately.

a. Classroom and Simulator Training

The team interviewed STAs and STA instructors to determine the effectiveness of STA classroom and simulator training. The team witnessed classroom instruction for an STA in the SRO-instant class. The student interacted with the instructor and the course content was appropriate.

b. OJT

The team interviewed STAs and STA instructors to determine the OJT effectiveness. Nearly all the STAs interviewed stated that the OJT was an effective part of their training. During OJT, the application of the knowledge gained from the formal classroom and simulator training provided a constructive forum for asking questions on items the trainee was uncertain of in the classroom. The STA conducting the OJT provided the trainee with insights gained from performing the STA functions. The team found that the OJT for STAs was effective.

c. Job Task Analysis

The team reviewed the STA task list, which delineated the 102 STA specific tasks. The team found that the task list neither accurately reflected the current STA position responsibilities nor had the HTU trained STAs on all required tasks. The following were examples of STA task list discrepancies:

Task 351\*002\*H2\*05 - This task provided technical review for temporary jumper installations and lead removals using the Control Wiring Drawings. The licensee revised the procedure and the STA did not have functions with the revised procedure.

Task 352\*038\*H4\*05 - The licensee split the tasks in this AOP into AOP-4 and AOP-36. The STAs interviewed have not received training on the split procedures.

Task 352\*001\*H1\*05 - This task required independent evaluation of normal operating events. None of the STAs interviewed were clear on what this requirement was or what training had received to accomplish this task.

Task 351\*004\*H1\*05 - This task required the STA to inspect the plant each shift. The team found that STAs routinely performed this task, however, there were no procedural requirements for this inspection and the results were not formally documented.

Task 355\*005\*H2\*05 - This task required the STA to approve temporary procedures. The STAs interviewed stated this was not within the STAs' authority.

Task 352\*096\*H5\*05 - This task required the STA to recommend actions using the EOP documentation following accident assessment team activation. The HTU did not train STAs to perform this function, and all the documentation required to perform this task (e.g., EOP Step Deviation Document) was not available in the Accident Assessment Team room.

Task 352\*112\*H5\*05 - This task required the STA to assist the TSC in evaluating plant conditions. The STAs stated that the HTU had not provided training to perform this function.

Task 355\*002\*H1\*05 - This task required the STA to reboot the ERFIS Computer. STAs stated they were not formally trained to reboot this computer.

Task 357\*004\*H1\*05 - This task required the STA to reboot the RM-11 Computer. STAs stated they were not formally trained to reboot this computer.

Task 357\*006\*H1\*05 - This task required the STA to reboot the Security Computer. STAs stated they were not formally trained to reboot this computer.

Task 357\*007\*H1\*05 - This task required the STA to reboot the Radwaste Computer. STAs stated they were not formally trained to reboot this computer.

STA role in performance of EOPs and AOPs - It was not clear to the STAs interviewed what the STA specific duties were during the performance of some EOPs and AOPs.

EOP validation exercises - Procedure OMM-20 provided administrative and technical guidance for the EOP verification and validation program implementation. Section 3.4 stated that STAs and HTU staff were responsible for evaluating EOP validation exercises. It also stated that STAs would coordinate the exercises and would be the primary evaluators. The STA training program did not include this task.

EOP Maintenance - Procedure OMM-21 provided administrative and technical guidance for EOP maintenance. Section 3.0 required the STA to prepare EOP changes, perform technical and safety reviews for the changes, and to implement the verification and validation program. STA training program did not include this task.

Based on interviews, STAs felt that some tasks could be better defined. The following were examples of tasks that could be better defined:

Event diagnosis - Several STA tasks required the STA to use event diagnostic skills. Some STAs interviewed stated the training for this could be significantly improved.

CSFST evaluation - Several STAs interviewed stated that their training for CSFST Evaluation was not sufficient.

Industry experience training - Some STAs interviewed stated they had limited knowledge of industry experience that directly affected STAs.

The team reviewed draft comments of a peer review panel. The draft peer review panel comments were similar to the teams' comments. The licensee stated they would evaluate the additional comments and take appropriate actions. The team concluded, the licensee recognized most the STA JTA deficiencies and the STAs interviewed were capable of performing the minimum STA requirements. The team concluded the licensee met the intent of the analysis element, although the program documentation had not been appropriately maintained. The team identified JTA deficiencies as a weakness in the STA training program.

#### d. Technical Specification

The team further reviewed TS 6.2.4, which delineated the specific requirements for the STA. The section stated: "The STA shall provide advisory technical support to the SF in the areas of thermal hydraulics, reactor engineering, and plant analysis with regard to the safe operation of the unit. The STA shall have a baccalaureate degree or equivalent in a scientific or engineering discipline and shall have received specific training in the response and analysis of the unit for transients and accidents, and in unit design and layout, including the capabilities of instrumentation and controls in the MCR."

The team discussed this TS section with STAs and reviewed the course material for applicable training. The team concluded that the licensee adequately met TS requirements for the STA position.

Based on the above reviews and discussions, the team concluded that further SAT process evaluation, as applied to the STA program was not warranted. Furthermore, the team concluded that STAs have qualifications commensurate with their job performance requirements.

## 7. Exit Interview

The inspection scope and findings were summarized on March 5, 1993, with those persons indicated in paragraph 1. The NRC described the areas inspected and discussed in detail the inspection findings. This report contains no proprietary information. During the exit interview the licensee had no dissenting comments.

## Appendix A

### List of Acronyms

AMSAC - ATWS Mitigating System Actuation Circuitry  
AO - Auxiliary Operator  
AOP - Abnormal Operating Procedure  
ATWS - Anticipated Transient Without Scram  
CSFST - Critical Safety Function Status Tree  
EOP - Emergency Operating Procedures  
ERFIS - Emergency Response Facility Information System  
FSAR - Final Safety Analysis Report  
HEEC - Harris Energy and Environmental Center  
HTU - Harris Training Unit  
JTA - Job Task Analysis  
LO - Learning Objective  
LOR - Licensed Operator Requalification Training  
LP - Lesson Plan  
MCR - Main Control Room  
NLO - Non-licensed Operator  
OJT - On-the-job Training  
RO - Reactor Operator  
RPS - Reactor Protective System  
RWO - Radioactive Waste Operator  
SAT - Systems Approach to Training  
SF - Shift Foreman  
SRO - Senior Reactor Operator  
SS - Shift Supervisor  
SS-D - Shift Supervisor - Designee



SS-N - Shift Supervisor - Nuclear

STA - Shift Technical Advisor

TFR - Training Feedback Report

TS - Technical Specification

## Appendix B

### List of Procedures

AI-11-B REV 1 Course Completion Evaluation  
AI-18-B REV 1 Instructor Continuing Training Program  
AP-019 REV 4 Guidance for Voluntary LCOs  
AP-522 REV 0 Heat Stress Management  
AP-545 REV 0 Containment Entries  
II-24 REV 0 Training Feedback Reports  
OMM-020 REV 0 EOP Verification and Validation Program  
OMM-021 REV 0 Maintenance of EOPs  
PEP-218 REV 3 Accident Assessment Team Leader  
PEP-362 REV 4 Core Damage Assessment  
PLP-702 REV 3 Independent Verification  
POP-100 REV 1 Conduct of Infrequently Performed Tests or Evolutions  
TI-107 REV 7 Radwaste Operator Training  
TI-104 REV 8 AO Training Program  
TI-200 REV 8 Licensed Operator Requalification Program  
TI-202 REV 5 SRO Replacement Training Program  
TI-210 REV 1 Real Time Training  
TI-601 REV 5 STA Training and Retraining

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