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REGION I  
LIMERICK GENERATING STATION TRAINING PROGRAM INSPECTION

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TRAINING PROGRAM INSPECTION, LIMERICK GENERATING STATION  
(Combined Inspection Report 50-352/91-80 and 50-353/91-80)

EXECUTIVE SUMMARY

A special announced training program inspection was performed at the Limerick Generating Station from May 13 to May 17, 1991. This team inspection focused on several of Limerick's Systems Approach to Training (SAT) based training programs and their implementation. The specific training programs inspected were: licensed operator (including fuel handlers), nonlicensed operator, I&C technician and technical staff. The inspection included a review of training program procedures, training materials, training records, qualification standards and other applicable documents, observations of classroom, simulator and on-the-job training, and interviews with operators, engineers, trainees, instructors, supervisors, and managers. In addition, the team reviewed the licensee's program for control of licensed operator medical evaluations to ensure compliance with 10 CFR 55.21.

The team concluded that the licensed operator initial training and requalification training was SAT based, but several deficiencies were noted. The licensed operator initial training and requalification training had two deficiencies identified that the licensee intends to correct to improve the programs. The licensee intends to discontinue use of informal methods to revise the cross reference matrix and provide more detailed instruction/training to individuals who sign off steps in the on-the-job (OJT) operator qualification manual.

The team concluded that the Nonlicensed Operator training program was also SAT based, but deficiencies were noted with OJT. The OJT portion lacked structure and did not use lesson plans as other methods of instruction did. The program allowed the job incumbents to decide how to make the presentation and perform the evaluation. This places a burden upon the job incumbent, who may not necessarily have had the presentation training required to train the students.

The team concluded that the Senior Reactor Operator Limited (fuel handling) (SROL) training program was SAT based, and it was under continuing development as licensee experience with this program was gained. This program was relatively new, and the licensee has now gathered enough operational experience that indicates that the scope of the SROL training program needed to be broadened. There was ample feedback to upgrade the program. The team concluded that licensee management had placed appropriate emphasis on the SROL program and that the facility understands the scope of the changes required for the program. Additionally, the facility's proposed schedule for upgrading the SROL training program appears appropriate.

The team concluded that the Instrumentation and Control (I&C) technician and technical staff training programs were SAT based and properly focused and implemented. The scope of both of the programs was broad. Licensee management displayed a favorable attitude toward these programs and dedicated the appropriate resources.



## DETAILS

### 1.0 BACKGROUND AND SCOPE OF INSPECTION

The Nuclear Regulatory Commission considers effective training of personnel to be an important part of safe nuclear power plant operations. This inspection was in keeping with NRC policy as stated in the "Commission Policy Statement on Training and Qualifications of Nuclear Plant Personnel," (as published in Federal Register 53 FR 46603), which states that the NRC will expand the method by which it monitors the industry training programs by performing post-accreditation inspections at selected sites.

This inspection was conducted using the guidance of NRC Inspection Manual Procedure 41500, "Training and Qualification Effectiveness." Procedure 41500 references NUREG-1220, "Training Review Criteria and Procedures." NUREG-1220 provides criteria to review performance based training, or a Systems Approach to Training (SAT) based program. The criteria assessed the five essential elements of an SAT program. These elements are:

1. Systematic analysis of the jobs to be performed,
2. Learning objectives that are derived from the analysis and that describe desired performance after training,
3. Training design and implementation based on the learning objectives,
4. Evaluation of trainee mastery of the objectives during training,
5. Evaluation and revision of the training based on the performance of trained personnel in the job setting.

The specific training programs inspected were licensed operator (RO, SRO and SRO limited), nonlicensed operator (NLO), technical staff and I&C technician.

The inspection included a review of training program procedures, training materials, records, qualification standards and other applicable documents, observations of classroom and simulator training, interviews with operators, engineers, trainees, instructors, supervisors, and managers.

The inspection was initiated by obtaining materials related to the selected training programs from the licensee. Specific job tasks were selected for each program (except for technical staff) and training program procedures were reviewed in preparation for the inspection. The focus of the inspection was on: (1) analysis of the jobs and tasks, (2) derivation of training objectives from the tasks, (3) design, development, and implementation of training for the tasks, (4) observation and evaluation of trainees to determine their level of task mastery, and (5) how

In addition, the inspection included a review of the licensee's program for control of licensed operator medical evaluations to ensure compliance with 10 CFR 55.21.

## 2.0 OPERATIONS TRAINING PROGRAMS

### 2.1 Scope of Review

The scope of the inspection for this section was evaluation of operations training programs. The operations training programs at Limerick Generating Station include the initial training for reactor operator, senior reactor operator, senior reactor operator limited to fuel handling and nonlicensed operator. The operations training programs also include continuing training for each of the above.

Using the guidance from NUREG-1220, "Training Review Criteria and Procedures," the team selected the following SRO tasks from the senior reactor operator cross reference matrix:

3440090303	Direct emergency response as the interim director
3410080303	As fuel handling director authorize, supervise and verify all fueling/refueling operations
3430160303	Assure adequate personnel coverage for all plant conditions in accordance with overtime policy
3440010303	Analyze all indications/instrumentation to determine emergency events and causes
2990080301	Report abnormal parameters or conditions

The team selected the following RO tasks from the reactor operator cross-reference matrix:

2990100301	Conduct equipment tagouts, clearance and switching
2980030101	Perform heat balance without process computer
2900070401	Actions for refuel floor high radiation alarm during refueling operations
2000600501	Bypass containment spray interlock
2770020101	Place emergency service water system in operation

The team selected the following NLO tasks from the nonlicensed operator cross reference matrix:

2001020504	Individually scram a control rod at its hydraulic control unit (HCU)
2012170204	Check control rod drive (CRD) accumulator pressure
2862050104	Reset a deluge valve & hatchway flow control valve
2994020304	Perform manipulation of locked valves
2993050304	Comply with operator aids procedure

The team selected the following SROL tasks from the senior reactor operator limited cross reference matrix:

2000360501	Actions for inadvertent criticality
3440070303	Classify emergency events
2031020101	Monitor shutdown cooling
2850030101	Operate the two-way radio
2900160401	Actions for dropped fuel assembly during refueling

Using these tasks, the team determined whether the licensee used the systems approach to training (SAT) to develop learning objectives, lesson plans, and trainee evaluations. The team conducted interviews with job incumbents for each of the operator training programs reviewed. The team also interviewed students, operator training instructors, training supervisors and supervisors of licensed operators to assess training implementation, trainee evaluation and program evaluations. The team observed portions of initial operator license team training, requal simulator training, nonlicensed operator OJT, and job performance measure training. The team also observed the licensee conducting the requal cycle operational evaluation of crew performance.

## 2.2 Licensed Operator Training

### 2.2.1 Job Analysis

The licensee used a cross reference matrix to control the required licensed operator tasks and the method to be used to train on the task. The matrix included a list of associated procedures, lesson plans, qualification and training manual sections, simulator training scenarios, and frequency of continuing requalification training. The cross-reference matrix was recently reviewed by a team of 2 SROs and 4 ROs from the plant to establish that the list of required tasks is complete, the list of procedures used to implement the task is correct, that the method used to train on the task is adequate, and that the frequency of continuing training is adequate. The matrix is also reviewed against the plant procedure index to determine if the matrix is complete.

Changes to the matrix are also reviewed by the Operation Training Interface Committee (OTIC). The OTIC is chaired by a watchstanding Shift Manager with members to include SROs, RO, Shift Technical Advisors, nonlicensed operators, and training representatives.

The team identified several discrepancies in the cross reference matrix for several of the tasks selected.

- Task 34400101303 indicated that procedures GP-8 and GP-13 would be included in the training. The lesson plans do not address GP-8 and GP-18. The Qualification Training manual sections do not list all the sections of the manual that apply, such as sections II-2.38, II-2.39 and III-3.5.

- Task 3410080303 indicates that GP-6.1 would be included in the training. The lesson plans do not address GP-6.1. The qualification manual sections do not list sections I-3, I-4, and I-9.
- Task 2990080301 indicates lesson plan LOT-1570 applies. Lesson plan LOT-1572 actually applies.
- Task 3430160303 indicates lesson plan LOT-1860 applies. Lesson plan LOT-1850 actually applies.

The licensee has a formal process to control changes to the cross-reference matrix by using NTS-I-504, "Program Revision Action." However, the licensee also uses less formal methods to revise the cross reference matrix. For the two tasks above in which the procedures were not included in the lesson plans, verbal direction was given to the lesson plan preparer to include the procedures in the lesson plan, and the cross-reference matrix was revised assuming the procedures would be included. The other errors in the cross-reference matrix were, in part, due to transcription errors. The team noted, however, that in spite of the errors in the cross-reference matrix and lesson plans, the trainees did receive training in the procedures omitted from the lesson plans.

#### 2.2.2 Learning Objectives

The team reviewed the lesson plans for the tasks chosen and determined that learning objectives were linked to the tasks. Many of the learning objectives were broadly worded and generically applied. This was especially true of the administrative procedure lesson plans.

#### 2.2.3 Design Implementation

The team reviewed the lesson plans to cover the tasks selected. Except for those discrepancies noted above in section 2.2.1, the lesson plans addressed the tasks selected. Based on the interviews conducted, the training programs have greatly improved over the past several years and the training provided in initial and continuing requalification training satisfies the needs of the operators. The majority of the operators interviewed strongly felt that improvements can be made in the continuing requalification training in operation related events training. The operators perceive that the training in this area is not always provided in a manner operationally relevant to the facility and includes material regarding systems in other facilities, but not at the Limerick Generating Station. The training staff agreed to review lesson plans and materials used for event reviews to assure that the connection with Limerick was clearly made.



The instructors used in the licensed operator training program are predominately contractor employees. The contractor instructors have been at the facility for several years and have knowledge of the facility's operations and systems. The licensee's long term plan includes replacing contractor instructors with PECO employees. The users of the training indicate that it is rare that misinformation is provided by the instructors. The users of the training indicate that the training instructors do a good job. The instructors are required to participate as students in the classroom portion of the requalification training during each cycle of requalification training. This assures that technical competency of the instructors is maintained. The instructors are required to have 32 hours per year of instructor skill improvement training. As identified by the facility's QA organization, the training instructors have been deficient in obtaining the 32 hours of instructor skill improvement training in the past, principally due to conflicts between teaching duties and offering of instructor skill improvement training. The licensee has taken actions to assure that the instructors will obtain the 32 hours of instructor skill improvement training.

The initial and requalification training program both use the OTIC to develop the scope of the training provided to the operators. Before the training is initiated, the OTIC reviews the scope of the training to be provided. In the requalification program, this is done at the beginning of the two year cycle of training and also at the beginning of each 6 week cycle of requalification training. In addition, as a final management check to assure that the requalification training provided is appropriate, the Assistant Superintendent of Operations schedules his requalification training to be the first week of the new requalification training cycle.

The operator requalification training observed in the simulator was based on a preselected documented training scenario. The instructors interacted with the operators during the course of the training scenario as necessary to assure that the operators were performing the operations in accordance with the facility procedures. The operators occasionally asked the instructor clarifying questions and the instructors satisfactorily answered the questions. At the end of the scenario, the instructors reviewed the objectives of the scenario with the operators and determined whether the operators met the scenario objectives.

The job performance measure training session was performed as a laboratory setting. The operators paired off and one operator performed the task while the other operator evaluated the first operator against the job performance measure. The instructor was available to answer any of the operator questions, but



performed more as a facilitator to the operator teams to assure that the job performance measures planned to be accomplished were completed.

The team reviewed the licensee process to control the activation of an inactive licensed operator. The licensee utilized a 40 hour main control room qualification manual to achieve an active license.

#### 2.2.4 Trainee Evaluation

The initial operator training utilizes quizzes during a training week and most recently utilizes a more comprehensive examination at the end of a major classroom portion, i.e., systems training complete or procedures training complete. The comprehensive examination was added after the licensee did an analysis of the reason many of the trainees in the last initial training program did not satisfactorily complete the program. This was not discovered until the training program was almost complete. In addition, evaluations on the simulator and audit examinations are conducted on the trainees. The licensee has preestablished criteria on poor performance and the actions to take with respect to trainee remediation or removal from the training program.

The initial operator training examination bank is simply a compilation of prior examinations. The instructors must develop an examination manually. The current bank does not allow easy identification of a question which relates to a specific learning objective. The licensee is planning to develop a computer bank of questions to allow questions to be identified based on a specific learning objective.

The requalification program utilizes weekly examinations in a form similar to that which will be experienced as part of the comprehensive requalification examinations. The operators experience a static simulator examination, a classroom examination, and an evaluation of their performance on the plant simulator. The team observed the licensee evaluation of the operator performance on the simulator. The licensee conducted the evaluation using the criteria that would be used as part of the 10 CFR 55 required annual operating test. The team also observed the feedback given to the operators on the evaluation of their performance on the plant simulator.

Licensed operator trainee OJT is performed as part of the required 13 weeks as an extra man on shift. To consistently apply the OJT and to provide a record, the licensee uses an operator qualification training manual. The qualification manual lists the skills and knowledge of facility plant systems

and procedures necessary to become a licensed operator. The mastery of the skills and knowledge can be signed off by an instructor or qualified licensed operator. Personnel who can sign off the qualification manual have received training in the qualification manual concept. The operator qualification manual provides criteria as to what the sign-off of the instructor or licensed operator means for a specific area of the trainee OJT. While no specific licensed operator trainee OJT was observed, the interviews conducted revealed that some of the licensed operator trainee OJT sign-offs may have been based on a training session rather than on an evaluation session. The training provided to the individuals qualified to sign off a qualification manual does not clearly describe that the evaluation session is needed to use to sign off activities in the manual.

#### 2.2.5 Program Evaluation

The licensee uses feedback from the operators and trainees to improve the operator training program. At the end of a training cycle, the trainee/operator is given an opportunity to provide feedback. The operator feedback obtained during the requalification program is not always factored into the training because of a screening/prioritization process. In the requalification program, many of the topics to be included in training are a result of prior commitments made in the FSAR and LERs. The licensee is in the process of revising the FSAR to use a systems approach to training to structure the requalification program rather than to rely on a list of commitments in the FSAR. As a result of the commitments, there is little time in the requalification training cycle to cover training identified as part of the feedback process; the training included is prioritized by the OTIC involvement in the training process. In addition, training management reviews the results of a completed requalification cycle to determine if any of the results from the completed cycle require additional training to the operators.

### 2.3 Nonlicensed Operator Training

#### 2.3.1 Job Analysis

The initial nonlicensed operator (NLO) job/task analysis was performed by reviewing the existing plant procedures. The analysis has been periodically reviewed and updated. The review was performed by job incumbents and approved by knowledgeable licensee supervision. The review was also used to build a matrix of tasks. The matrix was evaluated using a combination of task frequency, importance, and difficulty ratings. This evaluation yielded a numerical value which is used to determine how often a subject should be taught during NLO continuous training. In addition to the matrix review, supervision

provides additional training based on industry events, requests by incumbents, and management prerogative. The team determined that the analysis is adequate for development of learning objectives and is kept current as the job performance requirements change.

### 2.3.2 Learning Objectives

Learning objectives were found for the five tasks selected for review. They were relevant and well written. The learning objectives were derived from the NLO task matrix. There are procedures in place that modify learning objectives as job requirements change. However, the team determined that learning objectives relating to the topic of administrative procedures were not specific. As a result, examination questions did not exist to cover the full scope of the administrative procedures topic. This is a weakness in verification by testing of an important topic area.

### 2.3.3 Design Implementation

Existing instructional material has been evaluated and is adequate for the training needs. The selection of instructional settings is consistent with the job and aided all the learning objectives reviewed. The team observed the conduct of on-the-job training (OJT) and noted that the OJT instructor for the NLOs had not received adequate presentation training. The NLO OJT program allows inconsistencies amongst the evaluators in both training delivery and acceptance criteria. The OJT inconsistencies were compensated for by the NLOs' proper usage of station procedures and an extensive qualification manual. In general, training is conducted in an adequate manner and adequate records are maintained.

### 2.3.4 Trainee Evaluation

NTS-I-401, "Instructor Qualification," describes the process for determining how individuals meet the criteria for independent performance of instructor duties, including the position of OJT trainer/evaluator. This position is usually a member of a line organization who is qualified for the position being evaluated. NTS-I-401 indicates that satisfactory completion of OJT trainer/evaluator initial training is a prerequisite to independent performance of OJT trainer/evaluator duties. A review of nine lesson plans for the OJT trainer/evaluator courses indicated that this training focused on skills and knowledge related to OJT trainer/evaluator performance, but did not include students actually performing OJT or OJT evaluations. Observation of OJT and OJT evaluation by the team indicated that these activities are not conducted consistently. There is no link between the

job performance requirements and learning objectives. There was no usage of lesson plans for OJT. Minimum standards were not established and implemented as part of the OJT program.

#### 2.3.5 Program Evaluation

A system is in place to use feedback from trainee tests, student evaluations, job experience, and supervisors for program evaluation. The program has been revised as needed and the team concluded the revisions appear satisfactory.

### 2.4 Limited SRO (fuel handling) Training

#### 2.4.1 Job Analysis

Initial analysis for the SRO Limited to fuel handling (SROL) position was performed by reactor engineers, senior reactor operators, and operations shift managers. The subject matter experts (SMEs) identified tasks for the SROL position by reviewing the validated existing task lists for the senior reactor operator and reactor operator and by reviewing procedures related to refueling floor operations. Licensed operator lesson plans corresponding to tasks selected for the SROL were reviewed by the SMEs. Learning objectives were developed and the appropriate lesson plan content was identified based on the job performance requirements identified by the SMEs, and the K/A catalog (Knowledge and Abilities Catalog For Nuclear Plant Operators, NUREG-1123) related to refueling activities. The SMEs also identified topics to be covered that would allow the SROL to assess how other plant activities might impact refuel floor activities. Examples of these topics are selected aspects of residual heat removal, fuel pool cooling, and secondary containment ventilation. The team noted that the initial job analysis performed appeared adequate, but they also observed that the program is continuing to develop as licensee experience is gained.

#### 2.4.2 Learning Objectives

Learning objectives were found for the five tasks selected for review. They were relevant and well written. The learning objectives were derived from the SROL task matrix. There are procedures in place that modify learning objectives as job requirements change. The team noted that questions existed for all the higher level objectives.

#### 2.4.3 Design Implementation

Existing instructional material has been evaluated and appeared adequate for the training needs. The selection of instructional

settings was consistent with the job and aided all the learning objectives reviewed. The SROL qualification training manual provided adequate standards for the conduct of on-the-job training (OJT) and evaluation. These standards have been primarily provided through the use of memorandum from operations and operations training supervision. The team determined that training was properly conducted and that adequate records are maintained for the training conducted.

#### 2.4.4 Trainee Evaluation

Individuals who perform below minimum standards during initial and continuous training receive remedial training, are retested and are removed from training or job duties if their performance is deemed not acceptable. Adequate precautions are in place to ensure there are no test compromises. The SROL qualification manual requires tasks to be demonstrated in the field and signed off by qualified subject matter experts. The trainees are tested and licensed by the NRC prior to performing core alterations. The team determined that trainee evaluations were properly conducted.

#### 2.4.5 Program Evaluation

A system is in place to use feedback from trainee tests, student evaluations, job experience, and supervision for program evaluation. The team noted that interface meetings were taking place, but there were loose controls over the scheduling and conduct of these interface meetings. As a result of this concern, the facility has developed a more formalized interface committee charter with regularly scheduled meetings. Based on the promptness of the licensee addressing this concern, it was apparent that licensee management devoted the proper attention and resources to the SROL training program.

Through interviews with incumbents, it was determined that a need for training on additional topics was required. An example is training for in-vessel maintenance. The facility acknowledged that the original job analysis requires revision and has such training under development.

### 2.5 Conclusion

The licensed operator initial training and requalification training is based on a systems approach to training. The licensed operator initial training and requalification training had two deficiencies identified that the licensee intends to correct to improve the programs. The licensee intends to discontinue use of informal methods to revise the cross-reference matrix and provide more detailed instruction/training to individuals who sign off steps in the OJT operator qualification manual.

The Nonlicensed Operator training program is SAT performance based, but deficiencies are noted with OJT. The OJT process lacks the structure noted in other OJT programs. The program allowed the job incumbents to decide how to make the presentation and perform the evaluation. This places a burden upon the job incumbent, who may not have had the presentation training required to train the students.

The Senior Reactor Operator Limited (fuel handling) training program is SAT performance based and under continuing development as licensee experience is gained. This program is relatively new, and the licensee has now gathered enough operational experience to indicate that the scope of the SROL training program needs to be broadened. There is ample feedback to upgrade the program. The team concluded that licensee management has placed appropriate emphasis on the SROL program and that the facility understands the scope of the changes required for the program. Additionally, the facility's proposed schedule for upgrading the SROL training program appeared appropriate.

### 3.0 I&C TECHNICIAN TRAINING PROGRAM

#### 3.1 Scope of Review

The scope of the inspection covered under this section was to evaluate the Instrumentation and Control (I&C) technician training program. The training program for the I&C technicians at Limerick Generating Station consists of core training, initial training, and continuing training. This inspection was conducted using the guidance of NUREG-1220, "Training Review Criteria and Procedures."

The inspection included a review of training program procedures, training materials, qualification standards and other applicable documents, observation of on-the-job training (OJT) and interviews with junior technicians, senior technicians, training instructors, and training supervisors.

Using the guidance from NUREG-1220, "Training Review Criteria and Procedures," the team selected the following I&C tasks from the I&C technician cross reference matrix:

9100040209	Conduct surveillance test on Primary containment/Drywell and Reactor vessel isolation control system.
9193230209	Respond to site emergency.
9183110209	Test rod position indicating system.
9100180209	Conduct surveillance test on emergency core cooling water system.
7180010213	Report status of work.
7173500213	Perform circuit board repairs.

A number of the above were selected for OJT demonstration and evaluation. The OJT review scope was expanded during inspection to include OJT for the health physics instrumentation technicians.



### 3.2 Job Analysis

The I&C training program matrix for the facility was developed by using a systematic analysis of the jobs to be performed. The analysis was carried out by using The Institute of Nuclear Power Operations (INPO's) original task list and questionnaire. The questionnaire was sent to the technicians and supervisors to establish the task matrix for training. This matrix was reviewed by subject experts. In cases where the training is provided by consultants, e.g., "S. Levy Inc." for the rod position indication system, the training program is reviewed by the facility training staff and subject experts prior to its implementation. The tasks for core and initial training were differentiated in the I&C matrix. The frequency of training required for continuing training was defined in the I&C matrix. Major changes to the training program were implemented in the years 1985, 1988, and 1990.

By a review of the I&C training matrix and interviews with junior and senior technicians, the inspection team established that the job and task analysis was adequate to achieve the necessary learning objectives. However, the I&C matrix needed updating in terms of ST procedures and rod position indicating system lesson plan. To keep the I&C training program up-to-date as the job performance requirements change, the facility has a full-time OJT coordinator and an I&C foreman is a member of the technical training committee.

### 3.3 Learning Objectives

The team reviewed the current lesson plans for the tasks chosen to determine if learning objectives were derived from the job and task analysis. All the lesson plans reviewed included measurable learning objectives which are linked to the tasks performed by the I&C technicians. Interviews with the job incumbents and the training staff, along with a review of the I&C matrix indicated that the task list and the instruction materials are kept up-to-date to reflect changes implemented to JCC equipment and performance requirements.

### 3.4 Design Implementation

The team reviewed training lesson plans for each of the tasks selected and the process for maintaining the materials up-to-date and technically correct. The lesson plans reviewed were accurate and the format was consistent. No technical deficiencies were identified. References to various documents were checked and found to be correct. The lesson plans, materials, and the feedback from technicians and trainees are updated based on the changes in instrumentation. The technicians' questions and concerns are addressed in an adequate manner. Formal procedures are in place to implement any updating to the lesson plans. The training offered by consultants is evaluated by the training staff and the subject task experts prior to its implementation.



There was no classroom instruction taking place during the inspection week. However, the team was able to observe OJT training and evaluation for several technicians. The surveillance tests, i.e., NSSSS-RCIC Turbine exhaust pressure - High, division 1, channel E functional test (PIS-50-1N655E) and NSSSS-RCIC steam supply pressure - Low, division 1, channel E functional test (PIS-49-1N658E), were observed by the team. The trainees are required to perform the surveillance tests (ST) three times before being eligible to be examined for qualification for that particular ST. During the performance of training, the trainee is supervised/guided by a qualified OJT evaluator. During the examination, no guidance is provided to the trainees. However, if the trainee is about to commit an error, he is stopped from performing the test and is reexamined at a later date. During the inspection observation, the trainee performed one ST as part of his OJT and the other as an exam for OJT qualification. In both cases, the inspection team observed that proper procedures were being followed. The trainee was quizzed by the qualified OJT evaluator to establish the depth of his understanding of the ST. At the end of the exam, the trainee was further quizzed by the I&C foreman.

The team also observed OJT for electronic equipment repair. The facility did not have any trainee technicians in this area; therefore, an OJT demonstration was arranged for observation by the inspection team using qualified technicians. The technician performing the work was supervised by a senior technician. In this case, the procedure, which is also part of the continuing training, was followed. The other OJT observed was in the area of health physics instrumentation. The health physics instrumentation area was chosen to evaluate a broader cross-section of the training program. In this case, the trainee technician was supervised by a qualified OJT evaluator. The training exercise was on the use of an electrostatic voltmeter to measure RMS voltage and the calibration of a Xetex teledose transmitting dosimeter by using a Shepherd calibrator. The trainee was quizzed by the qualified OJT evaluator to establish the depth of his familiarization with the procedure, equipment, and the precautions involved in the exercise. The training was conducted in an organized manner observing appropriate procedures and precautions.

In order to evaluate the implementation of the training programs, the team assessed the qualifications of training instructors. After interviewing the I&C instructors, the team determined the instructors receive the training as stipulated in procedure NTS-I-401. Procedures are in place to verify the qualifications of instructors for vendor supplied training (NTS-I-300). Based on the results of interviews with trainees, the team noted that the I&C technicians were very satisfied with the training they were receiving. In the opinion of technicians, instructors were highly dedicated individuals and willing to provide any assistance that is needed. Technicians indicated that the training staff routinely addresses concerns to the technicians' satisfaction. Additionally, the technicians were pleased that the instructors spent as much time as practicable in the plant.

The I&C technician training program consists of core training, initial training, and continuing training. The tasks for initial and continuing training and their training frequencies are defined in the I&C matrix. The contractor technicians must also participate in continuing training. For surveillance testing, contractor technicians go through the same qualification process as do facility technicians. A list of qualifications of all the technicians is maintained.

### 3.5 Trainee Evaluation

I&C technicians are given quizzes during the training period to evaluate their progress. At the end of each lesson, a written exam is conducted. Technicians who do not meet the qualification standards are given quizzes before being reconsidered for final exams. The technicians whose scores are significantly below the passing mark are asked to repeat the training. Training waivers are determined based on performance testing.

The facility training staff is in the process of building an examination bank. In most areas, two sets of examinations exist. The target is to have at least five such sets of examinations for the examination bank. Examination questions are not repeated for subsequent exams. Sufficient precautions are in place to prevent test compromises.

### 3.6 Program Evaluation

Procedure NTS-I-504, "Program Revision Action," is the formal procedure to revise training programs. Efforts are being made to improve on the feedback for on-the-job experiences. By a review of instructors files, the inspection team established that instructors were routinely and objectively evaluated.

### 3.7 Conclusion

The inspection team concluded that the facility has a basically sound training program for the I&C technicians that is SAT based. The training staff interfaces well with line management. Communications and working relationships between various groups are good and the training staff is responsive to trainees' concerns. The OJT program for the I&C technicians appeared thorough and effective.

## 4.0 TECHNICAL STAFF TRAINING PROGRAM

### 4.1 Scope of Review

The scope of the inspection covered under this section was to evaluate the training program provided to the technical staff at the Limerick Generating Station. This portion of the inspection was conducted using, as guidance, the applicable portions of NUREG-1220, "Training Review Criteria and Procedures."

The technical staff training consists of the BWR fundamentals curriculum, the technical curriculum, the system engineer curriculum, the reactor engineer curriculum and the SRO certification program. The BWR fundamentals and the technical curriculums are the only curriculums or programs that are required for all the technical staff. The system engineer and reactor engineer curriculums are initiatives that the licensee is currently developing. The system engineer curriculum is scheduled to be completed by September 1991, and the reactor engineering curriculum is scheduled to be completed by December 1991.

The focus of this portion of the inspection was on the BWR fundamentals and the technical curriculums; however, certain aspects of the system engineer curriculum were reviewed to ensure that this curriculum was being developed from a performance based perspective. The inspection included a review of training program procedures, training materials, completed examinations, and other applicable documents. Interviews were conducted with plant engineers, training instructors, and training supervisors. Additionally, classroom and simulator training sessions were observed. The BWR fundamental and the technical curriculums do not have task analyses associated with them; therefore, no specific tasks were chosen for review. The system engineer curriculum did have a job analysis performed. Two tasks were chosen for review: (1) Perform a 10 CFR 50.59 safety evaluation, and (2) Conduct surveillance and routine tests required for his system.

#### 4.2 Job Analysis

The technical staff training program at the facility is designed to supplement position specific education and training in order to broaden the knowledge of the plant technical staff. The intent is to enhance the technical staff to perform their assigned duties. The technical staff training program plan delineates the target population for this training. The current target population consists of engineers and technical assistants assigned to the following: Superintendent, Operations; Superintendent, Technical; Superintendent, Outages; Superintendent, Maintenance/I&C; Engineer, Radwaste; and Modification Coordination Engineer. The inspection team noted that the licensee had employed a comprehensive target population and that licensee management encouraged personnel in addition to the target population personnel to attend training.

The current technical staff training program was established in April 1990 and is undergoing revision to meet current INPO guidelines. The previous program was developed using a job/task analysis. From this job/task analysis, a cross-reference matrix was developed. In addition, the licensee made efforts to ensure that all of the relevant tasks from the original job/task analysis were included in the current training program. The inspection team reviewed the methodology used by the licensee in developing the content of the current technical staff training program and determined the method was acceptable. The team noted that the program was comprehensive and appeared appropriate for the target population. Additionally, the licensee personnel interviewed also indicated that the scope of the technical curriculum was appropriate and that the curriculum was properly focused.

The system engineer curriculum is an initiative developed by the licensee. This curriculum was developed by initially performing a specific job/task analysis. The analysis was performed using the guidance of licensee procedure NTS-I-102, "Job Analysis." A sample population of eight engineers was canvassed for the analysis. The inspection team reviewed the analysis and the licensee's methodology for conducting the analysis. The team concluded that the analysis was thorough and performed in accordance with the licensee's procedure.

#### 4.3 Learning Objectives

The inspection team reviewed learning objectives associated with various lesson plans. The team reviewed lesson plans from the BWR fundamentals curriculum, the technical curriculum, and the system engineer curriculum. The system lesson plans from the system engineer curriculum were associated with the two chosen tasks from the job/task analysis. The team noted that all lesson plans contained objectives that were, in general, accurately written and were appropriate for the lesson plan. Where applicable, the objectives were linked to the job/task analysis. The licensee personnel interviewed also indicated that learning objectives were usually appropriate, but a number of individuals indicated that the learning objectives for the lesson plans dealing with administrative procedures were too broad and not properly focused.

#### 4.4 Design Implementation

The team reviewed the training and qualifications of the instructors who teach the technical staff. The team found the instructors to be properly trained and qualified. The team noted that the majority of technical staff instructors were PECO employees, not consultants.

The team reviewed a number of lesson plans to ensure they were designed to provide for consistent training delivery and that the appropriate instructional materials required were annotated. The lesson plans reviewed were for the BWR fundamental, technical, and system engineering curriculums. The team concluded that all lesson plans reviewed were properly designed and written.

Additionally, the team observed the conduct of training in both the classroom and simulator settings. The team noted that all the training observed was conducted professionally and that the instructors were able to maintain the interest of the students throughout the training sessions.

#### 4.5 Trainee Evaluation

The team reviewed the licensee's process for granting exemptions from training. This included the review of an actual waiver that was granted. The team determined that the licensee has an adequate method to process training waivers and the licensee has properly granted waivers when required.

The course plans for the technical staff training program have clear criteria for the administration and evaluation of trainee examinations. The course plans state the frequency of examinations and the pass/fail criteria for the examinations. The course plans also provide administrative guidance on when and how trainee remediation is conducted. The team concluded that the criteria provided in these course plans was adequate.

The team reviewed several examinations which had been previously administered. The examinations consisted of one BWR fundamentals final examination and six technical curriculum unit examinations. The team noted that the majority of questions were of an objective format and that all of the questions clearly referenced objectives from lesson plans.

#### 4.6 Program Evaluation

The team reviewed the licensee's methodology for systematic evaluation of the technical staff training program. This evaluation is required to ensure that the training program can be revised as appropriate and that continuing training is properly focused. The team found that effective methods were in place to change the training program as appropriate.

The technical staff training instructors routinely use feedback from the students and the job incumbents to enhance the training program. Additionally, interviews with job incumbents indicated that the technical staff can have their concerns addressed via various methods. All of the job incumbents interviewed indicated that if they had a concern that required training, the technical staff instructors would ensure the topic was covered during a future continuing training cycle if appropriate. The individuals interviewed also indicated that there were several diverse and simple methods to voice concerns to the training staff.

The licensee has developed a charter for a technical staff training interface committee. The interface committee's objective is to improve the effectiveness of the technical staff training program by providing a forum for direct plant staff involvement in training program administration and content. The team reviewed the interface committee charter and concluded that the interface committee proved to be effective at achieving its intended goals.

#### 4.7 Conclusion

The inspection team concluded that the technical staff training program was SAT based and was developed with the appropriate focus and that the training is being conducted effectively. The scope of the technical staff training program is broad. Licensee management has displayed a favorable attitude towards the program and has dedicated the appropriate resources.



## 5.0 LICENSED OPERATOR MEDICAL EVALUATIONS

### 5.1 Scope

The team reviewed the medical records for six licensed operators to determine if the licensee performs the required medical examinations every two years as required by 10 CFR 55.21. In addition, the team determined whether the facility program assures that, if, as a result of the medical examination, a change to the license is required, the facility will inform the NRC within 30 days as required by 10 CFR 55.25.

### 5.2 Findings

The licensee has recently begun performing annual medical examinations to licensed operators. This will assure that medical examinations meet the frequency requirement. A review of the six licensed operator files identified that the operators satisfied the two year requirement. One of the files contained an incomplete PECO form for an operator who had the potential for a change in the medical conditions. The PECO physician had referred the individual to another physician for additional testing. The additional testing had determined that no restriction to the operator license was required, but the PECO form had not been updated in the operator's file. The PECO physician made the appropriate changes to the operator's file. None of the files reviewed indicated that a change to the license was required. One of the files indicated a medical problem that was reported to the NRC. The PECO physician was aware of the need to assess changes to the individual's medical condition and to report this matter to the NRC. The PECO physician was aware that it was his responsibility to do this.

### 5.3 Conclusion

No violations of 10 CFR 55.21 or 25 were identified.

## 6.0 EXIT MEETING SUMMARY

The training program inspection was announced to the licensee in a letter from the Regional office dated March 27, 1991. This letter requested the licensee to provide the materials needed for inspection preparation. Licensee management was informed of the purpose and scope of the inspection at the entrance meeting on May 13, 1991. The NRC team leader discussed inspection findings with station management periodically throughout the inspection. The inspection findings were summarized at the exit meeting on May 17, 1991. Attendees at the entrance and exit meetings are noted in Attachment 1 of this report.

### Attachments:

1. Persons Contacted
2. Procedures Reviewed

## ATTACHMENT 1

PERSONS CONTACTEDPhiladelphia Electric Company - LGS

- # G. Leitch, Vice President
- \* # J. Doering, Plant Manager
- \* # V. Cwietniewicz, Superintendent - Training
- \* # R. Boyce, Superintendent - Maintenance/I&C
- # G. Edwards, Superintendent - Technical
- \* J. Armstrong, Assistant Superintendent - Operations
- \* R. Braun, Supervisor, Technical
- \* # D. Miller, Supervisor, Training Support
- \* # J. Kantner, Supervisor, Technical Training
- \* # R. Nunez, Supervisor, Operations Training
- \* # F. Roak, Supervisor, Maintenance/I&C Training
- \* # R. Lisko, Supervisor, Simulator Support
- \* T. Dougherty, Supervisor, Services Training
- # R. Moraco, Lead Instructor, Operations Training
- P. Doran, Lead Instructor, Operations Training
- J. Bilyeu, Lead Instructor, I&C Training
- M. Baughman, Instructor, Operations Training
- \* # D. Neff, Licensing Engineer
- # D. Shutt, Licensing Engineer
- R. McBride, Physician

The inspectors also held discussions with plant engineers, licensed operators, equipment operators and I&C technicians.

Philadelphia Electric Company - Chesterbrook

- # R. Klemm, Manager, Nuclear Training Division

U. S. Nuclear Regulatory Commission

- # L. Bettenhauser, Chief, Operations Branch, DRS
- # T. Kenny, Senior Resident Inspector
- \* L. Scholl, Resident Inspector

\* Denotes those present for the entrance meeting on May 13, 1991.

# Denotes those present for the exit meeting on May 17, 1991.



## ATTACHMENT 2

PROCEDURES REVIEWEDI&C Training

NI-203	Training Plan
NTS-1-305,	Qualification Manual/On The Job Training (OJT)
NTS-I-401,	Instructor Qualification
ST-2-050-604-1 Rev. 4	NSSSS-RCIC Turbine Exhaust Diaphragm pressure - High, division 1, channel E Functional Test (PIS-50-1N655E)
ST-2-049-607-1 Rev. 4	NSSSS-RCIC Steam supply pressure - Low, division 1, channel E Function Test
Lesson Plans:	
42117	Electronic Equipment Repair
22711L	Electrostatic Voltmeter (Study and Training Guide)
22621L	Xetex Teledose Transmitting Dosimeter System (Study and Training Guide)

Operator Training

LGS NLO Task Matrix  
 SROL Task Matrix  
 Generic Position Guide Senior Instructor  
 Position Guide 41-103 Supervisor operations training  
 Position Guide 11-131 Auxiliary Operator  
 Position Guide 11-128 Assistant Plant Operator  
 Procedure T-213, Individual Rod Scram  
 Procedure S22.8.c, Deluge Valve and Hatchway Valve Reset  
 Procedure A-8, Control of Locked Valves and Devices  
 SLO Hot License Upgrade Qualification Training Manual  
 Reactor Operator Qualification Training Manual  
 Main Control Room Qualification Manual to achieve active RO license, dated October 27, 1988  
 Corrective Action Request (CAR) Q0000371 Instructor Continuing Training Memo D. Miller to G. Bell dated 12/26/90  
 Lesson Plans:  
 APO 0580 Control Rod Drive Hydraulic System  
 APO 0690 Fire Protection System  
 AO 0730 Hierarchy of Documents  
 AO T213 Solenoid De-energization  
 LSRO 0230 Principles of Detector Operation  
 LSRO 1520 Emergency Plan and Procedures  
 LSRO 1550 Off-Normal Procedures  
 LSRO 0003 Refueling Operations and events  
 LSRO 0400 RHR Service Water System  
 LOT 0760 Refueling and Refueling Equipment  
 LOT 1520 Emergency Plan and Procedures  
 LOT 1530 General Plant Procedures

LOT 1540 Operation Transient Procedures  
 LOT 1550 Off-Normal Procedures  
 LOT 1560 TRIP Procedures  
 LOT 1563 Special Event Procedures  
 LOT 1566 Event Procedures  
 LOT 1570 Administrative Procedures  
 LOT 1571 Shift Operations  
 LOT 1572 NGAP, Reportability Reference Manual  
 LOT 1850 Tech. Spec. Administrative Control

#### Technical Staff Training

System Engineer Job/Task Analysis Summary  
 Reactor Engineer Job/Task Analysis Summary  
 Technical Staff Training Program Plan TSM-8900  
 Technical Curriculum Course Plan TSM-00  
 System Engineer Curriculum Course Plan SYSE-0000  
 NTS-I-301, Test Construction  
 NTS-I-306, Cross Reference Matrix  
 NTS-I-503, Program Evaluation  
 NTS-I-504, Program Revision Action (PRA)  
 BWR Final Examination  
 Technical Curriculum Unit Examinations (6)  
 Technical Staff Training Exemption/Waiver  
 Lesson Plans:  
   TSM-9043 Verbal Communications  
   TSM-9044 Self Checking/Self Verification  
   TSM-1240 Technical Specifications Administrative Controls  
   TSM-1190 Accident Analysis, Chapter 15 FSAR  
   TSM-1910 Plant Performance Monitoring and Testing  
   TSM-1260 10CFR50.59 Reviews  
   TSM-1400 'A' Procedures, Maintenance and Testing  
   BWR-0460 BWR Core Spray  
   SYSE-0240 Meters and Test Equipment  
   SYSE-0280 Troubleshooting Techniques