

**NEI 06-13A [Revision 2]**

# **Template for an Industry Training Program Description**

**March 2009**

**NEI 06-13A [Revision 2]**

**Nuclear Energy Institute**

**Template for an Industry  
Training Program  
Description**

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## **ACKNOWLEDGEMENTS**

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## **EXECUTIVE SUMMARY**

NEI 06-13A, *Template for an Industry Training Program Description*, Revision 2, provides a complete generic program description for use with combined license (COL) applications. The document reflects draft guidance provided by the NRC and industry–NRC discussions on training-related issues. A main objective of this program description is to assist in expediting NRC review and issuance of the combined license.

NRC approved this generic template guidance in a Safety Evaluation Report dated September 5, 2007 (see Appendix B).

NRC approved Appendix A, Cold License Training Plan, in a Safety Evaluation Report dated December 5, 2008 (see Appendix C).

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## **TEMPLATE FOR AN INDUSTRY TRAINING PROGRAM DESCRIPTION (TPD)**

### **1 TRAINING PROGRAM DESCRIPTION**

Training programs incorporate instructional requirements to qualify personnel to operate and maintain the facility in a safe manner in all modes of operation. The programs are developed and maintained in compliance with the facility license and applicable regulations. The training programs are periodically evaluated and revised to reflect industry experience and to incorporate changes to the facility, procedures, regulations, and quality assurance requirements, and are periodically reviewed by management for effectiveness. These training programs are described in site and/or corporate procedures, as appropriate. Sufficient records are maintained and kept available for NRC inspection to verify adequacy of the programs.

The Training Department provides the required training based on individual employee experience, the intended position, and previous training and education. Training Department personnel may be supplemented by other personnel such as subject matter experts, contract staff, and vendor representatives. Formal instruction may be presented through a combination of classroom lectures, e-learning, assigned reading, simulator training and evaluations, and other delivery techniques.

For reactor operators, senior reactor operators, fuel handlers, fire protection personnel, and positions specified in 10 CFR 50.120 (Reference 13.2-4), programs are developed, established, implemented and maintained using a systems (or systematic) approach to training (SAT) as defined by 10 CFR 55.4 (Reference 13.2-8) and ANSI/ANS-3.1-1993 (Reference 13.2-14), as endorsed by Regulatory Guide-1.8 (Reference 13.2-16).

Initial and continuing training programs accredited by the National Academy for Nuclear Training (NANT) provide personnel with the skills and knowledge to perform assigned tasks. Accredited training programs include the following:

- Non-licensed operator
- Reactor operator
- Senior reactor operator
- Shift manager
- Shift technical advisor
- Continuing training for licensed personnel
- Instrument and control technician and supervisor
- Electrical maintenance personnel and supervisor
- Mechanical maintenance personnel and supervisor
- Chemistry technician
- Radiological protection technician
- Engineering personnel

The results of reviews of operating experience are incorporated into training and retraining programs in accordance with the provisions of TMI Action Item I.C.5,

Appendix 1A. Training programs encompass all phases of plant operation including preoperational testing and low-power operation in accordance with the provisions of TMI Action Item I.G.1 (Reference 13.2-19). Before initial fuel loading, sufficient plant staff will be trained to provide for safe plant operations. Implementation milestones for initial training are presented in Table 13.4-1.

## **1.1 LICENSED OPERATOR TRAINING**

The Reactor Operator (RO) and Senior Reactor Operator (SRO) training programs, including initial and requalification training, provide the means to train individuals in the knowledge, skills, and abilities needed to perform licensed operator duties. The licensed operator training program includes the requalification program as required by 10 CFR 55.59 (Reference 13.2-13). Collectively, ROs and SROs are referred to as Licensed Operators. Before initial fuel loading, the number of persons trained in preparation for RO and SRO licensing examinations will be sufficient to meet regulatory requirements, with allowances for examination contingencies and without the need for planned overtime.

The site employs a simulator in accordance with 10 CFR 55.46. This simulator is used for training licensed personnel, and for the administration of the operating test.

### **1.1.1 Licensed Operator Initial Training Program**

The Licensed Operator Initial Training Program prepares RO and SRO candidates for the NRC license exam. This program is implemented in accordance with administrative procedures.

#### **1.1.1.1 Reactor Operator**

Reactor Operator candidates receive training in the topics listed in 10 CFR 55.41 (Reference 13.2-9). RO candidates receive plant simulator training to demonstrate understanding and the ability to perform the actions listed in 10 CFR 55.45 (Reference 13.2-11).

#### **1.1.1.2 Senior Reactor Operator**

In addition to the Reactor Operator topics listed in 10 CFR 55.41 (Reference 13.2-9), candidates for the Senior Reactor Operator license receive training in the topics listed in 10 CFR 55.43 (Reference 13.2-10). SRO candidates receive plant simulator training to demonstrate understanding and the ability to perform the actions listed in 10 CFR 55.45 (Reference 13.2-11).

### **1.1.2 Continuing Training for Licensed Personnel**

Continuing training for licensed personnel consists of regularly scheduled formal instruction, evaluation, and on-the-job training. Training material is developed using the SAT process, and includes Operational Experience (OE). Licensed operators participate in continuing training.

Program content, course schedules and examination schedules comply with 10 CFR 55.59 (Reference 13.2-13). Continuing training for licensed personnel is conducted in accordance with administrative procedures.

## **1.2 TRAINING FOR POSITIONS LISTED IN 10 CFR 50.120<sup>1</sup>**

This section addresses training programs for the positions listed in 10 CFR 50.120 (Reference 13.2-4). The systematic approach to training (SAT) process is used to establish and maintain training programs. Course duration and content are determined by the SAT process and by administrative procedure. This program will commence no later than eighteen months prior to initial fuel loading.

### **1.2.1 Non-Licensed Operator (NLO) Initial Training**

Personnel employed as NLOs receive instruction on operation of plant equipment and components under normal and emergency conditions. This program is a combination of formal instruction and on-the-job training. Training is given in:

- Fundamentals of mechanical and electrical components
- Operation of equipment and systems
- Operating procedures
- Surveillance requirements
- Operation of systems important to plant safety

In-plant training includes system walk downs, which emphasize the use of procedures, the proper operation of equipment, and safe operating practices.

### **1.2.2 Shift Manager Initial Training**

Shift managers have been trained as Senior Reactor Operators and receive additional training that addresses higher-level management skills and behaviors, and provides a broader perspective of plant operations. Initial training includes such topics as:

- Application of Operating Experience
- Problem-solving skills
- Planning and managing evolutions
- Maintaining a broad view of plant operations
- Application of observation skills
- Operating philosophy
- Shift team management
- Application of design bases to plant operations
- Emergency Plan
- Transient and Accident Analysis
- Systematic Approach to Training
- Work controls

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<sup>1</sup> 10 CFR 52.78 (Reference 13.2-6) requires that Combined License applicants demonstrate compliance with 10 CFR 50.120.

### **1.2.3 Shift Technical Advisor Initial Training Program**

Shift technical advisors provide engineering expertise on-shift. Training provides them with the skill and knowledge to monitor equipment and system operation, and assess plant conditions during abnormal and emergency events. Initial training for individuals who fill the position of shift technical advisor includes instruction in the following areas:

- Responses to accidents and analyses of plant transients
- Application of engineering principles to protection of the core
- Mitigation of plant accidents
- Basis of plant and systems design
- Reactor theory, thermodynamics, heat transfer, and fluid flow
- General Operating Procedures, Technical Specifications, and Administrative Controls
- Operational transient and accident analysis
- Simulator training, including exercises in the following situations:
  - Plant or reactor startups to include a range such that reactivity feedback from nuclear heat addition is noticeable and heatup rate is established
  - Plant shutdown
  - Manual control of feedwater during startup or shutdown.
  - Significant (10 percent) power changes due to manual changes in control rod position.
- Accident response training

### **1.2.4 Instrumentation and Control (I&C) Technician Initial Training**

Initial training for I&C technicians includes instruction in the following areas:

- Fundamentals of instrumentation and control
- Pneumatic systems and equipment
- Electronics
- Fundamental systems training
- I&C and other job related procedures
- Surveillance requirements
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage
- On-the-job training

On-the-job training allows I&C technicians to practice the skills learned in the classroom under the guidance of experienced and qualified I&C personnel.

### **1.2.5 Electrical Maintenance Initial Training Program**

Initial training for electrical maintenance technicians includes instruction in the following areas:

- Print reading
- Use of electrical tools and test equipment
- Fundamental systems training
- Electrical components and equipment
- Electrical maintenance practices

- Maintenance procedures
- On-the-job training

On-the-job training allows Electricians to practice the skills learned in the classroom under the guidance of experienced and qualified electrical maintenance personnel.

### **1.2.6 Mechanical Maintenance Initial Training Program**

Initial training for mechanical maintenance technicians includes instruction in the following areas:

- Print reading
- Use of hand tools, power tools, and measurement devices
- Fundamental systems training
- Mechanical components and equipment
- Mechanical maintenance practices
- Maintenance procedures
- On-the-job training

On-the-job training allows Mechanics to practice the skills learned in the classroom under the guidance of experienced and qualified mechanical maintenance personnel.

### **1.2.7 Radiological Protection Technician Initial Training**

Initial training for radiological protection technicians includes instruction in the following areas:

- Principles of radiation
- Radiation protection and safety
- Use of survey instruments
- Use of analytical equipment
- Radiation Protection procedures
- Emergency Plan procedures
- ALARA practices and procedures
- Fundamental systems training
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage

On-the-job training provides the trainee opportunities to practice actual operation of radiation protection equipment and use of procedures under the guidance of experienced technicians. Further information on training for radiological protection technicians can be found in Section 12.5.

### **1.2.8 Chemistry Technician Initial Training**

Initial training for chemistry technicians includes instruction in the following areas:

- Chemistry procedures
- Laboratory practices
- Conduct of analytical tests

- Operation of laboratory equipment
- Fundamental systems training
- On-the-job training to include actual operation of analytical equipment and the use of procedures
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage
- Power plant chemistry

On-the-job training provides the trainee opportunities to practice actual operation of analytical equipment and use of procedures under the guidance of experienced technicians.

### **1.2.9 Engineering Personnel Initial Training**

Engineering personnel complete orientation training on topics such as those listed below. The topics are chosen to familiarize engineering support personnel with various aspects of nuclear technology in an operating plant environment. Training topics include:

- Records management and document control
- Applicable industrial and nuclear regulations, codes, and standards
- Procedures and drawings
- Applicable programs such as corrective action, configuration management, work control, and the QA program
- Technical Specifications
- Fundamentals such as reactor theory, heat transfer, fluid flow, properties of materials, and chemistry
- Plant systems, instrumentation, and components
- Plant operations
- Introductory review of accidents
- Design processes

### **1.2.10 Continuing Training for Personnel Listed in 10 CFR 50.120**

Non-licensed plant personnel specified in Subsection 13.2.2 [i.e., personnel listed in 10 CFR 50.120 (Reference 13.2-4)] receive continuing training to maintain qualifications and enhance proficiency. Continuing training reinforces initial training by reiterating selected portions of the material. Continuing training also addresses new and modified procedures and plant design changes.

Operating Experience (OE) is included in continuing training, providing personnel with actual examples of good practices and lessons learned. OE topics are selected from Licensee Event Reports, corrective action databases, industry groups, and other sources.

Continuing training material is developed in accordance with the systematic approach to training and is conducted in accordance with administrative procedures.

STA qualifications are maintained by participation in continuing training for licensed personnel.

## **1.3 GENERAL EMPLOYEE TRAINING (GET) PROGRAM**

### **1.3.1 Plant Access Training**

As part of the GET program, members of the station staff, contractor workers, and unescorted visitors participate in Plant Access Training, which consists of the following topics, prior to being granted unescorted access to the plant:

- Station organization
- Station facilities and layout
- Station administration
- Nuclear plant overview
- Industrial safety
- Fire protection
- Quality assurance and quality control
- Plant security
- Emergency planning
- Radiological orientation
- Appropriate portions of 10 CFR 26 (Reference 13.2-2)
- Appropriate portions of 10 CFR 19 (Reference 13.2-1)

### **1.3.2 Radiation Worker Training Program**

Personnel whose job duties require them to have unescorted access to radiologically controlled areas of the plant receive instruction in the applicable aspects of radiation protection. Topics include the following:

- Sources of radiation
- Types and measurement of radiation
- Biological effects
- Limits and guidelines, including Reg. Guide 8.13 (Reference 13.2-18)
- Concept of As Low As Reasonably Achievable (ALARA)
- Radiation dosimetry
- Contamination
- Internal exposure
- Radiation work permits
- Radiological postings
- Radiological alarms
- Radioactive waste
- Rights and responsibilities
- Protective clothing

### **1.3.3 General Employee Requalification Training**

Personnel with unescorted access to the plant participate in annual requalification training. Requalification training includes those topics in 13.2.3.1 and 13.2.3.2, as applicable to access requirements. Emphasis is placed on significant changes to the plant,

plant procedures, government regulations regarding the operation of the plant, and quality assurance requirements. As applicable, training is conducted on industry operating experiences, Licensee Event Reports, and personnel errors.

## **1.4 SELECTED OTHER TRAINING PROGRAMS**

This subsection addresses training for positions not specified by 10 CFR 55 (Reference 13.2-7) or 10 CFR 50.120 (Reference 13.2-4).

### **1.4.1 Fire Protection Training**

Initial fire protection training is completed prior to receipt of fuel at the site. Personnel assigned as fire brigade members receive formal training prior to assuming brigade duties, and regularly scheduled retraining. Fire brigade training complies with NFPA Standard 600 (Reference 13.2-15).

Training appropriate to the assigned work is also provided for the fire protection staff, fire watch personnel, and the general employee. FSAR Section 9.5.1 includes additional information regarding fire protection training.

### **1.4.2 Emergency Plan Training Program**

Emergency Plan training meets the requirements of 10 CFR 50 Appendix E Section IV.F (Reference 13.2-5) and the standards of 10 CFR 50.47(b)(15) (Reference 13.2-3). Further details of the Emergency Plan training program can be found in the Emergency Plan, which is a separate document.

### **1.4.3 Physical Security Training Program**

Training of security personnel is discussed in FSAR section 13.6 and in the Physical Security Plan, which is a separate document.

### **1.4.4 Station Management Training Program**

Station supervisors receive Fitness for Duty (FFD) supervisory training in accordance with 10 CFR 26.22. The remaining definitions and recommendations in this subsection are taken from ANSI/ANS-3.1-1993 (Reference 13.2-14) as endorsed by Regulatory Guide 1.8 (Reference 13.2-16).

The qualification requirements for managers and middle managers include training or experience in supervision or management. Training for supervisors develops their skills in the following areas:

- Leadership
- Interpersonal communications
- Management responsibilities and limits
- Motivation of personnel
- Problem analysis and decision making
- Administrative policies and procedures
- Observation skills



■ Coaching

## **1.5 TRAINING EFFECTIVENESS EVALUATION PROGRAM**

The program to evaluate the effectiveness of training programs is based on three independent inputs or perspectives: the supervisor of the trainee, the trainee, and an educational content evaluation. Each of these reviews is discussed below.

### **1.5.1 Supervisory Review for Training Effectiveness**

The purpose of this review is to monitor the content and effectiveness of training programs as related to the duties and job responsibilities of the trainees. Reviews may be performed by supervisors of employees meeting with appropriate Training personnel, by designated oversight personnel, or by observing subsequent job performance. Observations are discussed to determine topics that may require additional training or subjects that may be removed from the training program.

### **1.5.2 Trainee Review of Training Effectiveness**

Following selected courses, or training cycles, trainees have the opportunity to provide comments regarding the effectiveness of the instructional methods and content relevancy to their jobs. These comments are used in the evaluation of both instruction and content of the training program.

### **1.5.3 Review for Effectiveness of Instructional Techniques and Materials**

Training material and instructional aids are assessed for clarity and applicability. Observations of instructors in the teaching environment are conducted by this qualified individual to monitor classroom performance. Full time instructors receive basic indoctrination in instructional techniques as soon as practicable after assuming instructional duties. The educational specialist conducts periodic seminars in instructional techniques, discussing areas where group performance could be improved and recommends innovative techniques observed at this or other power stations.

## 1.6 REFERENCES

- 13.2-1 10 CFR 19, “Notices, Instructions, and Reports to Workers; Inspection and Investigations”
- 13.2-2 10 CFR 26, “Fitness for Duty”
- 13.2-3 10 CFR 50.47, “Emergency Plans”
- 13.2-4 10 CFR 50.120, “Training and Qualification of Nuclear Power Plant Personnel”
- 13.2-5 10 CFR 50 Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities”
- 13.2-6 10 CFR 52.78, “Contents of Applications; Training and Qualification of Nuclear Power Plant Personnel”
- 13.2-7 10 CFR 55, “Operator's Licenses”
- 13.2-8 10 CFR 55.4, “Definitions”
- 13.2-9 10 CFR 55.41, “Written Examinations: Operators”
- 13.2-10 10 CFR 55.43, “Written Examinations, Senior Operators”
- 13.2-11 10 CFR 55.45, “Operating Tests”
- 13.2-12 10 CFR 55.46(c), “Plant-Referenced Simulators”
- 13.2-13 10 CFR 55.59, “Requalification”
- 13.2-14 American National Standards Institute, “Selection, Qualification, and Training of Personnel for Nuclear Power Plants,” ANSI/ANS-3.1-1993
- 13.2-15 National Fire Protection Association, “Standard on Industrial Fire Brigade,” NFPA Standard 600, 2005 Edition
- 13.2-16 U.S. Nuclear Regulatory Commission, “Qualification and Training of Personnel for Nuclear Power Plants,” Regulatory Guide 1.8, Revision 3, May 2000
- 13.2-17 U.S. Nuclear Regulatory Commission, “Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations,” Regulatory Guide 1.149, Revision 3, October 2001
- 13.2-18 U.S. Nuclear Regulatory Commission, “Instruction Concerning Prenatal Radiation Exposure,” Regulatory Guide 8.13, November, 1980.
- 13.2-19 U.S. Nuclear Regulatory Commission, “Clarification of TMI Action Plan Requirements”, NUREG-0737, Revision 3, June 1999
- 13.2-20 U.S. Nuclear Regulatory Commission, “Policy Statement on Engineering Expertise on Shift”, GL 86-04

## **APPENDIX A – COLD LICENSE TRAINING PLAN**

### 1. LICENSED OPERATOR TRAINING PROGRAM PRIOR TO COMPLETION OF THE FIRST REFUELING OUTAGE

Prior to operation, plant experience requirements specified in Regulatory Guide 1.8 (Revision 3) and ANSI/ANS 3.1-1993 cannot be met. Additionally, other standard guidance for operator selection, training, and qualification cannot be met.

Cold licensing of operators provides the method for operations personnel to acquire the knowledge and experience required for licensed operator duties during the unique conditions of new plant construction and initial operation.

Persons eligible for the cold license process shall meet the following requirements:

- Candidates for a Reactor Operator license shall have a High School Diploma or equivalent as required by R.G. 1.8 Revision 3.
- Candidates for a Senior Reactor Operator license shall have at least one of the following qualifications:
  - Previously held a Senior Reactor Operator license for an operating nuclear power plant
  - Previously held a Reactor Operator license for an operating nuclear power plant.
  - Bachelor's Degree in engineering or science as defined by R.G. 1.8 Revision 3.
  - Experience as a licensed operator training instructor with an SRO certification. This experience will be evaluated and approved on a case by case basis by the NRC.
  - Two years military experience in a position equivalent to a reactor operator.

The provisions in this section are applicable to each unit of a multiple unit site separately.

The cold licensing process for the selection, training and licensing of Operations personnel for the new nuclear plants adheres to current industry guidance for operating plants with exemptions and alternatives in the following areas.

## 1.1 Licensed Operator Experience Requirements Prior To Commercial Operation

Licensed operator candidates need not satisfy the experience requirements prior to entering a licensed operator training program. Experience and plant evolution requirements that have not been met at the time the licensed operator examination is administered shall be met prior to issuing the individual's NRC operator license. In such a case, the Licensee will notify the NRC when the candidate meets the experience and plant evolution requirements.

The methods listed below provide the licensed operator candidate with meaningful experience on the reactor for which the license is sought. Methods for gaining meaningful experience include completing systematically designed training courses, and participating in practical work assignments such as preoperational testing, procedure development and validation, human factors engineering activities, task analysis verification, or conducting licensed operator classroom or simulator training. Additionally, for these activities to be considered meaningful, they must be associated with safety significant, defense-in-depth, or other major plant components or systems. All cold licensed operator candidates will:

- Complete a systematically designed site layout course.
- Complete a site-specific non-licensed operator on-the-job training program on selected non-licensed operator tasks. The selected non-licensed operator tasks are those tasks that are important to plant operation with regard to nuclear safety, defense-in-depth, or that are risk significant.
- Participate in practical work assignments for a minimum of six months that includes preoperational testing, and one or more of the following:
  - Procedure development and validation
  - Human factors engineering activities
  - Task analysis verification
  - Licensed operator classroom presentations or simulator training implementation

Senior reactor operator cold license candidates will complete a site-specific reactor operator and senior reactor operator training course.

Senior reactor operator cold license candidates without "hot" plant experience will complete a plant operational excellence course that is conducted in a plant simulator or they will observe control room activities at an operating nuclear plant for at least six weeks. The course and the observation activity are designed to familiarize the candidate with the operational interfaces encountered by decision makers in a nuclear plant control room.

Hot plant experience is defined as performance of senior reactor operator duties for at least six months including:

- At least 6 weeks of operation above 20 percent power
- A startup from subcritical to 20 percent power
- A shutdown from above 20 percent power to cold (less than 212°F) and subcritical
- Startup preparations following a fueling or refueling outage

The startup, shutdown, and startup preparations may have been performed at an operating plant or a plant simulator.

Table 1, Comparison of Hot and Cold License Guidance, shows the current experience requirement and the associated cold license experience method. Table 2, Illustration of Cold Licensing Plan by Candidate Type, shows education and experience methods for each licensed operator candidate type.

## 1.2 Crew Experience Requirements during First Year of Operation

Each operating crew's cumulative nuclear power plant experience shall be > 6 years; and the crew's cumulative power plant experience shall be > 13 years.

The crew's cumulative nuclear power plant experience is gained by working at nuclear power plants and military nuclear propulsion plants, conducting licensed operator training, participating in new nuclear plant construction and testing, and completing academic degree requirements. The cumulative crew nuclear power plant experience is the sum of each individual's experience after applying weighting factors and maximum credit limits in Table 3, Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies.

When determining cumulative nuclear power plant experience, all 6 years shall not be attributed from one crew member.

The crew's cumulative power plant experience is the sum of each individual's power plant experience. Power plant experience, for example, is experience gained by working at nuclear power plants, conventional power plants, and military propulsion plants. Cumulative power plant experience does not involve weighting factors or maximum credit limits.

In addition to the experience requirement mentioned above, each operating crew shall be staffed with a senior reactor operator with hot plant experience (previously defined in 1.1, Licensed Operator Experience Requirements Prior to Commercial Operation). If a senior reactor operator with hot plant experience is not available, then a shift advisor may be substituted. The shift advisor will have at least one year of on-shift licensed senior reactor operator experience at a similar type (PWR/BWR) operating plant, and will have completed a training program on the design for which they are advising. While observing crew performance, the shift advisor will make recommendations to the shift manager only, and will not interfere with the licensed responsibilities of the operating crew. The shift advisor will have direct access to plant senior management to resolve issues. Shift advisor duties include, but are not limited to the following:

- Monitor procedure adherence
- Observe the conduct of prejob briefs, shift turnover, plant evolutions, non-licensed operator rounds, plant tours, and post job debriefs
- Monitor overall station risk

Weighting factors and maximum credit limits for determining cumulative nuclear power plant operating crew experience are shown in Table 3, Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies.

### 1.3 Conduct of On-the-Job Training (OJT)

Until plant construction is completed, acceptable methods for the conduct of on-the-job training include discussion, simulation, and use of mockup equipment and virtual reality technology

### 1.4 Use of Part-Task/Limited Scope Simulators

Part-task or limited scope simulators may be used during licensed operator training.

### 1.5 Licensed Operator Continuing Training

Licensed operator continuing training begins within 90 days following the issuance of the first operator license. Continuing training content is systematically determined to maintain operator knowledge of plant operation.

## 1.6 Cold Licensing process Applicability and Termination

The cold licensing process described in this document may be applied to each unit of a multi-unit site.

Cold license guidance items 1 through 9 on Table 1 will apply to any licensed operator training class started prior to initial fuel load.

Cold license guidance items 3 through 9 on Table 1 will apply to any licensed operator training class started after initial fuel load and before completion of the first refueling outage. Items 1 and 2 cold license guidance are no longer allowable after initial fuel load.

The cold licensing process will terminate after completion of the first refueling outage.

As plant systems, components, and structures are completed, and as integrated plant operations begin, the systematic approach to training process will be used to adjust cold license class training methods and settings used to implement the guidance in Table 1 items 1 through 9. The purpose is to optimize student learning using actual in-plant training and experience opportunities as they become available.

## 1.7 Initial Licensed Operator Examination Schedule

Administration of licensed operator examinations begins approximately 18 months prior to fuel load.

## 2 REFERENCES

- 2.1 Nuclear Energy Institute (NEI), "Technical Report on a Template for an Industry Training Program Description," NEI 06-13A





Table 1  
 Comparison of Hot and Cold License Guidance

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p><b>1.</b> Six months on-site at reactor for which license is sought.</p>	<p>All</p>	<p>ANSI 3.1-1993;                      4.4.1                      4.4.2                      4.5.1.                      Regulatory Guide 1.8 Rev 3:                      2.8                      2.10.                      NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments                      and                      Complete a site layout course</p>
<p><b>2.</b> One year on-site at the reactor for which the license is sought with six months as a nonlicensed operator.</p>	<p>Reactor operator</p>	<p>ANSI 3.1-1993:                      4.5.1.                      Regulatory Guide 1.8 Rev 3:                      2.10.                      NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments                      and                      Complete a site layout course                      and                      Complete a site-specific non-licensed operator training program for selected nonlicensed operator tasks</p>

Table 1  
 Comparison of Hot and Cold License Guidance

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p><b>3.</b> Pre-requisite experience requirements must be met to enter training program.</p>	<p>All</p>	<p>NUREG 1021 Rev 9 ES-202 Section D.</p>	<p>Applicable experience requirements shall be met prior to NRC license issuance.</p>
<p><b>4.</b> Three years power plant experience at least one of which should have been at the plant for which the license is sought.</p>	<p>Reactor operator</p>	<p>ANSI 3.1-1993:                      4.5.1                      Regulatory Guide 1.8 Rev 3:                      2.10                      NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments                      and                      Cumulative operating crew experience requirements apply</p>
<p><b>5.</b> Reactor operator license actively involved in the performance of licensed duties for at least one year.</p>	<p>Senior reactor operator                      (Non-degreed)</p>	<p>Regulatory Guide 1.8 Rev 3:                      2.8                      NUREG 1021 Rev 9 ES-202</p>	<p>Complete a site layout course                      and                      Complete a site-specific non-licensed operator training program for selected nonlicensed operator tasks                      and                      Complete a reactor operator and senior reactor operator training course</p>

Table 1  
Comparison of Hot and Cold License Guidance

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p><b>6.</b> At least three years of responsible nuclear power plant experience.</p>	<p>Senior reactor operator (Degreed)</p>	<p>Regulatory Guide 1.8 Rev 3: 1.3 2.8</p>	<p>Complete a site layout course and Complete a site-specific non-licensed operator training program for selected nonlicensed operator tasks and Complete a reactor operator and senior reactor operator training course</p>
<p><b>7.</b> At least six weeks of operation above 20% power, and startup from subcritical to 20% power, and shutdown from above 20% power to cold (less than 212 °F) and subcritical, and startup preparations following a fueling or refueling outage.</p>	<p>Shift Supervisor (Shift Manager)</p>	<p>ANSI 3.1-1993: 4.4.1</p>	<p>Cumulative Operating Crew Experience requirements apply and Complete a Plant Operational Excellence Course or plant observation activity</p>

Table 1  
 Comparison of Hot and Cold License Guidance

Current Hot License Guidance	Applicable Position	References	Cold License Guidance
<p><b>8.</b> At least six weeks of operation above 20% power.</p>	<p>Senior reactor operator</p>	<p>ANSI 3.1-1993:                      4.4.2</p>	<p>Cumulative Operating Crew Experience requirements apply                      and                      Complete a Plant Operational Excellence Course or plant observation activity</p>
<p><b>9.</b> Three years power plant experience and three years nuclear power plant experience</p>	<p>Senior reactor operator</p>	<p>ANSI 3.1-1993                      4.4.1                      4.4.2                      Regulatory Guide 1.8 Rev 3:                      2.8                      NUREG 1021 Rev 9 ES-202</p>	<p>Six months practical work assignments                      and                      Cumulative Operating Crew Experience requirements apply</p>

Table 2  
Illustration of Cold Licensing Plan by Candidate Type

License Candidate	Education	Site Layout Course	NLO Task Training	RO Training	SRO Training	Plant Operational Excellence Course or Observation Activity	Six Months Practical Work Assignments (1)
Reactor operator	High school diploma	Yes	Yes	Yes	N/A	N/A	Yes
Senior reactor operator – degreed manager or degreed nonlicensed operator or technical staff	Bachelor of Science or equivalent in engineering, engineering technology, or physical science	Yes	Yes	Yes	Yes	Yes	Yes
Senior reactor operator – previous license or military equivalent	High school diploma	Yes	Yes	Yes	Yes	Yes (2)	Yes
Senior reactor operator – certified instructor	High school diploma	Yes	Yes	Yes	Yes	Yes	Yes

(1): practical work assignments includes activities such as participating in preoperational testing, procedure development and validation, human factors engineering activities, and task analysis verification, or conducting licensed operator classroom or simulator training

(2): No, if candidate has hot license experience

Table 3  
 Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)

Type of Experience	Weighting Factor	Max Credit	Justification
1. Commercial Nuclear Plant RO/SRO on same type plant (PWR/BWR)	1.00	No Limit	Task Analysis for same type plant are essentially the same
2. Commercial Nuclear Plant RO/SRO from different type plant (PWR/BWR)	0.75	No Limit	Task Analysis demonstrates that 75% of PWR/BWR tasks are similar
3. Military Nuclear Propulsion Plant Experience (Propulsion Plant Watch Officer, Engineering Watch Supervisor, Reactor Operator, Engineering Officer of the Watch, Propulsion Plant Watch Supervisor)	0.5	36 months	For these military nuclear propulsion plant watch qualifications, approximately 50% of the job tasks are similar
4. Military Nuclear Propulsion Plant Experience (Other than watch qualifications in 3 above such as Machinist Mate, Electricians Mate, Engineering Laboratory Technician, or Electronics Technician)	0.25	36 months	For these (other) watch qualifications, a range of similarities between job tasks (25-75%) exists, so a conservative value of 25% is credited

Table 3  
 Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)

Type of Experience	Weighting Factor	Max Credit	Justification
5. Reference Plant Simulator	5.00	12 months	Industry analysis demonstrated that activities completed in a simulator, compare to an operating Control Room, occur in a ratio of approx. 400/1
6. Limited Scope Simulator	3.00	9 months	Similar to Reference Plant
7. Actual nuclear plant experience during construction	0.25	12 months	Approximately 25% of the tasks during construction testing in preparation for system turnover to operations is similar to an operating facility
8. Actual nuclear plant experience during pre-operational testing	0.75	12 months	75% of tasks during pre-operational testing are similar to an operating facility
9. Actual nuclear plant experience during fuel load and startup testing	1.00	12 months	Tasks during initial startup are similar to operating facility

Table 3  
 Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)

Type of Experience	Weighting Factor	Max Credit	Justification
10. License Classroom training	0.25	9 months	Theory of ops and specific plant design knowledge is critical to an operator's success
11. Participation in operator duties at another commercial nuclear facility. This includes nonlicensed operator duties	0.75	12 months	Task similarities
12. Other Nuclear Plant experience	0.25	12 months	Procedure writing, facility operation (water plant and other support facilities, etc)
13. Licensed operator instructor	0.50	12 months	Instructors will have participated in a train-the-trainer program that includes simulator, classroom (systems, theory).
14. Bachelors Degree in an Engineering, Science or Technical field	n/a	24 months	College work (in these fields) gives student an understanding of the fundamentals of plant operations



Table 3  
 Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies (1)

Type of Experience	Weighting Factor	Max Credit	Justification
15. Associates Degree (technical)	n/a	6 months	Student gains knowledge of fundamentals
(1): Weighting factors and max credit values based on those in "Industry Evaluation of Operating Shift Experience Requirements" By: J.H. Miller Jr. 2/24/1984, and endorsed by Generic Letter number 84-16, Adequacy of On-Shift Operating Experience For Near Term Operating License Applicants, except for shaded rows which are added experience types based on new technology or additional analysis.			



**APPENDIX B –**  
**FINAL SAFETY EVALUATION REPORT**  
**NEI 06-13, REVISION 0**





**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001**

September 5, 2007

Adrian P. Heymer, Senior Director  
New Plant Deployment Nuclear  
Generation Division Nuclear Energy  
Institute 1776 I Street, NW, Suite 400  
Washington, DC 20006-3708

**SUBJECT: FINAL SAFETY EVALUATION FOR TOPICAL REPORT NEI 06-13,  
"TEMPLATE FOR AN INDUSTRY TRAINING PROGRAM"  
(PROJECT NO. 689; TAC NO. MD3406)**

Dear Mr. Heymer:

By letter dated October 30, 2006, the Nuclear Energy Institute (NEI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review its proposed Template for an Industry Training Program, Revision 0.

Enclosed is the staffs safety evaluation (SE) which defines the basis for acceptance of NEI 06-13. On the basis of its review, the NRC staff finds that for combined license applications, NEI 06-13 provides an acceptable template for describing reactor operator and nonlicensed plant staff training programs.

Our acceptance applies only to material provided in NEI 06-13. We do not intend to repeat our review of the acceptable material described in the NEI 06-13. When the NEI 06-13 appears as a reference in regulatory applications, our review will ensure that the material presented applies to the specific application involved. Licensing requests that deviate from NEI 06-13 will be subject to a plant- or site-specific review in accordance with applicable review standards.

In accordance with the guidance provided on the NRC website, we request that NEI publish the accepted version of NEI 06-13 within three months of receipt of this letter. The accepted version should incorporate this letter and the enclosed SE after the title page. Typically, the accepted version would also contain historical review information, including NRC requests for additional information (RAIs) and your responses; however, that is not necessary for NEI 06-13 because RAIs were not issued. The accepted versions shall include a "-A" (designating accepted) following the report identification symbol.

If future changes to the NRC's regulatory requirements affect the acceptability of NEI 06-13, NEI will be expected to revise NEI 06-13 appropriately, or justify its continued applicability for subsequent referencing.

NEI 06-13A (Revision 2)  
March 2009

A. Heymer

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If you have any questions, please contact Michael Canova at (301) 415-0737, or [mac6@nrc.gov](mailto:mac6@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'Stephanie M. Coffin', with a long horizontal flourish extending to the right.

Stephanie M. Coffin, Chief  
AP1000 Projects Branch  
Division of New Reactor Licensing  
Office of New Reactors

Project No. 689

Enclosure  
Safety Evaluation

cc w/encl: See next page

SAFETY EVALUATION REGARDING THE  
NUCLEAR ENERGY INSTITUTE  
TOPICAL REPORT 06-13  
"TEMPLATE FOR AN INDUSTRY TRAINING PROGRAM"  
REVISION 0

1.0 BACKGROUND

By letter dated October 30, 2006, the Nuclear Energy Institute (NEI) submitted Template for an Industry Training Program," Revision 0 (NEI 06-13) for Nuclear Regulatory Commission (NRC) review and approval. The topical report provides a complete generic training program description for use with combined license applications. NEI 06-13 was developed by the NEI New Plant Training Task Force, which includes representatives from the four design-centered working groups, to assist in expediting NRC review of the combined license and issuance of the combined license. NEI 06-13 is not applicable to the review and issuance of construction permits or operating licenses.

2.0 REGULATORY EVALUATION

The NRC staff verified that NEI 06-13, Revision 0 complies with the following regulations, regulatory guidance, NUREGs, and industry standards:

- 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspections and Investigations"
- 10 CFR Part 26, "Fitness For Duty Programs"
- 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"
- 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities"
- 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants"
- 10 CFR Part 55, "Operators' Licenses"
- Regulatory Guide 1.8, Rev. 3, "Qualification and Training of Personnel for Nuclear Power Plants"
- Regulatory Guide 1.149, Rev. 3, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations"
- NUREG-0711, Rev. 2, "Human Factors Engineering Program Review Model"
- NUREG-0800, Rev. 2, Standard Review Plan, Section 13.2.1, "Reactor Operator Training"
- NUREG-0800, Rev. 2, Standard Review Plan, Section 13.2.2, "Training for Nonlicensed Plant Staff"
- NUREG-0800, Standard Review Plan, Section 18.0, "Human Factors Engineering"
- ANSI/ANS 3.1-1993, "Selection, Qualification, and Training of Personnel in Nuclear Power Plants"

ENCLOSURE

- NUREG-1021, Rev. 9, "Operator Licensing Examination Standards for Power Reactors"
- NUREG-1220, Rev. 1, "Training Review Criteria and Procedures"
- Generic Letter 86-04, "Policy Statement on Engineering Expertise on Shift,"  
February 1986

### 3.0 TECHNICAL EVALUATION

The staffs review concentrated on the proposed training program description format, attributes and level of detail. In evaluating the adequacy of the format, attributes and level of detail, the staff followed the guidance of the Standard Review Plan (NUREG-0800), Section 13.2.1 (SRP 13.2.1), "Reactor Operator Training" and Section 13.2.2 (SRP 13.2.2), "Training for Nonlicensed Plant Staff." SRP 13.2.1 outlines the training and requalification program guidance for licensed reactor operators and senior reactor operators. SRP 13.2.2 outlines the training and retraining program guidance for nonlicensed plant staff. SRP 13.2.1 and 13.2.2 apply to construction permit, operating license, and combined license applicants.

NEI 06-13 is organized into five areas, licensed operator training, training for positions listed in 10 CFR 50.120, general employee training, selected other training programs, and the training effectiveness evaluation program. Other training programs selected for description include fire protection, emergency plan, physical security, and station management training programs.

#### 3.1 Licensed Operator Training

The "Licensed Operator Training" section of NEI 06-13 states that the Reactor Operator (RO) and Senior Reactor Operator (SRO) training programs will provide individuals with the knowledge, skills, and abilities needed to perform licensed operator duties. The reactor operator training program description includes a description of the 10 CFR 55.59 required licensed operator requalification program. The RO and SRO training and requalification programs will be developed, established, implemented and maintained using a systems approach to training (SAT) as defined by 10 CFR 55.4 and as endorsed by Regulatory Guide 1.8 "Qualification and Training of Personnel for Nuclear Power Plants," ANSI/ANS-3.1-1993 "Selection, Qualification, and Training of Personnel in Nuclear Power Plants." In accordance with 10 CFR 55.46, a simulator will be used for training licensed personnel and for the administration of operating tests.

NEI 06-13 further states that prior to initial fuel load, the number of licensed ROs and SROs will be sufficient to meet regulatory requirements, with allowances for licensing examination contingencies, and without the need for planned overtime.

A summary of the RO and SRO training programs follows:

1. The Licensed Operator Initial Training Program will prepare RO and SRO candidates for the NRC license exam. The program will be implemented in accordance with licensee developed administrative procedures.
2. Reactor Operator candidates will receive training in the topics listed in 10 CFR 55.41. RO candidates will receive plant simulator training to demonstrate understanding and the ability to perform the actions listed in 10 CFR 55.45.



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3. In addition to the RO topics listed in 10 CFR 55.41, SRO candidates will receive training in the topics listed in 10 CFR 55.43. SRO candidates will receive plant simulator training to demonstrate understanding and the ability to perform the actions listed in 10 CFR 55.45.
4. Licensed Operator Requalification training will consist of regularly scheduled formal instruction, evaluation, and on-the-job training. Training material will be developed using the SAT process in accordance with licensee developed administrative procedures. All licensed operators will participate in continuing training.
5. Licensed Operator Requalification Program content, course schedules and examination schedules will comply with 10 CFR 55.59 and will include industry operating experience training. Licensed Operator Requalification training for licensed personnel will be conducted in accordance with licensee developed administrative procedures.

Based on the staff's review of the "Licensed Operator Training" section of NEI 06-13 outlined above, the staff concludes that NEI 06-13 clearly and sufficiently describes, in terms of scope and level of detail, the RO and SRO training programs to enable a reasonable assurance finding of acceptability for issuance of a combined license with verification of the RO and SRO training programs during the construction stage.

### 3.2 Training for Positions Listed in 10 CFR 50.120

The "Training for Positions Listed in 10 CFR 50.120" section of NEI 06-13 states that the training programs for the positions listed in 10 CFR 50.120 will be designed, developed, implemented, and maintained using the SAT process. 10 CFR 50.120 requires training and qualification of the following categories of nuclear power plant personnel:

- Non-licensed Operator
- Shift Supervisor
- Shift Technical Advisor
- Instrument and Control Technician
- Electrical Maintenance Personnel
- Mechanical Maintenance Personnel
- Radiological Protection Technician
- Chemistry Technician
- Engineering Support Personnel

Course content and duration for each 10 CFR 50.120 training program will be determined using SAT methodology and will follow licensee developed administrative procedures. The 10 CFR 50.120 training programs will be implemented and maintained no later than eighteen months prior to fuel load.

### 3.2.1 Non-licensed Operator (NLO)

NLOs will receive instruction on operation of plant equipment and components under normal and emergency conditions. The non-licensed operator training program will be a combination of formal instruction and on-the-job training. In-plant training will include system walk downs, which will emphasize the use of procedures, the proper operation of equipment, and safe operating practices. Areas of training will include:

- Fundamentals of mechanical and electrical components
- Operation of equipment and systems
- Operating procedures
- Surveillance requirements
- Operation of systems important to plant safety

### 3.2.2 Shift Supervisor

Prior to entering the training program, the shift supervisor will have been licensed as an SRO. The Shift Supervisors will receive additional training that addresses higher-level management skills and behaviors, and provides a broader perspective of plant operations. The Shift Supervisor training program will be a combination of formal instruction and on-the-job training. Initial shift supervisor training will include topics such as:

- Application of Operating Experience
- Problem-solving skills
- Planning and managing evolutions
- Maintaining a broad view of plant operations
- Application of observation skills
- Operating philosophy
- Shift team management
- Application of design bases to plant operations
- Emergency Plan
- Transient and Accident Analysis
- Systems Approach to Training
- Work controls

### 3.2.3 Shift Technical Advisor (STA)

STAs provide engineering expertise to the on-shift crew. Training provides the STA with the skills and knowledge to monitor equipment and system operation to assess plant conditions during abnormal, off-normal, and emergency events. The STA training program will be a combination of formal instruction and on-the-job training. STA initial training will include instruction in the following areas:

- Responses to accidents and analyses of plant transients
- Application of engineering principles to protection of the core
- Mitigation of plant accidents

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- Basis of plant and systems design
- Reactor theory, thermodynamics, heat transfer, and fluid flow
- General Operating Procedures, Abnormal and Emergency Operating Procedures, Technical Specifications, and Administrative Controls
- Operational transient and accident analysis
- Accident response training
- Simulator training, including exercises in at least the following situations:
  - Plant or reactor startups to include a range such that reactivity feedback from nuclear heat addition is noticeable and heatup rate is established
  - Plant shutdown from greater than 50 percent power
  - Manual control of feedwater during startup or shutdown
  - Significant (10 percent or greater) power changes, in the power range, using controls as defined in 10 CFR 55.4

#### 3.2.4 Instrument and Control (I&C) Technician

Initial training for I&C technicians will be a combination of formal instruction and on-the-job training. Training for I&C technicians will include instruction in the following areas:

- Fundamentals of instrumentation and control
- Pneumatic systems and equipment
- Electronics
- Fundamental systems training
- Instrument and Control and other job-related procedures
- Surveillance requirements
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage

On-the-job training will permit I&C technicians to practice the skills and knowledge learned in the classroom.

#### 3.2.5 Electrical Maintenance Personnel (electricians)

Initial training for electricians will be a combination of formal instruction and on-the-job training. Training for electricians will include instruction in the following areas:

- Print reading
- Use of electrical tools and test equipment
- Fundamental systems training
- Electrical components and equipment

- Electrical maintenance practices
- Maintenance procedures

On-the-job training will permit electricians to practice the skills and knowledge learned in the classroom.

### 3.2.6 Mechanical Maintenance Personnel (mechanics)

Initial training for mechanics will be a combination of formal instruction and on-the-job training. Training for mechanics will include instruction in the following areas:

- Print reading
- Use of hand tools, power tools, and measuring devices
- Fundamental systems training
- Mechanical components and equipment
- Mechanical maintenance practices
- Maintenance procedures

On-the-job training will permit mechanics to practice the skills and knowledge learned in the classroom.

### 3.2.7 Radiological Protection (RP) Technician

Initial training for RP technicians will be a combination of formal instruction and on-the-job training. Training for RP technicians will include instruction in the following areas:

- Principles of radiation
- Radiation protection and safety
- Use of survey instruments
- Use of analytical equipment
- Radiation Protection procedures
- Emergency Plan procedures
- ALARA practices and procedures
- Fundamental systems training
- Mitigating core damage training

On-the-job training will permit RP technicians opportunities to operate radiation protection equipment and practice the skills and knowledge learned in the classroom.

### 3.2.8 Chemistry Technician

Initial training for chemistry technicians will be a combination of formal instruction and on-the-job training. Training for chemistry technicians will include instruction in the following areas:

- Chemistry procedures
- Laboratory practices

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- Conduct of analytical tests
- Operation of laboratory equipment
- Fundamental systems training
- On-the-job training to include actual operation of analytical equipment and the use of procedures
- Mitigating core damage training commensurate with their responsibilities during accidents that involve severe core damage
- Power plant chemistry

On-the-job training will permit chemistry technicians opportunities to operate analytical equipment and practice the skills and knowledge learned in the classroom.

### 3.2.9 Engineering Support Personnel

Engineering support personnel complete orientation training on the various aspects of nuclear technology in an operating plant environment. Initial training for engineering support personnel will be a combination of formal instruction and on-the-job training. Training for engineering support personnel will include instruction in the following areas:

- Records management and document control
- Applicable industrial and nuclear regulations, codes, and standards
- Procedures and drawings
- Applicable programs such as corrective action, configuration management, work control, and the Quality Assurance program
- Technical Specifications
- Fundamentals such as reactor theory, heat transfer, fluid flow, properties of materials, and chemistry
- Plant systems, instrumentation, and components
- Plant operations
- Introductory review of accidents
- Design processes

On-the-job training will permit engineering support personnel opportunities to practice the skills and knowledge learned in the classroom.

### 3.2.10 Continuing Training for Personnel Listed in 10 CFR 50.120

Personnel in positions listed in 10 CFR 50.120 will receive continuing training to maintain qualifications and enhance proficiency. Continuing training reinforces initial training by reiterating selected portions of the material. Continuing training also addresses new and modified procedures and plant design changes.

Operating Experience (OE) is included in continuing training for all programs. OE training provides personnel with actual examples of good practices and lessons learned. OE topics will be selected from Licensee Event Reports, corrective action databases, industry groups, and other sources.

Continuing training programs will be developed in accordance with SAT principles and will be conducted in accordance with licensee developed administrative procedures.

Shift Technical Advisors (STAs) will maintain their qualifications by participating in licensed operator requalification training.

Based on the staffs review of the "Training for Positions Listed in 10 CFR 50.120" section of NEI 06-13 outlined above, the staff concludes that NEI 06-13 clearly and sufficiently describes, in terms of scope and level of detail, the training programs for positions listed in 10 CFR 50.120 to enable a reasonable assurance finding of acceptability for issuance of a combined license with verification of the programs during the construction stage.

### 3.3 General Employee Training

The "General Employee Training" (GET) section of NEI 06-13 states that GET consists of three components, Plant Access Training, Radiation Worker Training, and General Employee Requalification Training.

#### 3.3.1 Plant Access Training

Prior to being granted unescorted access to the plant, members of the station staff, contractor workers, and unescorted visitors will complete Plant Access Training. Plant Access Training will include the following topics:

- Station organization
- Station facilities and layout
- Station administration
- Nuclear plant overview
- Industrial safety
- Fire protection
- Quality assurance and quality control
- Plant security
- Emergency planning
- Radiological orientation
- Appropriate portions of 10 CFR 26
- Appropriate portions of 10 CFR 19

#### 3.3.2 Radiation Worker Training

Personnel whose job duties require unescorted access to radiologically controlled areas of the plant will receive instruction in the applicable aspects of radiation protection. Radiation Worker Training will include the following topics:

- Sources of radiation
- Types and measurement of radiation
- Biological effects of radiation
- Limits and guidelines, including Reg. Guide 8.13
- Concept of As Low As Is Reasonably Achievable (ALARA)
- Radiation dosimetry
- Contamination
- Internal exposure
- Radiation work permits
- Radiological postings
- Radiological alarms
- Radioactive waste
- Rights and responsibilities
- Protective clothing

### 3.3.3 General Employee Requalification Training

Personnel with unescorted access to the plant participate in annual requalification training. Requalification training will include those topics in 3.3.1 and 3.3.2, as applicable to continue to meet access requirements. Emphasis will be placed on changes to the plant, plant procedures and procedure changes, government regulations, and quality assurance requirements. As applicable, training will be conducted on industry operating experiences, Licensee Event Reports, and personnel errors.

Based on the staff's review of the "General Employee Training" (GET) section of NEI 06-13 outlined above, the staff concludes that NEI 06-13 clearly and sufficiently describes, in terms of scope and level of detail, the training programs for general employee training to enable a reasonable assurance finding of acceptability for issuance of a combined license with verification of the programs during the construction stage.

### 3.4 Selected Other Training Programs

The "Selected Other Training Programs" section of NEI 06-13 addresses training for positions not specified by either 10 CFR 55, "Operators' Licenses" or 10 CFR 50.120, "Training and Qualification of Nuclear Power Plant Personnel."

#### 3.4.1 Fire Protection Training

NEI 06-13 states that the training programs for fire protection personnel will be designed, developed, implemented, and maintained using the SAT process as defined by 10 CFR 55.4 and as endorsed by Regulatory Guide-1.8. In addition, initial fire protection training will be completed prior to receipt of fuel at the site. Personnel assigned as fire brigade members will receive formal training prior to assuming brigade duties. Fire brigade members will also receive regularly scheduled retraining. Fire brigade training will comply with National Fire Protection Association Standard 600, "Standard on Industrial Fire Brigades."

Training appropriate to the assigned work will be provided for the fire protection staff, fire watch personnel, and the general employee. Final Safety Analysis Report (FSAR) Section 9.5.1, "Fire

Protection Program" will include additional information regarding the fire protection training programs.

### 3.4.2 Emergency Plan Training Program

NEI 06-13 states that Emergency Plan training will meet the requirements of 10 CFR 50 Appendix E, Section IV. F, "Training" and 10 CFR 50.47(b)(15). Additional information about the Emergency Plan training program will be found in the Emergency Plan, which is a separate document.

### 3.4.3 Physical Security Training Program

NEI 06-13 states that training of security personnel will be discussed in FSAR Section 13.6, "Physical Security" and in the Physical Security Plan.

### 3.4.4 Station Management Training Program

NEI 06-13 states that station supervisors will receive Fitness for Duty training in accordance with 10 CFR 26.22. The qualification requirements for managers and middle managers include training or experience in supervision or management. Training for supervisors develops their skills in the following areas:

- Leadership
- Interpersonal communications
- Management responsibilities and limits
- Motivation of personnel
- Problem analysis and decision making
- Administrative policies and procedures
- Observation skills
- Coaching

Based on the staff's review of the "Selected Other Training Programs" section of NEI 06-13 outlined above (fire protection, emergency plan, physical security, and station management training programs), the staff concludes that NEI 06-13 clearly and sufficiently describes, in terms of scope and level of detail, the training programs for fire protection, emergency plan, physical security, and station management training to enable a reasonable assurance finding of acceptability for issuance of a combined license with verification of the programs during the construction stage.

## 3.5 Training Effectiveness Evaluation Program

NEI 06-13 states that the program to evaluate the effectiveness of training programs will be based on three independent inputs: the supervisor of the trainee, the trainee, and an educational content evaluation of the instructional techniques and materials.

### 3.5.1 Supervisory Review for Training Effectiveness

The supervisory review will evaluate the content and effectiveness of training programs as related to the duties and job responsibilities of the trainees. Reviews may be performed by the



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supervisor of the trainee (former student) meeting with appropriate Training Department personnel, by designated oversight personnel (Quality Assurance or instructional technologists), or by observing employee performance in the job setting.

Management observations of training will be discussed to determine topics that may require additional training or subjects that may be removed from the training program.

### 3.5.2 Trainee Review of Training Effectiveness

Following selected courses or training cycles, trainees will have the opportunity to provide comments regarding the effectiveness of the instructional methods and content relevancy to their jobs. These comments will be used in the evaluation of both instruction and content of the training program.

### 3.5.3 Review for Effectiveness of Instructional Techniques and Materials

The effectiveness of instructional techniques and materials review assesses the clarity and applicability of training material and instructional aids. Management observations of instructors in the teaching environment will be conducted by an educational specialist qualified to monitor and evaluate classroom performance. Full time instructors will receive basic indoctrination in instructional techniques as soon as practicable after assuming instructional duties. The educational specialist will conduct periodic seminars in instructional techniques, discussing areas where group performance could be improved and recommends innovative techniques observed at this or other power stations.

Based on the staffs review of the "Training Effectiveness Evaluation Program" section of NEI 06-13 outlined above, the staff concludes that NEI 06-13 clearly and sufficiently describes, in terms of scope and level of detail, the training effectiveness evaluation program to enable a reasonable assurance finding of acceptability for issuance of a combined license with verification of the programs during the construction stage.

## 4.0 CONCLUSION

Operator Licensing and Human Performance Branch (COLP) staff used the acceptance criteria of SRP 13.2.1 and 13.2.2 as the basis for evaluating the acceptability of NEI 06-13, "Template for an Industry Training Program Description," Revision 0. The COLP staff has determined that NEI 06-13, "Template for an Industry Training Program," Revision 0 is consistent with the training and qualification requirements, guidance, and industry standards for licensed and nonlicensed plant staff as outlined in Section 2.0 of this evaluation with verification of the programs during the construction stage.

The training programs for licensed and nonlicensed plant staff described in NEI 06-13 will incorporate instructional requirements to qualify personnel to operate and maintain the facility, in a safe manner, in all modes of operation. The training programs will be developed and maintained in compliance with the facility license and applicable regulations. The training programs will be periodically evaluated and revised to reflect industry experience; to incorporate changes to the facility, procedures, regulations, and quality assurance requirements; and by management to determine overall program effectiveness. The training programs will be further

described in site and/or corporate procedures. Sufficient records will be maintained and kept available for NRC inspection during construction to verify adequacy of the programs.

The results of reviews of operating experience will be incorporated into the training and retraining programs in accordance with the provisions of TMI Action Item I.C.5, Appendix 1 A. Training programs will encompass all phases of plant operation including preoperational testing and low-power operation in accordance with the provisions of TMI Action Item I.G. Sufficient plant staff will be trained prior to fuel load to provide for safe plant operations.

The licensed operator training program, to be derived using SAT principles, will be developed by the applicant and will meet the regulatory guidance of Regulatory Guide 1.8 and 10 CFR Part 55. Licensed operators and senior operators will receive training in security procedures, radiological emergency plans, administrative procedures, and radiation protection. Simulation facilities used for the licensed operator training program will meet the guidance of Regulatory Guide 1.149. The licensed operator requalification training program conforms to the requirements of 10 CFR Part 50 and 10 CFR 55.59 and follows the guidance in Regulatory Guide 1.8. Sufficient licensed operators will have completed the training program prior to fuel load to ensure that the minimum shift staffing requirements of 10 CFR 50.54 will be met. The licensed operator training program will be verified during the construction stage.

In accordance with the requirements of 10 CFR 50.34(a) and (b), the applicant has provided information related to its training program for nonlicensed personnel. The training and retraining of nonlicensed plant staff will meet the guidance of Regulatory Guide 1.8. The applicant has committed to establish, implement, and maintain training programs that will utilize a systems approach to training as required by 10 CFR 50.120 and as defined in 10 CFR 55.4. All initial training of the nonlicensed plant staff is scheduled to be completed prior to fuel loading. Training programs for personnel listed in 10 CFR 50.120 will be verified during the construction stage.

The applicant will meet the requirements of 10 CFR 19 by developing and implementing a training program that will inform and instruct personnel regarding radioactive materials and radiation, health protection problems associated with exposure to radiation, the means and responsibilities for the protection of workers from radiation, and the availability upon request of radiation exposure reports. The training program includes initial training and periodic retraining for categories of employees and nonemployees whose assistance may be needed in the event of a radiological emergency. The GET program will be verified during the construction stage.

The applicant will meet the requirements of 10 CFR Part 26 by having a training program to ensure that personnel are adequately informed regarding the fitness-for-duty policy. Supervisors and persons assigned to escort duties will be trained to ensure that they understand their roles, responsibilities, and procedures for the fitness-for-duty program. The fitness-for-duty training program will ensure supervisors and escorts will possess knowledge and skills necessary to recognize behavioral changes, drugs, and/or indications of the use of drugs. The fitness-for-duty training program will be verified during the construction stage.

NEI 06-13 states that training will be provided based on individual employee experience, the intended position, and previous training and education of the individual. Training Department personnel may be supplemented by other personnel such as subject matter experts, contract

staff, and vendor representatives. Formal instruction will be presented through a combination of classroom lectures, e-learning, assigned reading, simulator training and evaluations, and other delivery techniques.

On the basis of its review, the staff concludes that NEI 06-13, "Template for an Industry Training Program," Revision 0 adequately provides guidance for establishing the licensed operator and nonlicensed plant staff training programs. Accordingly, the COLP staff concludes that NEI 06-13, "Template for an Industry Training Program," Revision 0 complies with the applicable NRC regulations, guidance, and industry standards and can be utilized by applicants for combined license applications.

5. REFERENCES

- 5.1 Heymer, A. P., Nuclear Energy Institute, to the U.S. NRC, NEI 06-13, "Template for an Industry Training Program Description," October 30, 2006.
- 5.2 NUREG-0800, "Standard Review Plan," Section 13.2.1, "Reactor Operator Training," and Section 13.2.2, "Training for Nonlicensed Plant Staff"

NEI New Reactors Mailing List

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NEI New Reactors Mailing List

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**APPENDIX C –**  
**FINAL SAFETY EVALUATION REPORT**  
**NEI 06-13A, REVISION 1**







**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001**

December 5, 2008

Mr. Russell J. Bell, Director  
New Plant Licensing Nuclear  
Generation Division  
Nuclear Energy Institute  
1776 I Street, NW, Suite 400  
Washington, DC 20006-3708

**SUBJECT: FINAL SAFETY EVALUATION FOR TOPICAL REPORT NEI 06-13A,  
"TEMPLATE FOR AN INDUSTRY TRAINING PROGRAM DESCRIPTION,"  
REVISION 1**

Dear Mr. Bell:

On September 5, 2007, the U.S. Nuclear Regulatory Commission (NRC) accepted the Nuclear Energy Institute (NEI) 06-13, "Template for an Industry Training Program Description," Revision 0 as an acceptable template for describing reactor operator (RO) and non-licensed plant staff training programs for combined license applications (COLAs). By letter dated March 28, 2008, the NEI submitted NEI 06-13A, "Template for an Industry Training Program Description," Revision 1, for NRC review and approval. The change to NEI 06-13A is the addition of Appendix A, "Cold License Training Plan." The change to NEI 06-13A, Revision 1 is exclusive to the addition of the Appendix A and the remainder of the template has not been changed. NEI 06-13A, Revision 1 provides a generic training program description for use with COLAs. In addition, Appendix A to NEI 06-13A, Revision 1 provides licensed operator cold license eligibility guidance. NEI 06-13A, Revision 1 was developed by the NEI New Plant Training Task Force, which includes representatives from the four design-centered working groups, to assist in expediting NRC review of the combined license (COL) and issuance of the COL.

Enclosed is the staffs safety evaluation (SE) which defines the basis for acceptance of NEI 06-13A, Revision 1. The NRC staff finds that for COLAs, NEI 06-13A, Revision 1, provides an acceptable template for describing the licensed operator training program, the licensed operator cold license eligibility requirements, and the non-licensed plant staff training program.

Our acceptance applies only to material provided in NEI 06-13A, Revision 1. We do not intend to repeat our review of the acceptable material described in the NEI 06-13A, Revision 0. When NEI 06-13A, Revision 1 appears as a reference in COLAs, our review will ensure that the material presented applies to the specific application involved. Licensing requests that deviate from NEI 06-13A, Revision 1, will be subject to a plant-specific or site-specific review in accordance with applicable review standards.

In accordance with the guidance provided on the NRC website, we request that NEI publish the accepted version of NEI 06-13A, Revision 1 within 3 months of receipt of this letter. The accepted version should incorporate this letter and the enclosed SE. The accepted version should also contain historical review information, including NRC requests for additional information and your responses. The accepted versions shall include a "-A" (designating accepted) following the report identification symbol.

If future changes to the NRC's regulatory requirements affect the acceptability of NEI 06-13A, NEI will be expected to revise NEI 06-13A appropriately, or justify its continued applicability for subsequent referencing.

If you have any questions, please contact Sheryl A. Burrows at (301) 415-6086 or via email at [Sheryl.Burrows@nrc.gov](mailto:Sheryl.Burrows@nrc.gov).

Sincerely,

A handwritten signature in black ink that reads "William D. Reckley". The signature is written in a cursive style with a long horizontal stroke at the end.

William D. Reckley, Chief  
Rulemaking, Guidance, and  
Advanced Reactors Branch  
Division of New Reactor Licensing  
Office of New Reactors

Project No. 689

Enclosure:  
Safety Evaluation

cc w/encl: See next page

SAFETY EVALUATION  
REGARDING THE NUCLEAR ENERGY INSTITUTE  
"TEMPLATE FOR AN INDUSTRY TRAINING PROGRAM DESCRIPTION"  
NEI 06-13A (REVISION 1)

1.0 BACKGROUND

On September 5, 2007, the U.S. Nuclear Regulatory Commission (NRC) accepted the Nuclear Energy Institute (NEI) 06-13, "Template for an Industry Training Program Description," Revision 0 (Agencywide Documents Access and Management System (ADAMS) accession no. ML070950479) as an acceptable template for describing reactor operator (RO) and nonlicensed plant staff training programs for combined license applications (COLAs). By letter dated March 28, 2008, the NEI submitted NEI 06-13A, "Template for an Industry Training Program Description," Revision 1, for NRC review and approval. NEI 06-13, Revision 0, "Template for an Industry Training Program Description," was previously reviewed and approved on September 5, 2007 (ADAMS accession no. ML070950479). The change to NEI 06-13 is the addition of Appendix A, "Cold License Training Plan." The change to NEI 06-13 is exclusive to the addition of the Appendix A. The remainder of the template has not been changed. In addition to providing a generic training program description for use with COLAs, NEI 06-13 provides licensed operator cold license eligibility guidance. The template and revision was developed by the NEI New Plant Training Task Force, which includes representatives from the four design-centered working groups, to assist in expediting NRC review of the combined license (COL) and issuance of the COL. Changes to NEI 06-13 were discussed at public meetings held on May 24, 2007, September 13, 2007, January 8, 2008, and March 5, 2008.

Prior to obtaining an operating license from the NRC and prior to entering a licensed operator training program, an applicant must satisfy certain nuclear power plant (NPP) experience requirements and perform specific operating plant evolutions as described in the Title 10 of the *Code of Federal Regulations*, Part 55 (10 CFR Part 55); "Operators' licenses," 10 CFR Section 50.120; "Training and qualification of nuclear power plant personnel," Regulatory Guide (RG) 1.8, Revision 3; "qualification and training of personnel for nuclear power plants," NUREG-1021, Revision 9; "Operator Licensing Examination Standards for Power Reactors," and ANSI/ANS-3.1-1993; "Selection, Qualification, and Training of Personnel for Nuclear Power Plants."

In 1984, an Industry Working Group met to "define components of operating shift experience and establish acceptable methods of meeting this experience." On February 24, 1984, at a meeting before the Commission, the industry presented the industry position on the level and type of operating shift experience required for the safe startup and initial operation of a nuclear generating plant. This industry position has come to be known as "cold license eligibility."

The industry position for the licensed shift positions (shift supervisor, senior operator, and licensed operator) required power plant experience, nuclear plant experience, and "hot" operational experience. The experience requirements were derived from ANSI/ANS-3.1-1981, "Selection, Qualification and Training of Personnel for Nuclear Power Plants," and required additional hot plant shift time within each crew.

Enclosure

The power plant experience requirement provided assurance of a minimum of 13 years per shift crew. The nuclear plant experience requirement could be met using experience equivalencies derived from ten categories of experience, with specific weighting factors and maximum time credited to each category and required a minimum of six years equivalent experience per crew. Each crew was required to have hot-participation experience within the crew. Hot participation was defined as direct involvement in reviews and discussions leading to decisions relative to the operation of a commercial nuclear plant, or, direct hands-on operation as a trainee at a commercial NPP. Hot participation included six weeks participation in senior reactor operator (SRO) and RO duties at an operating plant of the same type (commercial boiling-water reactor (BWR) or pressurized-water reactor (PWR)), Shift Supervisor participation in reactor startup and shutdown at the same type plant, or six weeks participation as an SRO-Licensed STA participation at an operating plant of the same type.

In addition, if any hot participation experience requirement was not satisfied by either the Shift Supervisor or Senior Operator, a "Qualified Advisor" must be on shift.

Generic Letter (GL) 84-10, "Administration of Operating Tests Prior to Initial Criticality" informed licensees of actions to take for all applicants for RO and SRO licenses at facilities prior to initial criticality who did not have extensive actual operating experience. The Commission authorized the staff to grant exemptions to those individuals who have completed a cold license training program for their facility. The program must have included: (a) nuclear fundamentals, including ten reactor startups at a nuclear reactor, (b) observation training on shift at a comparable operating reactor, (c) training on a simulator and (d) training on the actual system design of the candidate's plant. An exemption request was not needed for individuals who completed a cold license training program that included the four elements. The necessary exemption was to be granted as part of the issuance of the operator's license, provided that the individual's records clearly indicated satisfactory completion of a program.

GL 84-16, "Adequacy of On-Shift Operating Experience for Near Term Operating License Applicants" discussed a June 14, 1984 letter sent to J. H. Miller, President, Georgia Power Company from the Chairman of the NRC, N. J. Palladino. The June 14, 1984 letter accepted, with some clarifications, the Industry Working Group proposal presented to the Commission on February 24, 1984. It was noted in GL 84-16 that "acceptance of these experience requirements by the NRC does not alter the guidance for eligibility, included in RG 1.8 and NUREG-0737, for RO and SRO licensing examination candidates."

RG 1.8, Revision 2, "Qualification and Training of Personnel for Nuclear Power Plants" discusses cold license applicants. A cold license candidate is one that uses cold license eligibility guidance to sit for the operator licensing examination. Licensed operator candidates utilizing cold license eligibility guidance are examined using a cold license examination. Cold license examinations are defined as those examinations administered before the unit has completed preoperational testing and the initial startup test program. Hot examinations are those administered after this condition is attained.

10 CFR Part 55, "Operators' licenses" states "The Commission shall use the criteria in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," in effect six months before the examination date to prepare the written examinations...and the operating

tests... The Commission shall also use the criteria in NUREG-1021 to evaluate the written examinations and operating tests prepared by power reactor facility licensees..."

ES-202, "Preparing and Reviewing Operator Licensing Applications" of NUREG 1021 states "Regulatory Guide 1.8 (Revision 2 or 3) and the guidelines for education and experience promulgated by the National Academy for Nuclear Training (NANT) outline acceptable methods for implementing the Commission's regulations in this area. In addition, methods different from those set forth in Regulatory Guide 1.8 (Revision 2 or 3) or the NANT guidelines may be acceptable if a facility licensee provides an adequate basis for using such methods," Appendix A to NEI 06-13 is a different methodology for determining experience for new reactor licensed operators.

On May 24, 2007, NRC staff met with representatives of NEI, the nuclear industry, and new reactor vendors in a public meeting (ADAMS accession no. ML071220329). The purpose of this meeting was to discuss issues related to the NRC operator licensing program for COLAs. The industry proposed to use limited-scope simulators for operator training because of the aggressive timelines leading to fuel loading. In addition, plant-referenced simulators are not projected to be available for reactivity manipulations and reactor startup until eighteen months prior to fuel load, in time for the licensing examination. Existing licensed operator eligibility requirements and anticipated problems with 'cold licensing' of operators were discussed. NEI proposed to have the industry develop alternative requirements that leverage technology. Cold license examinations are administered before completion of pre-operational and initial startup testing. Anticipated difficulties include conducting systems training prior to construction of the systems, reactivity manipulations without a plant or plant-referenced simulator, and meeting operator experience guidance.

On September 13, 2007, NRC staff met with representatives of NEI, the nuclear industry, and new reactor vendors in a public meeting (ADAMS accession no. ML072770067) to discuss the operator licensing white papers (ADAMS accession no. ML072420450) submitted by NEI on August 21, 2007. The operator licensing white papers discuss cold licensing and training of the estimated 450 licensed operators which are projected to be necessary to operate the new NPPs. Meeting participants agreed that existing regulatory guidance addresses the training and qualification needs of licensed operator candidates for operating reactors but does not address the situation in which the plant is not operational (i.e., under construction). In addition, guidance related to the cold licensing of operators needs to be developed so that clear, appropriate, and achievable training commitments can be documented in each facility's COLA. It was also agreed that any process should follow current operator licensing guidance for operating plants with additional guidance in the areas of experience requirements, training program implementation, job performance measures (JPMs) and on-shift on-the-job training (OJT) during construction, simulator training using a limited scope simulator, continuing training for license candidates, and licensing examinations.

Concerns expressed by the NRC during this meeting included documentation of individual experience, documentation of experience obtained while an individual is in a training status, consistent calculation of time spent obtaining experience prior to licensing, activities that count toward meeting the experience guidelines must be meaningful, and, operating crew overall experience levels.

On January 8, 2008, NRC staff met with representatives of NEI, the nuclear industry, and new reactor vendors in a public meeting (ADAMS accession no. ML080290034) to discuss the operator licensing white papers (ADAMS accession no. ML080150100) submitted by NEI on December 13, 2007. It was agreed that time spent obtaining experience prior to licensing must be meaningful and consistently calculated and the final determination of meeting the experience requirements rests with the NRC. Consensus was reached in the areas of training program accreditation and implementation, in-plant JPMs and on-shift OJT during construction, simulator training using a part task/limited scope simulator, continuing training prior to and following NRC licensing exams, and scheduling of licensing examinations. The NRC noted that additional guidance needs to be developed in the areas of documentation of individual experience and, operating crew overall experience levels.

On March 5, 2008, NRC staff met with representatives of NEI, the nuclear industry, and new reactor vendors in a public meeting (ADAMS accession no. ML080910315) to discuss the operator licensing white papers submitted by NEI on February 29, 2008. Consensus between the NRC and NEI was reached in the areas of training program accreditation and implementation, in-plant JPMs and on-shift OJT during construction, simulator training using a part task/limited scope simulator, continuing training prior to and following NRC licensing exams, scheduling of licensing examinations, documentation of individual experience, and, operating crew overall experience.

## 2-0 REGULATORY EVALUATION

The NRC staff verified that changes to NEI 06-13 comply with the following regulations, regulatory guidance, NUREGs, and industry standards:

- 10 CFR Part 50, "Domestic licensing of production and utilization facilities"
- 10 CFR Part 52, "Licenses, certifications, and approvals for nuclear power plants"
- 10 CFR Part 55, "Operators' licenses"
- RG 1.8, "Qualification and Training of Personnel for Nuclear Power Plants"
- RG 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations"
- "NUREG-0800, Standard Review Plan (SRP), Section 13.2.1, "Reactor Operator Requalification Program; Reactor Operator Training"
- NUREG-1021, "Operator Licensing Examination Standards for Power Reactors"
- ANSI/ANS 3.1-1993, "Selection, Qualification, and Training of Personnel in Nuclear Power Plants"
- GL 84-10, "Administration of Operating Tests Prior to Initial Criticality"
- GL 84-16, "Adequacy of On-Shift Operating Experience for Near Term Operating License Applicants"

## 3.0 TECHNICAL EVALUATION

The staffs review of Appendix A, "Cold License Training Plan" to NEI 06-13A, "Template for an Industry Training Program description," Revision 1 (NEI 06-13), focused on the "cold licensing"

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process for the selection, training and licensing of operators for the new nuclear plants. Specific areas of review included:

- A. Experience Requirements for License Candidates
- B. Crew Experience Requirements during the First Year of Operation
- C. Training Program Accreditation and Implementation
- D. In-Plant JPMs and On-Shift OJT during the Construction Phase
- E. Simulator Training Using a Part Task/Limited Scope Simulator
- F. Continuing Training for License Candidates Prior to NRC License Exams
- G. Scheduling of NRC License Examinations
- H. Initiation of Licensed Operator Continuing Training

### 3.1 Licensed Operator Training Program Prior to Completion of the First Refueling Outage

The "Licensed Operator Training Program Prior to Completion of the First Refueling Outage" section of NEI 06-13 states that persons eligible for the "cold licensing process" will be required to meet the following requirements:

RO candidates shall have a High School Diploma or equivalent

SRO candidates shall have at least one of the following:

Previously held an SRO license at an operating NPP

Previously held an RO license at an operating NPP

Have a Bachelor's Degree in engineering or science as defined by RG 1.8, Revision 3.

Two years military experience in a position equivalent to a RO.

NEI 06-13 states that experience as a licensed operator training instructor with an SRO certification is acceptable as experience for SRO candidates. As is the current NRC practice, the eligibility of licensed operator instructors to sit for the licensing examination will be evaluated on a case-by-case basis.

The requirements of this section are applicable to each unit of a multiple unit site.

The guidance in this section is equivalent to the guidance of RG 1.8, Revision 3, "Qualification and Training of Personnel for Nuclear Power Plants," ANSI/ANS 3.1-1993, "Selection, Qualification, And Training of Personnel for Nuclear Power Plants," and GL 84-16, "Adequacy of On-Shift Operating Experience for Near Term Operating License Applicants", and is acceptable.

The cold licensing process for the selection, training and licensing of operators for the new nuclear plants adheres to current industry guidance for operating plants with exemptions and alternatives in the following areas:

### 3.1.1 Experience Requirements for License Candidates

Licensed operator candidates do not need to satisfy all of the experience requirements prior to entering a licensed operator training program or sitting for the operator licensing examination. Experience and performance requirements that have not been met when the operator licensing examination is administered shall be met prior to issuance of the individual's license after notification from the licensee that all experience and performance requirements have been met. The NRC will determine the acceptability of experience for those candidates utilizing the alternative experience guidance.

The methods listed below are an acceptable method of providing the licensed operator candidate with meaningful experience on the reactor and at the site for which the license is sought. Methods for gaining meaningful experience include completing systematically designed training courses, and performing work assignments such as preoperational and startup testing, procedure development and validation, human factors engineering activities, task analysis verification, or conducting licensed operator classroom or simulator training. Additionally, for these activities to be considered meaningful, they must be associated with safety significant, defense in depth (DID), or major plant components or systems.

All cold licensed operator candidates will:

- Complete a systematically designed site familiarization course.

- Complete a site-specific non-licensed operator OJT program on selected non-licensed operator tasks. The tasks selected will be those tasks that are important to plant operation with regard to nuclear safety, DID, or that are risk significant.

- Participate in work assignments for a minimum of six months that includes preoperational testing, and one or more of the following:

  - Procedure development and validation

  - Human factors engineering activities

  - Task analysis verification

  - Licensed operator classroom presentations or simulator training implementation

SRO cold license candidates will complete a site-specific SRO training course. SRO cold license candidates that do not have "hot" plant experience will complete a six week plant Operational Excellence course that will be completed either in a full scope plant simulator or through observation of control room activities at a similar type operating nuclear plant. The course will familiarize the candidate with the operational interfaces encountered in a nuclear plant control room.



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"Hot" plant experience is defined as performance as a SRO for at least six months which includes:

- At least 6 weeks of operation above 20 percent power
- A startup from subcritical to 20 percent power
- A shutdown from above 20 percent power to cold (less than 212°F) and subcritical
- Startup preparations following a fueling or refueling outage

The startup, shutdown, and startup preparations may be performed at an operating plant or on a full scope plant simulator.

Table 1, "Comparison of Hot and Cold License Guidance," lists the current experience requirement and the associated cold license experience method. Table 2, "Illustration of Cold Licensing Plan by Candidate Type," lists the acceptable education and methods of obtaining equivalent experience for each type of licensed operator candidate.

The guidance in this section is equivalent to the guidance of RG 1.8, Revision 3, "Qualification and Training of Personnel for Nuclear Power Plants," ANSI/ANS 3.1-1993, "Selection, Qualification, And Training of Personnel for Nuclear Power Plants," and GL 84-16, "Adequacy of On-Shift Operating Experience for Near Term Operating License Applicants" and is acceptable.

### 3.1.2 Crew Experience Requirements during First Year of Operation

The cumulative NPP experience for each operating crew shall be greater than six years. The cumulative power plant experience for each operating crew shall be greater than 13 years.

Operators obtain NPP experience by working at NPPs and military nuclear propulsion plants (performing activities equivalent to those performed by licensed operators), conducting licensed operator training, participating in new nuclear plant construction and testing, and completing academic degree requirements. Cumulative crew NPP experience is the sum of each individual's NPP experience after applying weighting factors and maximum credit limits in Table 3, "Cumulative Nuclear Power Plant Operating Crew Experience Equivalencies." When determining cumulative NPP experience, the entire six years experience shall not reside in one crew member.

The crew's cumulative power plant experience is the sum of each individual's power plant experience. Operators obtain power plant experience by working at NPPs, conventional power plants and military propulsion plants (performing activities equivalent to those performed by non-licensed operators). Cumulative power plant experience does not utilize weighting factors or maximum credit limits.

In addition to the experience requirements described above, each operating crew shall be staffed with at least one SRO with hot plant experience. If a SRO with hot plant experience is not available, a shift advisor will be substituted. The shift advisor will have at least one year of on-shift licensed SRO experience at a similar type (PWR/BWR) operating plant and will have

completed a training program on the design/plant for which they will be advising. While observing crew performance, the shift advisor will make recommendations to the shift manager and will not interfere with the licensed responsibilities of the operating crew. The shift advisor will have direct access to plant senior management. Shift advisor duties include, but are not limited to:

Monitoring procedure adherence

Observing the conduct of pre-job briefs, shift turnovers, plant evolutions, non-licensed operator rounds, plant tours, and post job debriefs

Monitoring overall station risk.

The guidance in this section is equivalent to the guidance of GL 84-16, "Adequacy of On-Shift Operating Experience for Near Term Operating License Applicants" and is acceptable.

### 3.1.3 Conduct of OJT

Until construction of the plant is complete, acceptable methods for the conduct of OJT include discussion, simulation, and use of mockup equipment and virtual reality technology.

Selection of the instructional setting is an integral part of the systems approach to the training process as defined in 10 CFR 55.4, "Definitions." The guidance in this section meets the requirements of 10 CFR 50.120, "Training and qualification of nuclear power plant personnel" and is acceptable.

### 3.1.4 Use of Part-Task/Limited Scope Simulators

With the exception of the Operational Excellence course, which will utilize a full scope plant simulator, part-task or limited scope simulators may be used during licensed operator training.

RG 1.149, Revision 3, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," allows the use of a simulation facility for RO and senior operator training. 10 CFR 55.4 defines a simulation facility as one or more of the following components, alone or in combination: used for either the partial conduct of operating tests for operators, senior operators, and license applicants, or to establish OJT and experience prerequisites for operator license eligibility:

- (1) A plant-referenced simulator;
- (2) A Commission-approved simulator under 10 CFR 55.46(b); or
- (3) Another simulation device, including part-task and limited scope simulation devices, approved under 10 CFR 55.46(b).

This guidance in this section is acceptable for those part-task or limited scope simulators that meet the requirements of 10 CFR 55.46(b).

### 3.1.5 Licensed Operator Continuing Training

Licensed operator continuing training will begin within 90 days following the issuance of the first operator license. Continuing training content will be determined using a systems approach to training methodology to maintain operator skills, knowledge, and abilities.

10 CFR 50.54.1 (i-1) requires that within three months after either the issuance of an operating license or the date that the Commission makes the finding under § 52.103(g) of this chapter for a COL, as applicable, the licensee shall have in effect an operator requalification program. The operator requalification program must, as a minimum, meet the requirements of 10 CFR 55.59(c). The guidance in this section meets the requirements of 10 CFR 50.54.1 (i-1) and is acceptable.

### 3.1.6 Cold Licensing Process Applicability and Termination

The cold licensing process may be applied to each unit of a multi-unit site.

Cold license guidance items 1 through 9 on Table 1 of NEI 06-13 will apply to any licensed operator training class started prior to initial fuel load. The cold licensing process will terminate after completion of the first refueling outage.

Cold license guidance items 3 through 9 on Table 1 of NEI 06-13 will apply to any licensed operator training class started after initial fuel load and before completion of the first refueling outage. Items 1 and 2 of the Table 1 cold license guidance will not be allowed after the initial fuel load.

As plant systems, components, and structures are completed and made operational, and as integrated plant operations start, a systems approach to training methodology will be used to modify the cold license class training methods and settings. These modifications will optimize student learning using actual in-plant training and experience opportunities.

The guidance in this section is equivalent to the guidance of GL 84-16, "Adequacy of On-Shift Operating Experience for Near Term Operating License Applicants" and is acceptable.

### 3.1.7 Initial Licensed Operator Examination Schedule

Administration of the initial licensed operator examination will be approximately 18 months prior to initial fuel load.

10 CFR 50.120 requires NPP operating license applicants, by 18 months prior to fuel load to establish, implement, and maintain training programs based on a systems approach to training. The guidance in this section ensures licensed operator examinations are developed from training programs that meet the requirements of 10 CFR 50.120 and is acceptable.

#### 4.0 CONCLUSION

Operator Licensing and Human Performance Branch (COLP) staff used the guidance and the acceptance criteria in the documents listed in Section 2.0 of this evaluation as the basis for evaluating the acceptability of NEI 06-13A, "Template for an Industry Training Program Description," Revision 1. The COLP staff has determined that NEI 06-13A, "Template for an Industry Training Program description," Revision 1 is consistent with the training and qualification requirements, guidance, and industry standards for licensed plant staff training and eligibility as outlined in Section 2.0 of this evaluation with verification of the implementation of the cold license training plan during the construction stage.

On the basis of its review, the staff concludes that NEI 06-13 A, "Template for an Industry Training Program description," Revision 1 adequately provides guidance for establishing the cold licensed operator eligibility guidance. Accordingly, the COLP staff concludes that NEI 06-13 A, "Template for an Industry Training Program description," Revision 1 complies with the applicable NRC regulations, guidance, and industry standards and can be utilized by applicants for COLAs.

#### 5.0 REFERENCES

- 5.1 Roe, J. W., NEI, to the U.S. NRC, NEI 06-13A, "Template for an Industry Training Program Description, Revision 1," March 28, 2008.
- 5.2 NUREG-0800, SRP, Section 13.2.1, "Reactor Operator Requalification Program; Reactor Operator Training."
- 5.3 Miller, J. H., Jr., "Industry Evaluation Of Operating Shift Experience Requirements," February 24, 1984.
- 5.4 Summary of May 24, 2007 Category 2 Public Meeting with NEI to Discuss New Reactor Operator Licensing Initiatives.
- 5.5 Summary of September 13, 2007 Category 2 Public Meeting with NEI to Discuss Issues Related to Implementation of New Reactor Operator Licensing.
- 5.6 Summary Of January 8, 2008 Category 2 Public Meeting with NEI to Discuss New Reactor Operator Licensing Initiatives.
- 5.7 Summary Of March 5, 2008 Category 2 Public Meeting with NEI to Discuss New Reactor Operator Licensing Initiatives.
- 5.8 GL 84-10, "Administration of Operating Tests Prior to Initial Criticality."
- 5.9 GL 84-16, "Adequacy of On-Shift Operating Experience for Near Term Operating License Applicants."
- 5.10 RG 1.8, Revision 3, "Qualification and Training of Personnel for Nuclear Power Plants."

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- 5.11 NUREG-1021, Revision 9, "Operator Licensing Examination Standards for Power Reactors."
- 5.12 ANSI/ANS-3.1-1993, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants."

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