

MANAGEMENT MEASURES

11.4 TRAINING AND QUALIFICATION OF PLANT PERSONNEL

11.4.1 PURPOSE OF REVIEW

The purpose of this review is to establish that there is reasonable assurance that personnel who perform activities relied on for safety at the plant¹ will understand, recognize the importance of, and be qualified to perform these activities as required by 10 CFR Part 70, as revised², in a manner that adequately protects the public and worker health and safety and the environment.

11.4.2 RESPONSIBILITY FOR REVIEW

Primary: Training, Quality Assurance or Human Factors Engineer/Specialist

Secondary: Licensing Project Manager

Supporting: Site Representative/Facility Inspector

11.4.3 AREAS OF REVIEW

The regulation, 10 CFR Part 70, as revised, requires that personnel who perform activities relied on for safety be trained, tested, and retested as necessary to ensure that they understand, recognize the importance of, and are qualified to perform these activities in a manner that adequately protects the public and worker health and safety and the environment. Personnel at the plant should have the knowledge and skills necessary to start-up, operate, maintain, modify, and decommission the facility in a safe manner. Therefore, the training, testing, retesting, and qualification of these personnel as described in the license application should be reviewed. This should include the training, testing, retesting, and qualification of managers, supervisors, designers, technical staff, plant operators, technicians, maintenance personnel and other personnel whose level of knowledge is relied on for safety.

¹This SRP section provides guidance for the review of information on the training and qualification of plant personnel who perform activities relied on for safety. Section 2 of SRP Appendix C on quality assurance provides review guidance on the subject of training and qualification of other personnel (for example, construction personnel) who perform activities relied on for safety.

²Nuclear Regulatory Commission (U.S.), Washington, D.C. "Domestic Licensing of Special Nuclear Material (10 CFR Part 70)." *Federal Register* : Vol. 64, No. 146. pp. 41338-41357. July 30, 1999.

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The following areas should be reviewed:

1. Organization and management of training,
2. Trainee selection,
3. Conduct of needs/job analysis and identification of tasks for training,
4. Development of learning objectives as the basis for training,
5. Organization of instruction using lesson plans and other training guides,
6. Evaluation of trainee mastery of learning objectives,
7. Conduct of on-the-job training,
8. Systematic evaluation of training effectiveness,
9. Personnel qualification, and
10. Applicant's provisions for continuing assurance.

11.4.4 ACCEPTANCE CRITERIA

The regulatory requirements, regulatory guidance, and regulatory acceptance criteria applicable to training and qualification of plant personnel are listed in the following sections.

11.4.4.1 Regulatory Requirements

The requirement for training and qualification is addressed in the following:

Nuclear Regulatory Commission (U.S.), Washington, D.C. "Domestic Licensing of Special Nuclear Material (10 CFR Part 70)." *Federal Register*: Vol. 64, No. 146. pp. 41338-41357. July 30, 1999.

Specific references are as follows:

1. In § 70.4, "Definitions," the term management measures is defined. Training and qualification are included as a management measure.
2. In § 70.62(d), the applicant or licensee is required to establish management measures to provide continuing assurance of compliance with the performance requirements
3. In § 70.64(a)(1), the design of new facilities or the design of new processes at existing facilities is required to be developed and implemented in accordance with management measures.
4. In § 70.65(a), the application is required to include a description of the management measures.

An additional requirement for training and qualification is addressed in the following:

Code of Federal Regulations, Title 10, Energy, Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations." The specific reference to § 19.12, "Instructions to Workers."

11.4.4.2 Regulatory Guidance

NRC guidance applicable to training and qualification of personnel at nuclear power plants is given in the following:

Nuclear Regulatory Commission (U.S.), Washington, D.C. "Training Review Criteria and Procedures," NUREG-1220, Rev.1, January 1993.

As appropriate, this guidance should be used for training and qualification of plant personnel at other nuclear facilities.

11.4.4.3 Regulatory Acceptance Criteria

The NRC reviewers should find the applicant's submittal regarding training and qualification of plant personnel provides reasonable assurance that the regulatory acceptance criteria below are adequately addressed and satisfied.

In addition to the regulatory acceptance criteria given below, SRP Sections 4.1.5.4 and 4.1.5.6 provide criteria for training and qualification of plant personnel for radiation safety functions.

1. Organization and Management of Training

The organization and management of training of plant personnel should be acceptable if the start-up, operation, maintenance, modification, and decommissioning of the facility are organized, staffed, and managed to facilitate planning, directing, evaluating, and controlling a systematic training process that fulfills job-related training needs. Formal training should be provided for each position or activity for which the required performance is relied on for safety. The application should state what training will be conducted and which personnel will be provided this training. Training should include retraining of previously trained and qualified personnel based on specified criteria.

The following commitments should be in the application regarding organization and management of training:

- a. Line management should be responsible for the content and effective conduct of the training.
- b. The job function, responsibility, authority, and accountability of personnel involved in managing, supervising, and implementing training should be clearly defined.
- c. Performance-based training should be used as the primary management tool for analyzing, designing, developing, conducting, and evaluating training.
- d. Procedures should be documented and implemented to ensure that all phases of training are conducted reliably and consistently.

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- e. Training documents should be linked to the configuration management system to ensure that design changes and plant modifications are accounted for in the training.
- f. Exceptions from training may be granted to trainees and incumbents when justified, documented, and approved by management.
- g. Auditable training records should be maintained. Training records, both programmatic and individual, should support management information needs and provide required data on each individual's training, job performance, and fitness for intended duty. (Refer to SRP Section 11.9 for detailed guidance on records management.)

2. Trainee Selection

Selection of trainees who will perform activities relied on for safety should be acceptable if minimum requirements for selection of trainees are specified. Trainees should meet entry-level criteria defined for the position including minimum educational, technical, experience, and (if necessary) physical fitness requirements.

3. Conduct of Needs/Job Analysis and Identification of Tasks for Training

The conduct of needs/job analysis and identification of tasks for training should be acceptable if the tasks required for competent and safe job performance are identified, documented, and included in the training.

Operations personnel, training staff, and other subject matter experts, as appropriate, should conduct a needs/job analysis to develop a valid task list for specific jobs. The jobs treated in this manner should include, as a minimum, those responsible for managing, supervising, performing, and verifying the activities specified in the Integrated Safety Analysis (ISA - see SRP Chapter 3) as preventing or mitigating accident sequences. Each task selected for training (initial or continuing) from the facility-specific task list should be matrixed to supporting procedures and training materials. The facility-specific list of tasks selected for training and the comparison to training materials should be reviewed on an established schedule and updated as necessitated by changes in procedures, facility systems/equipment, or job scope.

4. Development of Learning Objectives as the Basis for Training

The development of learning objectives as the basis for training should be acceptable if learning objectives that identify training content and define satisfactory trainee performance are derived from job performance requirements. Learning objectives should state the knowledge, skills, and abilities the trainee should demonstrate, the conditions under which required actions will take place, and the standards of performance the trainee should achieve upon completion of the training activity. Learning objectives should be sequenced based on their relationship to each other.

5. Organization of Instruction Using Lesson Plans and Other Training Guides

The organization of instruction using lesson plans and other training guides should be acceptable if the plans/guides are based on the required learning objectives derived from specific job performance requirements. Plans/guides should be used for in-class training and on-the-job training and should include standards for evaluating proper trainee performance. Review and approval requirements should be established for all plans/guides and other training materials before their issue and use.

6. Evaluation of Trainee Mastery of Learning Objectives

The evaluation of trainee mastery of learning objectives should be acceptable if trainees are evaluated periodically during training to determine their progress toward mastery of job performance requirements and at the completion of training to determine their mastery of job performance requirements.

7. Conduct of On-the-Job Training

The conduct of on-the-job training should be acceptable if on-the-job training used for activities required by the ISA are fully described. On-the-job training should be conducted using well-organized and current performance-based training materials. On-the-job training should be conducted by designated personnel who are competent in the program standards and methods of conducting the training. Completion of on-the-job training should be by actual task performance. When the actual task cannot be performed and is therefore "walked-down," the conditions of task performance, references, tools, and equipment should reflect the actual task to the extent possible.

8. Systematic Evaluation of Training Effectiveness

A systematic evaluation of training effectiveness and its relation to on-the-job performance should be acceptable if it ensures that the training program conveys all required skills and knowledge and is used to revise the training, where necessary, based on the performance of trained personnel in the job setting. A comprehensive evaluation of individual training programs should be conducted periodically by qualified individuals to identify program strengths and weaknesses. Feedback from trainee performance during training and from former trainees and their supervisors should be used to evaluate and refine the training. Change actions (for example, procedure changes, equipment changes, facility modifications) should be monitored and evaluated for their impact on the development or modification of initial and continuing training and should be incorporated in a timely manner. This should be accomplished through the configuration management system (see SRP Section 11.2). Improvements and changes to initial and continuing training should be systematically initiated, evaluated, tracked, and incorporated to correct training deficiencies and performance problems.

9. Personnel Qualification

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The following commitments should be in the application regarding personnel qualification for managers, supervisors, designers, technical staff, plant operators, technicians, maintenance personnel and other plant staff required to meet NRC regulations:

- a. Managers should have a minimum of a B.S./B.A. or equivalent. Each manager should have either management experience or technical experience in facilities similar to the facility.
- b. Supervisors should have at least the qualifications required of personnel being supervised with either one additional year experience supervising the technical area at a similar facility or should have completed the supervisor training.
- c. Technical staff identified in the ISA whose actions or judgments are relied on for safety to satisfy the performance requirements identified in 10 CFR Part 70, as revised, should have a B.S. in the appropriate technical field and three years experience.
- d. Plant operators, technicians, maintenance personnel, and other staff whose actions are required to comply with NRC regulations should have completed the applicant's training process or have equivalent experience or training.
- e. Candidates for process operators should be required to meet minimum qualifications described in the application. Candidates for job functions other than process operators should also be required to meet minimum qualifications, but these minimum qualifications need not be described in the application.

10. Applicant's Provisions for Continuing Assurance

The applicant's provisions for continuing assurance of training and qualification of plant personnel should be acceptable if the submittal addresses periodic retesting of personnel as necessary to ensure that they continue to understand, recognize the importance of, and are qualified to perform their activities that are relied on for safety.

11.4.5 REVIEW PROCEDURES

11.4.5.1 Acceptance Review

The primary reviewer should evaluate the application to determine whether it addresses the "Areas of Review" discussed in Section 11.4.3, above. If significant deficiencies are identified, the applicant should be requested to submit additional material before the start of the safety evaluation.

11.4.5.2 Safety Evaluation

After determining that the application is acceptable for review in accordance with Section 11.4.5.1, above, the primary reviewer should perform a safety evaluation against the

acceptance criteria described in Section 11.4.4, recognizing that the rigor and formality of a systematic approach to training and the required qualification of plant personnel may be graded to correspond to the hazard potential of the facility and to the complexity of the training needed. The review should determine whether the applicant has adequately planned for the training and qualification of plant personnel to be accomplished and whether necessary policies, procedures, and instructions will be in place and appropriate training and qualification will be accomplished before these personnel begin activities relied on for safety. Some of the information may be referenced to other sections of the application, or incorporated by reference, provided that these references are clear and specific.

The secondary reviewer should confirm that the applicant's commitments regarding the training and qualification of plant personnel are consistent with other sections of the submittal. The secondary reviewer should also integrate the training and qualification of plant personnel input into the Safety Evaluation Report (SER).

The supporting reviewer should become familiar with the applicant's commitments for the training and qualification of plant personnel and determine whether ongoing activities (at an existing facility) are in agreement with them.

On the basis of its review, the staff may request that the applicant provide additional information or modify the application to meet the acceptance criteria. The staff or applicant may also propose license conditions to ensure that the training and qualification of plant personnel meet the acceptance criteria. The review should result in a determination that there is reasonable assurance that the applicant's training and qualification of plant personnel will ensure that only properly trained and qualified personnel will perform activities relied on for safety.

When the safety evaluation is complete, the primary staff reviewer, with assistance from the other reviewers, should prepare the training and qualification of plant personnel input for the SER as described in Section 11.4.6 using the acceptance criteria from Section 11.4.4.

11.4.6 EVALUATION FINDINGS

The staff's evaluation should verify that the license application provides sufficient information to satisfy the regulatory requirements of Part 70, as revised (as listed in SRP Section 11.4.4.1), and that the regulatory acceptance criteria in Section 11.4.4.3 have been appropriately considered in satisfying the requirements. On the basis of this information, the staff should conclude that this evaluation is complete. The reviewers should write material suitable for inclusion in the SER prepared for the entire application. The SER should include a summary statement of what was evaluated and the basis for the reviewers' conclusions.

The staff can document the evaluation as follows:

[Here the primary reviewer provides a summary statement of what was evaluated and why the reviewer finds the submittal acceptable.] Continued with: *Based on its review of the license application, the NRC staff concludes that:*

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1. *the applicant has adequately described its training and qualification of plant personnel, and*
2. *the applicant's training and qualification of plant personnel meet the requirements of 10 CFR Part 70 and provide reasonable assurance of protection of public health and safety and of the environment.*

11.4.7 REFERENCES

1. Nuclear Regulatory Commission (U.S.), Washington, D.C. "Domestic Licensing of Special Nuclear Material, (10 CFR Part 70)." *Federal Register*: Vol. 64, No. 146. pp. 41338-41357. July 30, 1999.
2. Nuclear Regulatory Commission (U.S.), Washington, D.C. "Training Review Criteria and Procedures," NUREG-1220, Rev. 1, January 1993.