



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

Report Nos.: 50-338/87-39 and 50-339/87-39

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Docket Nos.: 50-338 and 50-339

License Nos.: NPF-4 and NPF-7

Facility Name: North Anna 1 and 2

Inspection Conducted: October 16-20, 1987

Inspector: *P. Mocre*
P. Mocre, Team Leader

1/20/88
Date Signed

Team Members: C. Rapp
R. Schin
L. Watson

Approved by: *M. Shymlock*
M. Shymlock, Chief
Operational Programs Section
Division of Reactor Safety

1-20-88
Date Signed

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of licensed operator and non-licensed operator training and requalification training as well as maintenance training, and natural circulation cooldown procedure implementation.

Results: One violation was identified in which the licensee's Emergency Operating Procedures for natural circulation cooldown contained cooldown curves that exceeded those specified in Figure 3.4.3 of Technical Specifications. One deviation was identified wherein the licensee's procedures for natural circulation cooldown and related Step Deviation Document did not follow the guidance committed to in their Procedure Generation Package for Emergency Operating Procedures.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *L. Edmonds, Superintendent, Nuclear Training
- *R. Enfinger, Superintendent, Operations
- +T. Harding, Licensing Staff Engineer
- *E. Harrell, Station Manager
- *T. Johnson, Supervisor, Quality Assurance
- *G. Kane, Assistant Station Manager
- *J. Leberstien, Licensing Engineer
- +D. VandeWalle, Licensing Supervisor

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

NRC Resident Inspectors

- *J. Caldwell

- *Attended exit interview
- +Participated in subsequent telecons

2. Exit Interview

The inspection scope and findings were summarized at an exit meeting on November 20, 1987, and in subsequent phone calls through December 23, 1987, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings listed below. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. No dissenting comments were received from the licensee.

<u>Item Number</u>	<u>Status</u>	<u>Description/Reference Paragraph</u>
338,339/87-39-01	Open	Violation - Inadequate Emergency Operating Procedures for natural circulation cooldown: cooldown curves exceed those in the Technical Specifications (paragraph 9.a).
338,339/87-39-02	Open	Deviation - Failure to follow Procedure Generation Package commitments in generating Emergency Operating Procedures for natural circulation cooldown (paragraph 9.a)

338,339/87-39-03	Open	IFI - Licensee commitment to review incorrect exam questions with licensed operators to assure that they understand correct answers (paragraph 6.c).
338,339/87-39-04	Open	IFI - Simulator cannot perform Mode 5 or 6 operation (paragraph 6.f).
338,339/87-39-05	Open	IFI - Superseded procedures in use at simulator (paragraph 6.f).
338,339/87-39-06	Open	IFI - Security of assembled exams at word processor (paragraph 6.g).
338,339/87-39-07	Open	IFI - Training in clearance and tagging for non-licensed operators with prior experience (paragraph 7.a).
338,339/87-39-08	Open	IFI - Training in natural circulation cooldown (paragraph 9.b).

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. General Comments

a. Training

In the training area, substantial improvements were observed. Systematic, task-oriented training had been implemented for those programs reviewed. Management involvement in program planning and implementation was evident and well-defined in procedures. Training materials were detailed and student contact hours were well above minimum requirements.

The training facilities were noteworthy; including the mockups for general employee training and the mockups for maintenance training. The training department staff were competent, appeared to have good morale, and were very helpful in the conduct of this inspection. Also, comments received from students about the current quality of training were generally very positive.

The licensee indicated that INPO accreditation had been achieved for the following programs: Reactor Operator License Course, Licensed Operator Requalification Program, Senior Reactor Operator License Course, Non-Licensed Operator Course, Electrical Technician, Mechanical Technician, Health Physics, Technical Staff and Manager Training, Chemistry, and Instrument Technician.

b. Natural Circulation Cooldown

In the natural circulation cooldown procedures, some concerns were identified. In an NRC approved Procedures Generation Package (PGP), the licensee has committed to implement the Westinghouse Owners Group Emergency Response Guidelines (ERGs), Rev. 1, in their Emergency Operating Procedures (EOPs). Also, the PGP includes commitments on identifying, justifying, and documenting any procedural step deviations from the ERG. The NRC considers the EOPs to have direct safety significance. Accordingly, the NRC has reviewed for safety and approved the ERGs, including the methodology used for setpoint calculations contained in the ERGs. Use of a setpoint that is different from one specified in the ERG constitutes a significant step deviation, which the licensee has committed to justify. During this inspection, concerns arose in the area of step deviations - specifically with the licensee's identification, justification, and documentation of them. One violation and one deviation were cited in the area of natural circulation cooldown EOPs. PGP commitments will be reviewed in a subsequent NRC inspection of all Emergency Operating Procedures.

5. Corporate Oversight

The structure of the training program appeared to be well defined. The licensee utilized the Nuclear Operations Department Standards Manual to set forth the corporate standards and policies for the licensee's training programs. The corporate organization responsible for training is Power Training Services (PTS). The program manual for PTS, the Training Systems Manual (September 1987 revision), was reviewed by an inspector. This manual provides guidance and direction for the development, implementation and evaluation of training programs based on a systematic approach to training. The PTS also issues program guides for individual training programs. The inspectors reviewed various program guides during the inspection as documented in this report. These program guides appeared to comprehensively address each training area. In addition, the PTS had an Organizational Manual which described the responsibilities of managers in the organization.

The North Anna Training Department (NATD) reports to PTS. The NATD has a set of Training Administrative Guidelines to provide detailed direction at the site level on administration of the training programs.

The licensee has corporate staff dedicated to the evaluation of the training program. The inspector reviewed the program and conducted interviews with responsible personnel. The program states the following goals for ensuring that the training program is adequate:

- Training materials cover the occupational skills and knowledge required to perform the job;

- Training occurs as specified in the program guide;
- Trainees demonstrate mastery of occupational skills and knowledge at the end of training;
- Trainees demonstrate competency in occupational knowledge and skill on-the-job;
- The demonstrated occupational knowledge and skills support effective power station operation.

The program includes evaluation indicators and criteria for determining the adequacy of each area. A schedule is maintained that evaluates each area on a monthly, quarterly, semi-annual, or annual basis. A discrepancy report is written when an indicator does not meet its acceptable level. This discrepancy report requires the person responsible for the indicator to sign and attach an action plan if necessary. Management is then required to review the discrepancy report and sign off. The inspector found the program evaluation to be complete and comprehensive.

The inspector discussed the Operational Experience Report (OER) program with the corporate personnel responsible for implementing it. The main point of discussion was the amount of time it was taking for OERs to move through the review and implementation process. A number of Licensee Event Reports (LERs) were noted to be taking four to five months from the issue date before they were incorporated into the training program or dispositioned. The inspector was concerned that the program may not be adequately sized or organized to assure prompt review or implementation. The minimum documents reviewed by the Independent Operating Experience Report (IOER) group are NRC Inspection and Enforcement (I&E) Information Notices, Institute of Nuclear Power Operations Significant Operating Event Report, and LERs. These documents are reviewed for applicability and distributed to the following groups:

- Engineering/Construction;
- Station Licensing (Surry and North Anna);
- PTS (responsible for distribution to Surry and North Anna training departments);
- IOER.

The action date for these reports is three months as defined by Nuclear Operations Department Standard (NODS) LR-03, The Standard for Operating Experience Review Rev. 1. These reports are to have a completed review and disposition within this time period. The inspector discussed the LERs that were past due. The individual in charge of the PTS OER group stated that back to back forced outages (pipe break at Surry, tube rupture at North Anna), had pulled a number of the IOER personnel away

from their tasks to support the outages. The individual was able to track down the late LERs and demonstrated the ability to locate and identify those OERs that were overdue. Overall the inspector found the OER program to be adequate in addressing the training of personnel with regard to operating events in the industry.

No violations or deviations were identified in this area.

6. Licensed Reactor Operator (RO) and Senior Reactor Operator (SRO) Training Programs (41701)

a. RO Candidate Training Program

The training program to prepare non-licensed operators for a reactor operator license was documented in the Reactor Operator License Course Program Guide dated September 1985. The program guide sets forth training goals; roles and responsibilities of management; prerequisites; a program of instruction including classroom and simulator instruction, trainee performance evaluation methods; and, documentation requirements. The inspector noted during the program review that Appendix B of the Program Guide, Instructional Program, listed approximately 19 weeks of contact hours for the required courses, 13 weeks of in-plant training, and additional time for startup certification, specialized subjects, and exam preparation. However, the times listed in the Program Guide generic course schedule, Appendix C, RO License Course Generic Schedule, and in the Course Schedule, Reactor Operator License Class 87-1, January 1987, were different. A review of these differences indicated that the January 1987 course schedule was more conservative, requiring approximately 52 weeks of training in the initial RO class. Specific hours for individual courses had been reduced in some cases, but the training appeared to be captured in non-licensed operator training or simulator training. The licensee indicated that as improvements had been made to the course schedules, the program guide had not been updated to reflect the changes. The licensee stated that the Program Guide would be revised to clarify the contact hour differences. The licensee indicated that a new job task analysis was being conducted that would effect the reactor operator license course target hours and that the Program Guide would undergo a comprehensive corporate and site review and update after completion of the new job task analysis.

The RO License Course Program Guide also contained a training program for SRO candidates with no previous North Anna operational experience. This allows highly qualified candidates to obtain appropriate systems knowledge at North Anna. The program requires completion of in-plant training by utilizing a qualification standard for each required watch station. Completion of Shift Supervisor job performance measures are also required.

The inspector interviewed two reactor operators and reviewed training records for these operators. The inspectors attended a portion of simulator training for the reactor operator license class. Observation of simulator classes revealed no major problems with simulator training, however, the following comments were communicated to the licensee:

- The instructors asked questions of students during complex operations, which was distracting.
- While the instructors were attentive to student difficulties, they were sometimes too quick to assist students to resolve problems. This interfered with good operator communication and did not promote understanding of integrated plant operation.

No violations or deviations were identified in this area.

b. SRO Candidate Training Program

The training program for upgrade for a licensed RO to a licensed SRO was documented in the Shift Supervisor Training Program - Program Guide, Rev. 1, October 1, 1987. The program guide specified program entry requirements and completion criteria, a program of instruction including classroom, simulator and in-plant training, evaluation methods, and documentation requirements. The program emphasizes advanced skills in plant operation and design, supervisory training, and development of diagnostic capabilities. The Course Schedule, Shift Supervisor Class 87-1, January 1987, lists approximately 39 weeks of training for the SRO candidate class.

No violations or deviations were identified in this area.

c. Licensed RO and SRO Requalification Training

The training program for annual requalification of ROs and SROs is provided in the Licensed Operator Requalification Program (LORP) - Program Guide, Rev. 0, dated October 1987. The LORP Program Guide provides a program description, entry requirements, program of instruction, student evaluation methods, and program documentation requirements. The inspector reviewed the LORP against the requirements of 10 CFR 55. The requalification program met the requirements of the regulations.

The inspector reviewed the training records and conducted interviews with three reactor operators and two senior reactor operators. Two areas of concern were identified during the reviews. A case was identified where accelerated requalification training had not been adequately structured by the training department. When questioned concerning the training, licensee management indicated that the

problems had been identified at the time of the training by feedback from the Operations Department, and that provisions had been included in the program to assure that accelerated requalification training is structured. The inspector reviewed the LORP, Section 3.3.A, and determined that the program required that accelerated requalification training requirements be specified, documented, and approved by management.

The operators also indicated that test results were not reviewed in class. The inspector was concerned that individuals may not be aware of incorrect responses since it appeared that the only feedback from the exams was the grade. The inspector discussed this concern with management. The licensee representative indicated that answer keys were provided to the students. The licensee committed to review incorrect exam questions with students and assure that students understood the correct answers. Review of corrective action in this area is identified as inspector followup item 338, 339/87-39-03.

The inspector attended a portion of requalification training involving industry feedback and plant modification and event training. The instructor appeared to be prepared and good class participation was noted. The inspector reviewed the lesson plans, which contained material derived from Training Impact Reports. No problems were identified.

Operational event feedback for the requalification program was reviewed. The licensee utilizes required reading programs to assure that non-licensed and licensed operators are aware of industry and plant events. In addition, for selected major events, lectures were given to all operating crews. Four operational events affecting licensed operators were selected for inspector review of required reading implementation. In all of the cases, required reading packages were routed by the Superintendent of Operations within four days of the LER issue date. Each package included a cover sheet with the names of the addressees and due dates for completion and return. All of the LER cover sheets that were reviewed were signed and returned within one month of the LER issue date. Overall, the required reading system appeared to be complete, timely, and well documented.

No violations or deviations were identified in this area.

d. Lesson Plans

The inspector reviewed the following seven lesson plans:

- NCRODP 83, Thermodynamics, Fluid Flow, and Heat Transfer, Rev. 0
- NCRODP 86.2, Reactor Operating Principles, Rev. 0
- NCRODP 86.3, Reactor Energy Removal, Rev. 0

- NCRODP 88.3, Chemical Volume and Control System, Rev. 3
- NCRODP 88.5, Technical Specifications, Rev. 2
- NCRODP 90.3, Vital and Emergency Distribution, Rev. 1
- NCRODP 91.1, Engineered Safety Features, Rev. 1

The inspector found the course material to be very detailed. The learning objectives, however, were too broad, vague and addressed low knowledge and ability values. The licensee is presently revising the learning objectives to be more specific and address areas of operator performance. The licensee is also reassessing the Job Task Analyses for better definition of training scope and learning objectives.

No violations or deviations were identified in this area.

e. Instructor Training/Certification Program

Instructors involved in operator training are required to meet technical competency requirements and complete a certification program. The Instructor Training/Certification Program - Program Guide, November 1, 1986, was reviewed by the inspector. The program requires a seven-day basic program in teaching skills followed by a two-year advanced training program, consisting of independent-study units, advanced skills group workshops, and a continuing education program. The certification process includes training and demonstration of proficiency in preparing lesson plans and other training materials, conducting classroom and, as appropriate, simulator sessions, and evaluating student progress.

Interviews with ROs and SROs indicated that instructor preparation and technical capabilities were adequate and in most cases above average. Interviews indicated, however, that during past requalification classes, at least two systems classes were conducted by instructors with marginal systems knowledge. The licensee indicated that action had already been taken to correct this problem based on operator feedback to training management by placing instructors into SRO training classes. The licensee currently has three instructors in an SRO training class which should be completed in March 1988. Two instructors will be placed in the next SRO training class. Completion of this training will significantly improve the technical capabilities of the training staff.

Interviews were conducted with two instructors. The qualifications and training records of these instructors were reviewed. The instructors appeared to be well-qualified to teach the courses assigned. Each instructor indicated that he utilized approved lesson plans and routinely upgraded lesson plans to provide more detail and incorporate experience feedback. Both instructors had completed the basic certification process and were working on the advanced certification process. One instructor held an SRO license and had

attended specialized simulator instructor training. The instructors indicated a strong commitment to assuring that students received high quality training.

No violations or deviations were identified in this area.

f. Simulator

The licensee is in the process of upgrading the North Anna simulator for future NRC certification. The inspectors were concerned that this upgrade process appeared to take precedence in some cases over correction of problems affecting the quality of the evolutions being performed for operator training. The inspector also noted that attempts to interface additional computers has caused forced maintenance outages which reduced the amount of contact hours. (Contact hours have been maintained well above the minimum requirements however.) The following concerns were identified during the inspection:

- Instructors were not always getting prompt information on the completion and results of simulator modifications from the simulator maintenance group in that modifications are sometimes installed without instructor knowledge causing different or unexpected responses that could render an evolution ineffective.
- Instructors are the primary identifiers of simulator problems and initiate simulator maintenance requests but do not appear to have significant involvement with the development of corrective actions for simulator problems.
- The simulator cannot simulate mode 5 or 6 operations. Correction of this deficiency will be inspector followup item 338, 339/87-39-04.

These concerns were discussed with the licensee. The licensee indicated that these concerns had been brought to the attention of management and that actions were being taken to assure that they were addressed. The licensee had held meetings between the training department and the simulator maintenance group to provide a coordinated schedule to achieve certification and address problems currently affecting training. The licensee's actions in these areas appeared adequate to address these concerns.

A review of procedures on file in the simulator revealed that document control was not providing updated procedure indexes or procedures on a timely basis. The inspector noted that the most current index was not on file and several procedures were not current. This is inspector followup item 338, 339/87-39-05.

No violations or deviations were identified in this area.

g. Exam Security

The inspectors reviewed the licensee's control over the security of the assembled exams. Inspectors observed that while exams are being assembled on a word processor, they are not controlled in a manner to prevent an unauthorized individual from making a copy of a future exam. Interviews with staff involved in this area revealed no formal training on the responsibilities or requirements of exam security. Also, there is no access or authorization list for exams or exam banks. This is inspector followup item 338, 339/87-39-06.

No violations or deviations were identified in this area.

7. Non-licensed Operator (NLO) Training (41400)

a. Operational Experience Feedback

The inspectors reviewed incorporation of experience feedback into the NLO training and retraining programs. A plant event involving NLOs was selected for the review. The event, LER 87-015-00, on Unit 1, was a reactor trip due to 5A feedwater heater High-High level. The cause was improper valve lineup of instrument air valves, resulting from failure to follow administrative controls for removing clearance tags and returning valves to service. The tagout and subsequent removal of clearance tags had been accomplished by NLOs.

Training prior to the event (of NLOs in tagout and configuration control) was covered in step 1 of NLO training program. During interviews with NLOs, it was determined that some were never given training in tagouts, system alignments, or configuration control procedures. Those with prior experience (i.e. Navy nuclear) were exempted from steps 1 through 3 of the NLO training program. It should be noted that all NLOs have to complete a Job Performance Measure that requires them to satisfactorily perform a clearance tagout. Nonetheless, in light of the large portion of operational events within the nuclear industry relating to improper tagouts, this training should receive more attention. Plant procedures for tagout, system alignment and configuration control should be taught to all NLOs, regardless of past experience. Also, this should be included in requalification training. The inspector discussed this concern with the licensee and the licensee agreed to provide training on tagouts system alignments and configuration control to all NLOs. This is inspector followup item 338, 339/87-39-07.

Training immediately following the event included lectures to each operating section and required reading of the LER by all NLOs. This post-event training appeared to be adequate.

LER 87-015-00 was tracked for incorporation into the ongoing training programs. As of November 18, 1987, LER 87-015-00 had not yet been routed for review by the training department staff for potential

inclusion into the ongoing training programs. The event occurred on June 29, 1987, and the LER was issued on July 28, 1987. Tracking of several other LERs revealed a typical delay time of 4-1/2 to 5 months between issuing an LER and routing it to the training department staff for review and implementation into training programs. This delay appeared to be due to corporate review.

When the OER is reviewed at the site training department, it is tracked, routed, and implemented under two procedures: Power Training Services Operating Experience Review Policy and Procedure, and Training Impact Report Tracking. The Program Change Coordinator (PCC) receives each OER from the corporate office, reviews it for applicability, and enters it into a computer tracking system. It is then routed to Power Training Services staff members for review of its impact on training. The reviewer initiates a Training Impact Report (TIR) or Simulator Modification Request (SMR). The OERs, TIRs, and SMRs are tracked on a computer through completion of action and the reporting of results back to the corporate office.

The computer tracking system of the PCC appeared to be quite helpful in tracking OERs and maintaining a readily accessible record of the status of each. The status of implementation in the training lesson plans was verified for two OERs, for which the inspector reviewed the modified lesson plans.

Another tool used by management in event followup was the Human Performance Evaluation System (HPES). A HPES report to management, dated November 9, 1987, was reviewed by the inspectors. This report investigated the causes of the event in substantially more detail than was found in the LER. In it, several areas were identified that needed to be addressed by plant operations and training. The corporate OER Review System included HPES Reports, so this important information should receive formal management review for implementation of needed changes.

There is a provision for an annual review of OER program effectiveness. This is accomplished by a corporate entity known as the Program Evaluation Staff. A yearly review is conducted on the TIR status reports and their resolution. The status reports are produced and circulated monthly to the appropriate individuals and updated by the appropriate supervision/management. The number of closed TIR's is reported monthly at the training center; TIR's are completed in accordance with management goals; resolution of TIR's is incorporated into the training program. These procedures and their implementation under the evaluation schedule appear adequate, however, processing times for screening OERs prior to sending them to the site training department should be reduced.

No violations or deviations were identified in this area.

b. Entry Level Training

The Non-Licensed Operator Training program utilizes the Nuclear Foundations Training Program to prepare entry level personnel for admission into the Nuclear Control Room Operator Development Program. A common track is employed for those seeking to be health physics technicians or control room operators. This consists of orientation, mathematics, classical physics, chemistry, electricity (DC), and Nuclear Physics. This is a four month program and is followed by a two month program designed specifically for operators that consists of thermodynamics, heat transfer, fluid flow, reactor theory, electricity (AC), instrumentation and control, and engineering mechanics.

No violations or deviations were identified in this area.

c. Requalification Training

Requalification training was reviewed by the inspector and found to be adequate. The inspector reviewed the licensee's schedule for non-licensed operator continuing training and found it to be comprehensive and well organized. The curriculum was divided into cycles that listed morning and afternoon sessions for each week, the method of instruction, instructor designation where applicable, and a listing of when each shift was to attend class. The curriculum covered such topics as advanced radiation worker training, EOP's, steam traps, fire protection, fuel handling, emergency response organization, simulator training, nuclear instrumentation, secondary plant equipment, and modifications. Most of the cycles contained quizzes and the final cycle spent one day of self-study followed by an annual examination. Training records reviewed during an audit of the qualifications of NLO's were complete and well organized.

No violations or deviations were identified in this area.

8. Maintenance Training

Overall, training records reviewed during an audit of the training of maintenance personnel were complete and well organized.

a. Operational Event Feedback

Thirteen OERs (seven LERs and six I&E Notices) were selected for inspector review for feedback into the training programs. Of these, seven had been entered into the TIR system, two had just been received by the PCC through the corporate OER process, two had not yet been received through corporate OER process, and two I&E Notices from 1985 were found to have no record of being received at the site.

These I&E Notices were received prior to the computerized tracking system currently used by the PCC. At the time there was no site system for monitoring the records of all the OERs received by the PCC. The PCC stated that old INPO issued OERs were backfitted into the computer TIR system by using annual indexes supplied by INPO. The PCC receives no annual index of NRC issued OERs. However, each I&E Notice contains an index of recent I&E Notices, so that an annual index could be constructed by the licensee.

The OERs that were in the computerized tracking system appeared to be adequately tracked and implemented. Lesson plan revisions were checked for selected OERs and were found to be adequate.

The primary methods used for Operational Event Feedback for maintenance personnel is required reading. The required reading system was reviewed for electrical, mechanical and I&C technicians. In each case, monthly packages of required reading are assembled with a routing cover sheet. Each package may contain about ten different items. Inspection of several completed required reading routing cover sheets revealed that they had all been signed, and that the routings had been completed within six months. The licensee indicated that the routing process was being revised to cover each shift separately instead of the whole department. This should greatly improve the timeliness of the feedback process.

No violations or deviations were identified in this area.

b. On the Job Training (OJT)

Inspectors reviewed the OJT program for maintenance personnel. The licensee uses Job Performance Measures (JPMs) to assess the training of maintenance personnel to qualify them for each successive step that they achieve. The inspector interviewed maintenance foremen and reviewed records for specific technicians' JPMs which the foremen maintain. The review demonstrated consistency between the training records and the jobs for which the maintenance personnel had qualified. The JPMs are used by the foremen to verify, when there is a question, the qualifications of personnel to perform assigned tasks.

No violations or deviations were identified in this area.

c. Laboratory Mockups

The inspectors toured the licensee's mockup training facilities. The facilities were comprehensive and contained equipment for instrumentation and control, electrical, and maintenance training. The licensee is still expanding the use of mockups and plans to implement more training aids. The most extensive use of mockups was for the

practical factors portion of the General Employee Training (GET) program. The licensee has a full scale mockup of the dress-out rooms, health physics checkpoint, radiation controlled area access point, maintenance jobs, and radiation controlled area egress point. The licensee utilized a small hidden source under a frisking table pad to simulate contamination and reinforce the trainees attention to contamination precautions. The inspectors consider the mockups an excellent training method.

As an aside to the GET training mockup, the inspectors discussed a recent incident at the site where an employee received an overexposure due to a "hot" particle embedded within protective clothing. As an example of the licensee's response to an operational event, they immediately implemented more stringent surveys of all protective clothing and subsequently purchased stand up portal monitors to survey employees, in their protective clothing, prior to entering the radiation controlled area.

Inspectors interviewed several maintenance personnel regarding their opinions of the training program. Personnel were chosen to represent a diverse cross-section of experience so that feedback could be obtained from veterans with a great deal of experience as well as new employees with a fresh outlook. The veteran employees expressed a satisfaction with the direction of the training program and its attention to their training needs. The newer employees also had no problems with the amount or adequacy of their training and its relation to the work they performed.

No violations or deviations were identified in this area.

d. Contract Personnel

The qualification of contract personnel were discussed with the licensee. The licensee writes their contracts specifically addressing ANSI 3.1 and Regulatory Guide 1.8. Nondestructive examination personnel were used as an example of a typical contract that was reviewed and audited. All contracts are reviewed on an annual basis unless there is no activity. When an audit is postponed due to insufficient activity, the responsible supervisor must approve the reduction of audit scope. Vendor programs are evaluated based on the month of contract approval. For example, a contract approved in August would be audited annually or tri-annually based on the nature of the work and the duration of the qualifications.

No violations or deviations were identified in this area.

9. Natural Circulation Cooldown (41701)

a. Procedures

The inspectors reviewed the following emergency procedures for natural circulation cooldown:

- 1-ES-0.2A, Natural Circulation Cooldown With Shroud Cooling Fans, Rev. 1;
- 1-ES-0.2B, Natural Circulation Cooldown Without Shroud Cooling Fans, Rev. 1;
- 1-ES-0.3, Natural Circulation Cooldown With Steam Void in Vessel (with RVLIS), Rev. 1.

The licensee committed to write the EOPs in accordance with an NRC approved Procedure Generation Package (PGP) and incorporate the Westinghouse Owners Group (WOG) Emergency Response Guidelines (ERG), Rev. 1, into the EOPs. The PGP requires the justification of any setpoint or significant deviation from an ERG step. The licensee uses a Step Deviation Document (SDD) for the identification of step deviations and the documentation of step deviation justifications. The licensee also uses an EOP Setpoints document for detailed setpoint justifications.

Two of these procedures, 1-ES-0.2A and 1-ES-0.3, appeared to contain all of the prevention and mitigation measures for reactor vessel head bubble as set forth in the WOG guideline procedures. These measures include the use of core exit thermocouples for monitoring vessel head temperature, checks for unexpected large variations in pressurizer level, instructions on the mitigation of void formation, and limits on cooldown rate and subcooling margin.

1-ES-0.2B deviated from the WOG guideline in two aspects:

- (1) The cooldown and depressurization to a hold point is done differently:

	<u>WOG</u>	<u>North Anna</u>
Starting Pressure	≥1950 psig	≥1950 psig
Subcooling at core exit thermocouples	≥200°F	≥180°F
Cooldown Rate	≤25°F/hour	≤15°F/hour
Reduce Pressure (while maintaining subcooling) to hold point of	1200 psig	1025 psig
Soak Period	9 hours	8 hours

The licensee has no justification for these procedural step deviations in their Step Deviation Document (SDD). The licensee's SDD should identify each step deviation, and reference applicable EOP Setpoint documents for any needed further justification. The lack of SDD documentation is an example of deviation 338, 339/87-39-02.

The intent of this WOG guideline procedure is to cooldown and depressurize the primary coolant system while maintaining assurance of no voiding (boiling) in the reactor vessel upper head. The inspector reviewed the licensee's data from the North Anna EOP Setpoint document to determine whether this portion of the North Anna procedure met the intent of the WOG guidelines. Upper head subcooling was calculated by the inspector, using licensee's data for upper head temperatures in comparison to allowable primary pressures. This was done for both the North Anna procedure and the WOG procedure. The inspector found that the North Anna procedure maintains subcooling in the upper head greater than the corresponding WOG procedure for this portion of the cooldown. Therefore, the inspector concluded that this portion of the North Anna procedure appears to meet the intent of the WOG guideline.

- (2) After the hold period above, further cooldown and depressurization is done differently in step 20 of ES-0.2B. The WOG guidelines indicate that pressure should be reduced to 350-400 psig while maintaining subcooling at $\geq 200^{\circ}\text{F}$. ES-0.2B has no specific subcooling requirement.

In the licensee's procedure, following the eight hour soak period, isothermal depressurization is performed with the intent of bringing RHR on line as soon as possible. This results in a situation where subcooling of the upper head could be reduced to as little as 2°F . The comparable WOG procedure maintains upper head subcooling greater than about 39°F . The licensee makes no mention of this procedural step deviation in their SDD. This lack of documentation or justification is an example of deviation 338, 339/87-39-02.

The PGP also requires that controls and displays to be used are identified in their procedures to assist the operator in accurate and quick identification. However, ES 0.2B, Attachment 1, Pressure/Temperature Limits for Cooldown, fails to indicate which temperature instruments are to be used in complying with the curve. The same inadequately labelled curve appears in ES-0.2A and ES-0.3. This is an example of deviation 338, 339/87-39-02.

The licensee's procedures for natural circulation cooldown (1-ES-0.2A, 1-ES-0.2B, and 1-ES-0.3) contain a cooldown minimum

temperature/pressure limit curve that is different than the corresponding technical specification cooldown curve. Further, the licensee's natural circulation cooldown curve allows operation in the "Unacceptable Operation" region of the Technical Specification cooldown limit curve. The licensee's procedures are thus inadequate in that the procedures do not reflect technical specification requirements. This is violation 338, 339/87-39-01.

The fact that the licensee's natural circulation cooldown curve was different from the corresponding Technical Specification curve was not mentioned in the SDD. This failure to properly identify and justify the use of a different setpoint is an example of deviation 338, 339/87-39-02.

b. Training

Natural circulation cooldown training was reviewed, and the inspectors found this area to be insufficient for the following reasons:

- OER's, including the St. Lucie event, were not formally integrated into the lesson plan on natural circulation;
- Training was not sufficiently in-depth. It was noted that there was no discussion of complications during natural circulation, reasons for complications, detection of upper head voiding, indication of upper head voiding, and mitigation/corrective actions for upper head voiding;
- Natural circulation cooldown is addressed in four separate areas of training (theory, systems, mitigation of core damage, and emergency operating procedures) without adequate ties to each area.

The upgrade of natural circulation cooldown training will be inspector followup item 338, 339/87-39-08.

No violations or deviations were identified in this area.