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Superseding

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DOE HANDBOOK

GUIDE TO GOOD PRACTICES FOR ON-THE-JOB TRAINING



**U.S. Department of Energy
Washington, D.C. 20585**

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FOREWORD

1. This Department of Energy (DOE) Handbook is approved for use by all DOE Components and their contractors. The Handbook incorporates editorial changes to DOE-STD-1012-92, *Guide to Good Practices for On-the-job Training*, and supersedes DOE-STD-1012-92. Technical content of this Handbook has not changed from the original technical standard. Changes are primarily editorial improvements, redesignation of the standard to a Handbook, and format changes to conform with current Technical Standards Program procedures.

2. This technical standard provides guidance to DOE staff and contractors that can be used to modify existing programs or to develop new programs. DOE contractors should not feel obligated to adopt all parts of this guide. Rather, they can use the information in this guide to develop programs that apply to their facility. This guide can be used as an aid in the design and development of a facility's on-the-job (OJT) programs and to assist the instructors who conduct OJT and performance tests in the areas of facility operations, maintenance, and technical support.

3. Beneficial comments (recommendations, additions, deletions) and any pertinent data that may improve this document should be sent to the Office of Nuclear Safety Policy and Standards (EH-31), U.S. Department of Energy, Washington, DC 20585, by letter or by using the self-addressed Document Improvement Proposal (DOE F 1300.3) appearing at the end of this document.

4. DOE technical standards, such as this Handbook, do not establish requirements. However, all or part of the provisions in a technical standard can become requirements under the following circumstances:
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 - (2) the organization makes a commitment to meet a technical standard in a contract or in a plan or program required by a DOE requirements document.

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1. INTRODUCTION

1.1 Purpose

Training programs at DOE facilities should prepare personnel to safely and efficiently operate and maintain the facilities in accordance with DOE requirements. This guide presents good practices for a systematic approach to on-the-job training (OJT) and OJT programs and should be used in conjunction with DOE *Training Program Handbook: A Systematic Approach to Training*, and with the DOE Handbook entitled *Alternative Systematic Approaches to Training* to develop performance-based OJT programs. DOE contractors may also use this guide to modify existing OJT programs that do not meet the systematic approach to training (SAT) objectives.

1.2 Background

Because of a contractor-identified need for generic guidance regarding performance-based OJT and OJT programs, DOE/ID-10177, *Guide to Good Practices for On-the-Job Training* was developed in 1987. This guidance was updated and changed to DOE-STD-1012-92 in July of 1992. It preceded the DOE *Training Program Handbook: A Systematic Approach to Training* in providing guidance for the development of OJT programs using the SAT process. The bulk of the information specific to the SAT process that was included in DOE-STD-1012-92 was removed during this revision because DOE *Training Program Handbook: A Systematic Approach to Training* has broad applicability to all SAT-based training programs.

1.3 Application

The methods described in this guide and in DOE *Training Program Handbook: A Systematic Approach to Training* may be appropriate for high-hazard facilities/tasks but may not be necessary nor cost-effective for moderate-or low-hazard potential facilities/tasks. Therefore, the DOE Handbook entitled *Alternative Systematic Approaches to Training* should also be used with this guide when developing OJT programs for DOE nuclear facilities to ensure that these programs meet current DOE training requirements with the proper level of detail for the hazard and risk of the facility and task and are cost-effective.

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2. DEFINITIONS

Exception is the release of an individual from portions of a training program through prior education, experience, and/or testing.

On-the-Job Training (OJT) is formal training that is conducted and evaluated in the work environment.

OJT Checklist (Qualification Card/Performance Evaluation Checklist/Practical Factor Card) is a document issued to an individual which lists training program qualification requirements for a specific position and which is used to document on-the-job training and performance evaluation results on a task-by-task basis. OJT checklists may also be used to document the evaluation of associated theory, equipment, systems, and procedural knowledge.

OJT Guide (OJT Lesson Plan) is an instructor's document that outlines instructor and trainee activities, learning objectives, training content, and resources necessary for the consistent conduct of on-the-job training.

Performance Test is a practical (hands-on) demonstration by the trainee of the knowledge and skills required to perform a task that is evaluated by a qualified instructor. Performance tests may be used to evaluate the competency of any employee (e.g., craft personnel, radiation workers, facility operators, and technicians).

Performance Test Level of Accomplishment is the level of accomplishing a performance test where perform (P), simulate (S), observe (O), or discuss (D), are defined as:

- P - Perform the specified task using approved procedures and observing all applicable safety and administrative requirements. This includes a thorough discussion, prior to performing the task, that addresses safety implications, the elements involved, the effects on associated equipment or systems, and abnormal situations which may arise while performing the task.
- S - Simulate performance of the specified task. Using approved procedures, "walk through" the task and simulate all actual manipulations (valves, switches, tools, etc.) an employee would perform. Describe applicable safety and administrative requirements and the parameters (meters, charts, measurements, etc.) an employee would observe/monitor during actual performance of the task. Conduct the same discussion as required for a perform signature.
- O - Observe an individual performing the specified task. Conduct the same discussion as required for a perform signature.

- D - Discuss the specified task using applicable procedures, piping and instrumentation drawings, blueprints, etc., including the discussion as required for a perform. Demonstrate knowledge of the task by describing the manipulations required and the parameters that may be expected to change.

Subject Matter Expert (SME) is an individual qualified (or previously qualified) and experienced in performing a particular task. A subject matter expert may also be an individual who by education, training, and/or experience is a recognized expert on a particular subject, topic, or system.

3. OJT PROGRAM DEVELOPMENT

OJT is designed to prepare employees for job performance through training and performance testing that is conducted by qualified OJT instructors in the work environment. It provides practical hands-on experience, and has the advantage of providing training on tasks that are of immediate need to the employee. OJT is limited to those situations where it is administratively and physically possible to conduct the training (i.e., where facilities are adequate, where OJT can be conducted without significant interference to facility operations, and where qualified personnel are available to conduct and manage the OJT program). Instructors and training material designers/developers should be aware of the potential advantages and disadvantages of OJT when selecting training settings.

The advantages of OJT are:

- Training takes place in the actual work environment. The trainee is surrounded with the sights, sounds, smells, etc., of the job, so little is left to the trainee's imagination.
- The instructor demonstrates the task at the job site using the same tools and/or equipment the trainee will use to perform the task.
- The instructor can tailor the training to meet the needs of each trainee because the instructor has the option to change the pace, order, depth, and the length of instruction to allow the trainee to learn the task.
- The trainee is able to practice the task and gain hands-on experience.

There are also disadvantages to OJT that should be considered.

- The actual job site may not be the best place for training. The equipment at the job site may not be available for the length of time required to conduct OJT. Training may have to take a "back seat" to the requirements for operation. That is, the equipment may simply not be available for training due to operational goals or commitments.
- The cost of OJT can be high. OJT is usually conducted one-on-one, and this method of training and performance testing takes a great deal of time. In some cases, an instructor can train more than one trainee; however, performance tests should always be done one-on-one.
- Certain equipment may be dangerous in the hands of a trainee even under close supervision. (A simulator training setting would be a more desirable

setting for tasks that fall in this category.) There is also a chance that a trainee may damage equipment in the process of learning how to operate it.

The ultimate success of any training program requires a strong commitment to training by both line organization management and training management. The concurrence of these organizations regarding goals and content of an OJT program is essential for effective training. Training review/steering groups have been an important link in this process at several facilities. However, the facility's line organization has the ultimate responsibility for the proper training of their personnel.

Accurate records that document the actions and decisions made during each OJT program's construction and revision should be maintained to serve as the audit trail. The critical portion of an audit trail is not necessarily the decisions themselves, but the rationale that led to making them. These records should be maintained on an ongoing basis.

This section of the guide briefly addresses each phase of the systematic approach to training (SAT) process. Where appropriate, specific guidance for OJT and OJT programs is presented. The table-top processes for analysis, design, and development described in the DOE Handbook entitled *Alternative Systematic Approaches to Training* should be reviewed for applicability when developing or modifying OJT programs. These processes can normally produce equivalent results more efficiently than the more traditional methods that have been used. The DOE *Training Program Handbook: A Systematic Approach to Training* contains detailed information regarding all phases of a systematic approach to training and should be referenced for specific details.

3.1 Analysis Phase

Training requirements can be identified by performing needs analysis, job analysis, and/or task analysis. Analyses form the basis for determining training needs, developing and maintaining valid task lists, and selecting tasks that must be trained on. To facilitate tracking and revisions of training materials on the basis of facility or procedural changes, task lists are entered into systems such as task-to-training matrices. Correctly done, these analyses provide assurance that training is appropriate for the expected performance and identify requirements that serve as the basis for the design and development of OJT programs.

3.2 Design Phase

Design phase activities include writing of terminal objectives, selection of appropriate training settings, and development of training/evaluation standards (TES) for each task selected for training. It is during the development of the TES that the bulk of the tasks are further analyzed, enabling objectives are written, and decisions are made regarding how training will be conducted and evaluated. OJT may be conducted using general instructions and task-specific evaluation materials for low-hazard potential facilities or tasks.

When writing a terminal objective, the training setting must be considered. The training setting selected should be consistent with the task, but balanced against available resources and facility constraints. Guidance on writing learning objectives is contained in the *DOE Guide to Good Practices for Developing Learning Objectives*.

3.2.1 Training/Evaluation Standards (TES)

A training/evaluation standard (or equivalent document) is developed for each task selected for training. The TES specifies elements, criteria, and conditions required for adequate task performance. Each TES contains two parts: a training standard and an evaluation standard. The training standard contains the task title, the terminal and enabling learning objectives, and any applicable references. The information in the training standard is used to establish entry-level requirements and forms the basis for training development activities. The evaluation standard contains a performance test that includes prerequisites (to measure the trainee's knowledge and skills on each task), amplifying conditions and standards, and instructions to the trainee and the evaluator. The evaluation standard defines the conditions (cues) that signal a person to perform a specific task, establishes conditions under which actions occur, and establishes standards that measure knowledge and performance. It may be practical to combine the information contained in the training and evaluation standards into one document or include it in a qualification card or checklist. Figure 1 depicts the relationship of a task to a terminal objective to a TES and the output of the TES.

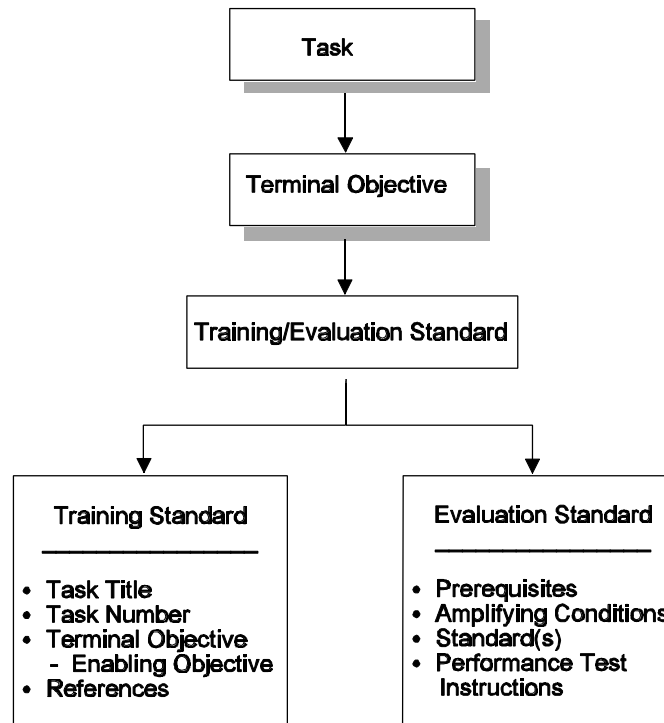


Figure 1 Training/Evaluation Standard

Instructors and training material designers/developers should design each evaluation standard so that different OJT instructors will administer the test consistently. The test should require actual task performance if possible. The DOE *Guide to Good Practices for Design, Development, and Implementation of Examinations* contains detailed guidance for developing performance tests.

The methods of conducting OJT and the required level of accomplishing performance testing is determined during the TES development process. The acceptable level of accomplishment (perform, simulate, observe, discuss) should be specified in each TES. Certain tasks should require that a trainee demonstrate achievement of the terminal objective through actual task performance. A core of tasks that must be performed should be identified by line and training management. These tasks are typically overtrain tasks or those that may be critical to safety.

Ultimately, the training and performance testing an employee receives should lead to qualifying that individual to perform the task. Therefore, the majority of tasks should be performance coded as either perform or simulate. Observe and discuss are primarily used for knowledge assessments. Appendix A, Performance Test Code Guidelines, may be used to help determine the most applicable level of accomplishment for a given task.

3.3 Development Phase

Development phase activities include the writing of training materials such as OJT checklists, qualification standards, and OJT guides. Additional activities include the selection and training of OJT instructors. The specifications generated in the design phase are used to develop an OJT program and all required training materials. Care should be taken to keep OJT materials simple and usable.

OJT checklists (qualification cards) that are specific to an individual OJT program should be developed to document training and performance testing. OJT checklists should be based on knowledge and skills required by the training and evaluation standards. Required level/levels of accomplishing performance testing should be specified for each task. Appendix B contains two examples of OJT checklists that are in use at DOE nuclear facilities.

While many options exist for the format of an OJT checklist, only two general formats will be discussed. The first, and probably the most common, is simply a list of all the tasks required for qualification and the required level of performance test accomplishment (the Power Plant Area Practical Factors Card in Appendix B is an example of this format). In this case, the OJT checklist is used as a signature record card to document the performance testing for each task. The completion of training for each task should also be documented on the OJT checklist. An OJT checklist should reference the OJT guides used to conduct the training and the evaluation standards used to conduct the performance tests. If the trainee must be trained and performance tested on a number of tasks to become qualified, this format is usually the

best. Figure 2 illustrates the relationship of the elements that make up the most common OJT checklist.

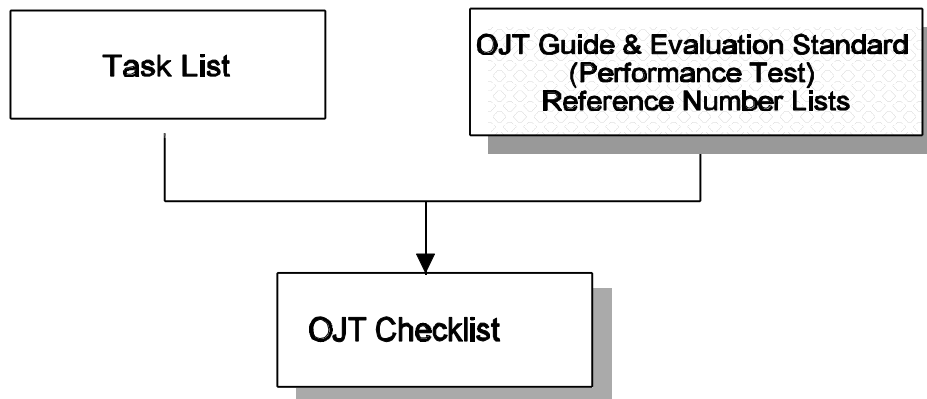


Figure 2 Task List-Based OJT Checklist

A second format used by some facilities includes each task's evaluation standard as a part of the OJT checklist (it may also contain each task's OJT guide). The On-The-Job Training/Evaluation Guide in Appendix B is an example of this format. This format, depicted in Figure 3, may result in a much larger OJT checklist. If a facility qualifies trainees on a duty area or a task basis, this approach may be workable.

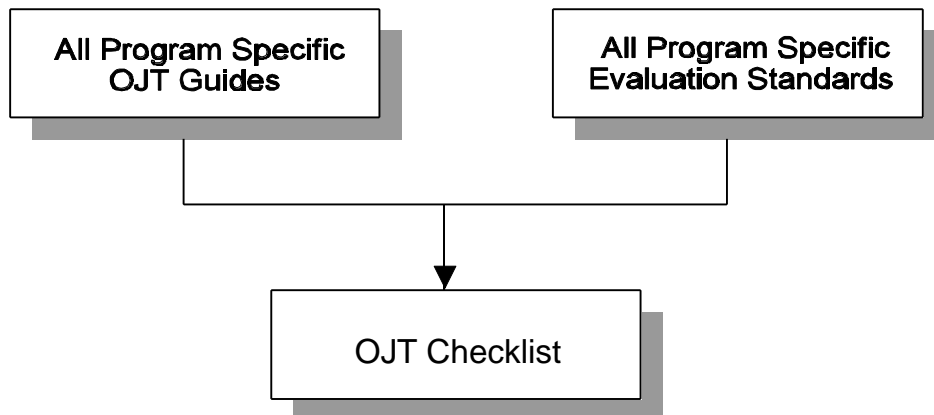


Figure 3 Combination Task List/TES OJT Checklist

The use of an OJT checklist that has two instructor signatures for each task helps to ensure that OJT is conducted and evaluated as a two-part process. The trainee is taught the task using an OJT guide and is then performance-tested using the evaluation standard.

OJT checklists may contain tasks that have both simulate and perform specified as the acceptable levels of accomplishment. At the time of conducting the OJT and/or the performance test, the OJT instructor should select the highest level of accomplishment that is supported by facility conditions. The OJT guide and the evaluation standard for a task that has multiple levels of accomplishment should be written to support the training and the evaluation at either level of accomplishment.

For tasks with a single level of accomplishment, there may be times that facility conditions do not support performance testing at the specified level of accomplishment. If this is the case, the instructor should inform the OJT program coordinator. The program coordinator may then reschedule the performance test or, with management's documented concurrence, the specific level of performance test accomplishment may be lowered. This documented concurrence should be attached to, and become a permanent part of, the trainee's OJT checklist.

3.3.1 Qualification Standards

Qualification standards are documents that contain the knowledge and skill requirements necessary for the successful completion of a training program. A qualification standard should provide explicit guidance to the instructor and to the trainee to aid in the preparation for and the consistent administration of performance tests. A qualification standard should include all program-specific evaluation standards to be used during performance testing. Facilities that qualify employees on a task basis need not develop a qualification standard. In this case, the OJT instructor and the trainee only need the task's evaluation standard.

A qualification standard should be prepared consistent with the program's OJT guides and evaluation standards. It should list the specific procedures and training resource materials required for each task (e.g., operating procedures, system descriptions, fundamentals text). This type of information may also be specified on the qualification card/checklist or in other training documents or procedures. The qualification standard may also include reading assignments, self-study requirements, study questions, problem analysis exercises, figures and diagrams, and amplifying information. Qualification standards should not include copies of facility procedures or training manuals/materials. They should instead reference these resources. Figure 4 illustrates the inputs to the qualification standard.

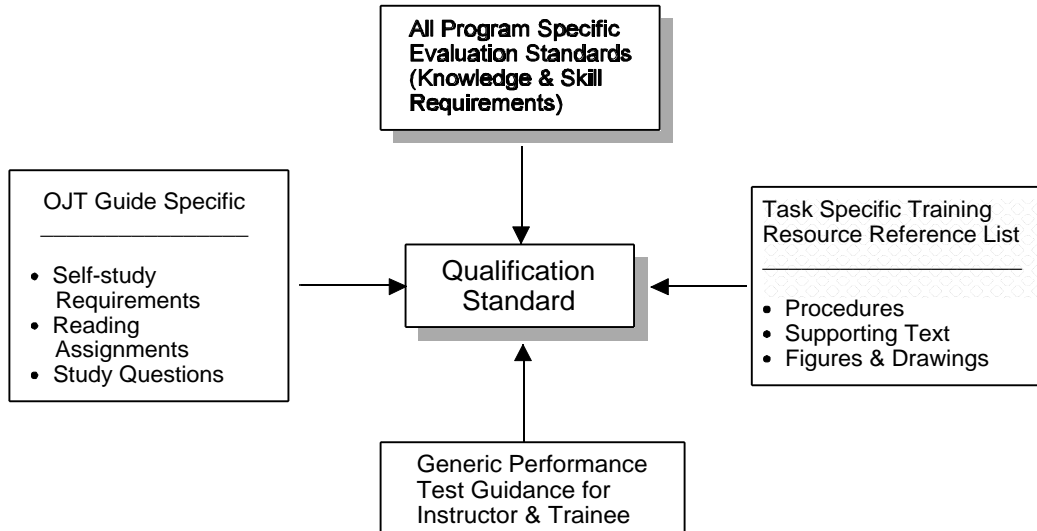


Figure 4 Qualification Standard Elements

Trainees in an OJT program that requires self-study should find the qualification standard a very useful document. It provides them with information on what to study, where this information may be found, and guidance on what they need to learn.

A qualification standard should contain a section that provides a trainee entering an OJT program with information on how that specific program operates, what will be expected of him/her, and how/where to obtain training-related help. It should provide information regarding the use of the OJT checklist and how to use the qualification standard. This section of the qualification standard should also address (if not included in other training documents or procedures):

- Facility restrictions on unsupervised trainee operation of facility equipment/systems
- Guidelines on self-study
- Guidelines on improving listening habits
- Established goals and how trainee progress will be tracked
- How the trainee interacts with the OJT instructor/program coordinator
- How to prepare for performance tests
- Comprehensive testing/evaluation required at the program's completion.

3.3.2 OJT Guides

Performance-based training programs should require the use of OJT guides (or equivalents) to ensure consistent delivery of training. An OJT Guide is a document that outlines instructor and trainee activities, learning objectives, training content, and the resources (equipment, material, etc.) necessary for the consistent conduct of training. The contents of an OJT guide for a specific task should be based on the training standard portion of the TES. An OJT guide should identify trainee prerequisites, learning activities, training equipment, and materials needed for training and specific guidance for their use. OJT guides also provide specific direction to the instructor for guiding the learning process. The relationship of an OJT guide to the TES and the OJT guide's content is depicted in Figure 5.

Some may question the necessity of OJT guides for on-the-job training. However, one of the most frequently asked questions is "How can we ensure consistent training from one instructor to the next?" One way to ensure this is by the use of the OJT guide. It may be a part of the OJT qualification card/checklist or a stand-alone document. In either case it should reference the specific task it supports and should be organized and formatted to enhance the one-on-one learning process.

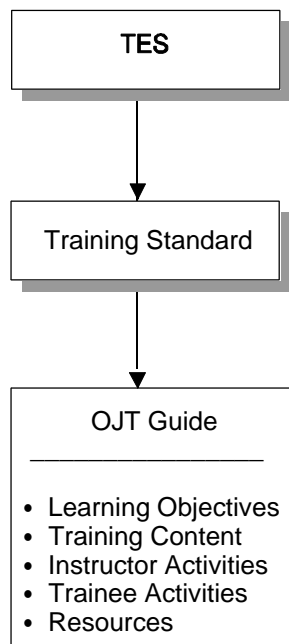


Figure 5 OJT Guide

OJT guides should not contain copies of facility procedures. Rather, they should reference the appropriate procedures and provide the instructor with task specific guidance which enhances the learning process. It should not include generic instructions that would be more appropriate in a training procedure or other type of guidance document. This practice helps ensure that the system/facility is operated only with approved procedures (which adds realism to the training), rather than with training materials, and will minimize revisions to the OJT guide as facility procedures are revised.

OJT guides should be prepared with the assistance of the OJT instructor serving as the subject matter expert (SME). They should be reviewed by an additional SME who was not directly involved in their development, and should be approved prior to use by supervisory members of the training staff and the management of the work group for which the training was developed.

There are numerous factors which can have a significant influence on a trainee's learning and motivation during the OJT process. Instructors or training material designers/developers should use these factors as they develop OJT guides. Appendix C discusses learning and motivation as they apply to OJT.

There are many OJT guide formats that could be successfully used for on-the-job training. OJT guides normally consist of a cover page, a body, and a conclusion. It should be noted that much of this information may be included in the qualification card/checklist or other appropriate training procedures or guidance documents.

The cover page should provide the instructor with the following information:

- Task title, number, and estimated time to complete the training
- Tools, materials, equipment, and references required
- Safety precautions and procedural limitations
- Reference to relevant facility procedures, facility conditions, and whose permission is required
- Terminal and enabling objectives
- Trainee prerequisites
- Notes to the instructor--guidance/suggestions
- OJT guide review and approval signature(s).

The body is the outline for the instructional process and includes the following major sections:

- Introduction
- Explanation
- Demonstration
- Practice under supervision.

The conclusion includes the following elements:

- Summary
- Additional motivation
- Documentation of Training.

3.3.3 Instructor Selection and Training

The credibility of a training program (and OJT programs in particular) depends on the quality of the instructors. OJT instructors should be qualified to deliver on-the-job training and/or conduct performance tests. The selection of OJT instructors is the responsibility of each facility's line and training management; however, first-line supervisor and senior job incumbents are the recommended first choices for OJT instructors. OJT instructors should be trained and qualified in accordance with the guidance in the DOE *Guide to Good Practices for Training and Qualification of Instructors*.

Several factors should be considered when selecting OJT instructors. OJT instructors should be technically competent. They should have the skills necessary to train and evaluate assigned trainees. Additional factors to be considered when selecting OJT instructors include recognition of responsibilities, professionalism, maturity, judgment, integrity, safety awareness, communication skills, personal standards of performance, and a commitment to quality.

The options normally available for selecting OJT instructors are the first-line supervisors and senior job incumbents or an instructor from the training organization. The supervisors and senior job incumbents are usually SMEs who supervise or perform the job. As such, they have first-hand knowledge of the job. An instructor from training may well be an expert on training but will typically not be as knowledgeable or proficient in the specifics of the job as an SME. It is usually better to train the supervisor or senior incumbent to be an effective instructor than to train the instructor to be a job expert. When OJT is conducted and evaluated using facility equipment, the instructor must be qualified to perform the task.

OJT instructors should receive instructor training in advance to allow sufficient time to develop instructor competency prior to working with trainees. When instructors have not yet attained the required instructional qualifications or only instruct occasionally, training quality may be maintained through mock training exercises and appropriate supervision and assistance.

All OJT instructors should be given the opportunity to enhance their technical competency and instructional skills. Continuing training that is based on periodic instructor performance evaluations should be provided to all qualified instructors. Instructor evaluations should include direct observation by training and operations supervision during training sessions, and should address technical competency, instructor skills, and overall effectiveness in facilitating the trainee's achievement of the learning objectives. Both announced and unannounced evaluations are appropriate.

3.4 Implementation Phase

Implementation phase activities for an OJT program include implementing the OJT program's administrative guidance, assigning an OJT coordinator, implementing the OJT program, conducting in-training evaluations, and maintaining training records.

Each OJT program at a DOE facility may have many instructors for training and performance testing. However, one person from the line organization staff or the training organization staff should be designated to perform the functions of an OJT program coordinator. OJT program coordinator functions may be one part of an individual's job. An OJT program coordinator may have responsibility for one or more OJT programs. The duties of an OJT program coordinator should include:

- Issuing OJT checklists and qualification standards
- Providing the trainee with a list of instructors qualified to conduct the OJT and/or performance testing
- Providing assistance to instructors and trainees
- Tracking trainee progress and setting target dates to reach qualification milestones/goals
- Ensuring proper documentation of training and performance tests
- Providing program feedback by evaluating the effectiveness of program materials and instructors
- Scheduling training to take advantage of unusual or infrequent job-related activities
- Counseling and assigning remedial training as a result of unsatisfactory performance
- Maintaining communication with the instructor(s) regarding the OJT program and the qualification progress of individual trainees.

3.4.1 Implementation of the OJT Program

Implementing an OJT program involves evaluating the knowledge and skills of trainees entering an OJT program to determine if they meet the entry-level requirements for that specific OJT program. When trainees enter the OJT program, they need to learn how the program operates and what will be expected of them. They should be provided with an OJT checklist, a qualification standard, and other supporting self-study materials.

Key factors in successful OJT instruction and performance testing (implementation) include:

- The learning objectives should be clearly understood by the instructor and the trainee
- The standards for successful completion of the training should be clearly understood by both the instructor and the trainee

- The instructor should have the knowledge and the ability to instruct and evaluate the trainee in accordance with the learning objectives and performance tests
- The training and the performance tests should be documented to meet training record requirements and to provide feedback to the training program.

NOTE

Personnel previously qualified at other facilities who have satisfactorily completed training programs with comparable content and performance standards may be granted an exception from portions of training on a case-by-case basis. Exception from training should be based on a review of their previous training records, personal interviews, and may include a pre-test based on the objectives stated for the training program. Pre-tests readily support exceptions from training when the trainee can demonstrate mastery of specific learning objectives. Pre-test results may also provide useful data to justify modification of an OJT program based on common strengths and weaknesses.

3.4.2 Conduct of In-Training Evaluations

In-training evaluations are necessary to provide data which will be used in the evaluation phase of the SAT process. In-training evaluations usually consist of:

- Instructor critique of training
- Trainee critique of training
- Trainee performance data (pre-tests, progress, and post-tests)
- OJT program coordinator's evaluation of instructor and trainee performance.

3.4.3 Training Records

Auditable records of each individual's participation and performance in, or exceptions granted from, the training program(s) should be maintained in accordance with DOE Order 5480.20A. The guidance in TG-17, "Nuclear Information and Records Management Association Guideline for Management of Nuclear Related Training Records," should be considered to standardize identification, handling, and storage of training records.

3.5 Evaluation Phase

The evaluation phase of performance-based training takes place to determine the effectiveness of training programs and to identify program changes that may be required. The DOE *Training Program Handbook: A Systematic Approach to Training*, contains detailed information and example forms that may be used to conduct this component of the SAT

process. Line management should also be actively involved in the evaluation of an OJT program's effectiveness. Line management's observation of facility activities that reflect improving or declining job quality and efficiency are a very important source of feedback for training, especially for an OJT program.

An OJT program's content should be continuously monitored and revised as a result of changes affecting policies and/or procedures, system or component design, job requirements, regulatory requirements, and industry guidelines or commitments. Facility and industry operating, maintenance, and safety experiences should be monitored to identify employee performance problems.

If training related employee performance problems exist, the solution may involve repeating portions of the analysis, design, and development activities and revision of existing materials. Because of the work and cost involved, the decision to modify the training program should first be based on safety considerations and then on a cost versus benefit basis. To ensure that programs remain effective and efficient, management's concurrence on all programmatic changes should be required.

4. CONDUCTING OJT

During this phase of OJT the instructor introduces and explains the task to be performed and demonstrates to the trainee how to perform the task. The instructor then supervises the trainee's practice of the task. For high-hazard potential tasks, this phase of the OJT process is separate and distinct from the evaluation phase of OJT. For low-hazard tasks OJT may be conducted and evaluated simultaneously. This may also be appropriate for category 3 hazard nuclear facilities.

Instructors should use the "Three Ts" of effective training as they conduct OJT. The first "T" is "tell them what you are going to tell them," the second is "tell them," and the third is to "tell them what you told them." Use of the three Ts helps to ensure effective on-the-job training.

The primary instructional method used in the on-the-job training setting is the demonstration-performance method. In this method, the instructor tells and shows the trainee how to perform the task. The shop foreman teaches the apprentice almost entirely by some version of this method, and the flight instructor uses it to teach flying skills. The instructor explains and demonstrates the particular task to the trainee and then coaches while the trainee practices the task. This method is based on the principle that trainees learn best by doing. During the practice the instructor points out errors and helps the trainee improve techniques or eliminate errors in performance. The trainee is allowed repeated practice to achieve the terminal objective. When the trainee has satisfied the objectives, the instructor concludes the training and documents it on the trainee's OJT checklist.

4.1 Preparation Step

Instructors should adequately prepare prior to conducting OJT to ensure consistent and effective training. A major portion of preparation should be a review of the OJT guide (or equivalent). This review should concentrate on the equipment and/or tools required, expected trainee preparations, reference materials, safety precautions, and may include a review of the factors that influence trainee learning and motivation (Appendix C contains factors of learning and motivation). The instructor should review the procedures referenced by the OJT guide, prepare the job site, and ensure that all necessary tools, materials, and procedures are available. The instructor should also ensure that sufficient time for the training has been scheduled.

4.2 Introduction Step

Put the trainee at ease. It is natural for a trainee to be somewhat nervous at first, especially if this is the first contact with the instructor. Time spent putting the trainee at ease will normally be time well spent. A relaxed trainee will be more receptive to the OJT process.

The instructor should motivate or arouse the trainee's interest in the training session. An adult likes to see a direct link between his/her job and the skills and knowledge presented during the training. To help to establish this link, the trainee needs answers to the following questions:

- What's in it for me (WIIFM)?
- Why do I need to learn this?
- When will I use this information?
- How will I use this information?

The trainee should understand the terminal and enabling learning objectives. The instructor should state and discuss the objectives with the trainee to ensure that the trainee understands the required performance, how well it should be performed, and under what conditions.

The instructor should provide the trainee with the first "T" of effective training--"tell them what you are going to tell them." The instructor should present an overview of the task that includes not only what will be learned, but how it will be presented. The overview should be brief and stress safety measures and compliance to procedures. This process may also help to relate this training to previous or future training. The instructor should make sure the trainee understands that he/she can ask questions anytime during the training.

The instructor should continue to stress safety while establishing the "ground rules" regarding how he/she intends to conduct the training. Explain under what circumstances the evolution will be interrupted (e.g., to demonstrate if needed) and under what circumstances the evolution will be stopped (e.g., if personnel or equipment safety concerns arise). The instructor should stress that facility procedures (administrative, operations, maintenance, lockout and tagout, radiological, etc.) must be adhered to at all times.

The instructor should determine what the trainee already knows about the particular job or task. The instructor should then tailor the training based on a combination of the trainee's experience, knowledge, and training completed to date. By briefly reviewing what the trainee knows and then progressing to new material, the risk of losing the trainee's attention will be minimized.

The instructor should minimize interruptions during the training process. The presence of co-workers at the training site may be a problem because the trainee needs to be able to practice, make errors, and receive corrective instruction without personal embarrassment. Although elimination of all co-workers from the vicinity of the training is difficult or impossible, some degree of privacy is needed.

The last step in the introduction is to express confidence that the trainee will learn to perform the task quickly and well. The goal is for the trainee to begin the training with a feeling of confidence and a desire to meet the challenge.

4.3 Explanation Step

With a simple task the instructor may combine the explanation and demonstration steps of OJT. With a complicated or hazardous task, however, it is usually better if the instructor separates these two steps.

The instructor tells the trainee how to perform the task--the second "T" of effective training. The instructor should clearly describe the action(s) the trainee is expected to perform. An important consideration in this step is the language used. Instructors should speak on a level the trainee understands and fully explain technical terms.

The instructor should stress key points and critical steps during the explanation of the task. This helps the trainee differentiate between the important (critical) and the not-so-important information. Full use should be made of being at the job site to explain the task and bring to the trainee's attention any cues and or stimuli related to the task. The instructor should explain why and in what order procedural steps or task elements are done to reinforce learning and stress safety by his/her words and actions.

An effective explanation requires two way communication between the instructor and the trainee. The instructor should ask the trainee questions to verify comprehension and should be patient and willing to explain something as many times as necessary. The instructor should answer any questions the trainee asks.

Most skills lend themselves to a sequential pattern where the instructor explains the skill in the same order in which it is performed. When the instructor can relate material to what a trainee already knows, the known-to-unknown strategy may be used effectively. When teaching more than one skill, the simple-to-complex strategy works well. By starting with the simplest skill, trainees build confidence and are less likely to become frustrated when faced with more complex skills. The instructor should not describe short cuts or unapproved alternative methods of performing a task. The instructor should not try to impress the trainee with his/her knowledge, because training should be trainee centered.

4.4 Demonstration Step

During the demonstration step the instructor shows and explains to the trainee how to perform the task. The instructor may demonstrate the complete task and then require the trainee to practice or they may perform the demonstration and practice steps together on an element-by-element basis. A well written OJT guide (or equivalent) should provide the necessary guidance to the instructor regarding the most effective techniques to use.

It is important that the instructor demonstrate the skill correctly and safely the first time. If demonstrated incorrectly, the instructor's credibility is reduced and the trainee will have to "unlearn" the incorrectly presented material before he/she can learn it correctly. The instructor

should stress safety and compliance with facility procedures. An effective way to do this is by his/her own personal actions. Since the trainee generally imitates the instructor's performance, the instructor should demonstrate the task exactly the way it should be performed. The instructor should ask the trainee frequent questions and explain or demonstrate task elements again as necessary. The instructor should proceed slowly and continue the demonstration only after it is clear that the trainee understands.

4.5 Practice Under Supervision

The instructor should closely supervise the trainee's initial practice to ensure safe and correct task performance. An effective method of conducting the practice step is to have the trainee talk through the key points and demonstrate the main steps of the task. During the practice session, the instructor should ask the trainee questions regarding what is being done, why it is done, and what indications to look for. The trainee should practice at his/her own pace without unnecessary interruption or too much instructor assistance. As the trainee gains proficiency, the instructor should reduce or fade his/her coaching. However, the instructor should never hesitate to stop the trainee if a mistake can be prevented or has been made. The instructor should correct improper actions promptly and without belittling the individual. The trainee will usually know what he/she did wrong, and very little correction should be necessary. The instructor should be patient and provide positive comments on the trainee's initial efforts.

Sufficient time should be scheduled to allow for trainee practice. Depending on the difficulty a trainee is having performing a task, the instructor may have to schedule additional training and practice at a later date. The time to identify and correct errors is during the training rather than during the performance test.

The OJT guide (or equivalent) should specify the degree of supervision that is required when the trainee practices under supervision. Facility procedures and the hazard or complexity of the task should be the overriding factor in this requirement. In both of the following cases the instructor supervises the trainee, but the degree of supervision is different:

- **Controlled**--The instructor closely supervises the trainee. The trainee works at his/her own pace but the instructor is always ready to stop him/her to prevent or correct mistakes.
- **Independent**--The instructor allows the trainee to practice the task at his/her own pace following the demonstration. This method has limited usefulness for facility operators but may work quite well in a shop or laboratory environment. The instructor closely supervises the trainee the first time he/she practices the task and then allows the trainee to practice independently, periodically checking and coaching as necessary.

Regardless of the method used, the end result should be sufficient trainee practice to develop proficiency in task performance (i.e., performance satisfies the learning objectives).

4.6 Conclusion

The conclusion of the training phase of OJT usually consists of three important elements. The first element is a summary of the training and is the last "T" of effective training--"tell them what you told them." The summary consists of a review of the learning objectives and the task steps. The instructor should make positive comments and praise what the trainee did well. This should be done even during review of an area in which the trainee had difficulty. However, it is equally important to discuss the areas in which the trainee had difficulty, because suggestions for ways to improve specific difficulties is also important feedback.

The second element is to provide additional motivation for the trainee. Reinforce how this training will help him/her perform on-the-job and discuss how it relates to previous and future training.

The last element is to document the training. Facility training procedures should specify how the instructor documents completion of training. One method is to document the training on the individual's OJT checklist.

4.7 Common Training Errors

OJT instructors are sometimes ineffective in their role as trainers for a variety of reasons. This section contains common errors that OJT instructors sometimes commit.

Trying to Teach Too Much--No one can really learn a very complex task all at once. Rather, people should be taught elements of the task (enabling objectives) and develop skills in doing those elements before they are taught the total operation. In short, don't try to teach a complex task as a complete unit. Break the task into understandable parts.

Attempting to Teach Too Fast--Attempting to teach the task too rapidly forces the trainee to perform a task when he/she is not ready. Many instructors feel that training can sometimes be done more rapidly than it can. This usually happens when they are very familiar with the task and feel it's easy to accomplish.

Lack of an Overview--OJT instructors sometimes skip the overview of the task because they know the job very well, and feel the trainee should be able to follow their explanation and demonstration without the first "T" of effective training.

Failure to Recognize Individual Differences in Trainees--Some trainees learn more quickly and easily than others because people vary in their working knowledge and skills (mental and/or physical dexterity, visual acuity). Learning speed is a function of both mental and physical skills. Effective instructors adapt their training styles to the individual differences and capabilities of their trainees.

Failure to Provide Practice Time--Being proficient at anything requires practice. There is no such thing as a natural born athlete or skilled mechanic. All tasks which require mental and physical skills require some practice. The point to recognize is that there is a difference between knowing how to perform a task and being proficient at performing it. The instructor should give the trainee time to practice to develop proficiency before evaluating the trainee's performance.

Failure to Show the Trainee the Overall Objective--The trainee should understand how the job fits into the operation or mission. The instructor should tell the trainee the importance of and how his/her products or services and how they will be used.

Failure to Give Reinforcement--Providing positive reinforcement of a trainee's efforts is an effective motivational practice. It is usually not enough simply to be motivated to try a job. Without some kind of reinforcement, people find it difficult to sustain a high level of motivation.

The reinforcement or encouragement given to the trainee need not be in a tangible form (promotion, pay raise, bonus). Intangible rewards are also meaningful. Vocal encouragement and praise in front of others have positive benefits in encouraging a person. If a trainee can develop a feeling of personal progress and accomplishment on the job or the mastering of a skill, he/she will usually be highly motivated.

Intimidation of Trainees--Some instructors may be ineffective as trainers because they intimidate trainees. They can do this in a variety of ways. Some use their position over the trainee in an effort to enhance their own ego. Others, by their behavior and attitude, do it unwittingly and unknowingly. Yet others feel that being very demanding is a good training practice. They may have good intentions but end up intimidating trainees.

Recognizing that an instructor is intimidating trainees is often difficult. Evaluation (reaction) forms should be provided to trainees in an OJT program. The OJT program coordinator or a line/training supervisor should review these forms and conduct periodic evaluations of OJT instructors. They should be able to determine if intimidation is taking place, and if necessary, counsel the instructor in ways to eliminate it.

5. EVALUATING PERFORMANCE

During the evaluation phase of OJT the instructor (evaluator) administers a performance test to assess the trainee's performance against predetermined performance standards. The evaluation phase should be separate and distinct from the training phase. However, OJT for low-hazard tasks may be conducted and evaluated simultaneously. This may also be the case for Category 3 hazard nuclear facilities. During the evaluation phase, the instructor tests the trainee. The time for instruction has ended.

5.1 Performance Testing

A performance test (sometimes called a practical factor) is a hands-on demonstration by the trainee of the knowledge and skills required to perform a task. Performance tests should be given and evaluated by qualified OJT instructors. The instructor uses an evaluation standard from a TES (or equivalent) to determine if the trainee has the knowledge and skills to perform the task. A trainee's knowledge may be assessed prior to, during, or following task completion. It is suggested that safety-related questions should be asked prior to task performance. A limited number of questions may be asked during the performance test if they will not distract the trainee from the task's performance, with the remaining questions asked following task completion.

The trainee is tested following the completion of training and any additional practice necessary to develop proficiency. Just as in the training phase of OJT, the evaluation phase consists of several distinct steps. To conduct a performance test the trainee and the instructor should prepare for the test. The instructor should then brief the trainee, conduct the performance test, debrief the trainee, and document the performance test.

5.1.1 Preparing for a Performance Test

Trainee Preparation. The trainee should review the evaluation standard and the OJT checklist to determine the required level of accomplishment. If there has been a significant time lag between the completion of training and the scheduled performance test, the trainee should study and/or practice the task under an OJT instructor's supervision to help refresh his/her skills. The trainee should confirm the scheduled evaluation time, review safety requirements, and obtain any necessary safety equipment.

Instructor Preparation. The instructor should confirm scheduled evaluation time with the trainee and verify completion of all prerequisite training. The instructor should prepare for the performance test by reviewing the materials that will be used (the OJT checklist, the evaluation standard for the task, and the procedure). If time permits, the instructor may want to walk through the task to ensure he/she is current on task specifics.

The instructor should ensure that required facilities, equipment, personnel, materials, etc., will be available at the scheduled time, and that facility operations will support and allow the level of accomplishment specified for the performance test.

5.1.2 Briefing the Trainee

Prior to conducting a performance test, the instructor should provide the trainee with an overview of the performance testing process and explicit instructions regarding the task to be tested. That is, the instructor should provide clear and complete instructions as to what the trainee is/is not allowed to do and explain under what circumstances he/she will stop the trainee (such as danger to personnel or equipment).

The instructor should review the evaluation standard with the trainee and explain the standards of acceptable performance. The instructor should tell the trainee that any answer or action that would place personnel, the facility, or system in danger is an immediate failure of the performance test regardless of the acceptability of other responses.

5.1.3 Conducting the Performance Test

A performance test is not an instructional process. Its purpose is to evaluate the trainee's skills and knowledge. The instructor should not coach or prompt the trainee by giving hints, by asking leading questions, or by his/her actions. If a task requires the trainee to go to a location, the instructor should not lead the way. If the evaluation standard references a procedure, that procedure should be available to the trainee during the test but should not be handed to the trainee by the instructor. Part of the performance test is to assess the trainee's use of procedures and understanding of their importance.

With most tasks, the instructor should be able to determine if the trainee is performing the task correctly by observing and comparing the trainee's actions to the evaluation standard and the procedure. The instructor should evaluate the trainee's ability to:

- Obtain the needed reference material and tools without difficulty
- Use the references and tools correctly and in the proper sequence
- Observe applicable facility safety rules when performing the task
- Manipulate the equipment in a deliberate and timely manner
- Recognize equipment status (such as, does he/she recognize when a valve is open or a pump is running).

Usually it is not enough for employees to only possess the skills to operate a tool, a component, or a system. Knowledge of the underlying theory/principles of operation, interactions with other systems, and actions if the equipment or system doesn't operate properly should also be required. To assess a trainee's knowledge, the instructor must ask questions to verify understanding of the task; however, the instructor should not ask questions

to distract the trainee. All questions asked during a performance test should be related to the task's terminal and enabling learning objectives, starting with the easier questions. This technique tends to build confidence and puts the trainee at ease. The instructor may then progress to more thought-provoking questions. The instructor may also ask the trainee to "talk through" the task as he/she performs it. This technique reduces the number of questions the instructor needs to ask and allows the instructor to stop the trainee before he/she makes a serious mistake. The questions used may be written in the evaluation standard (preferred method) or generated by the instructor during the performance test. Approved questions may be maintained in a question and answer bank and inserted into the evaluation standard prior to conducting a performance test.

Benefits of developing written questions for the instructor to ask as a part of the performance test include standardizing the knowledge assessment portion and minimizing the diversion of the instructor's attention from the trainee's answer (the instructor may be thinking about what to ask next while the trainee is answering the current question). Wrong responses may then go unnoticed, thus reinforcing in the trainee's mind that what he/she said was correct when, in fact, it was not. The questions asked during the performance test should test understanding and judgment as well as factual knowledge.

If the evaluation standard was developed with questions and answers built into it, the instructor should select appropriate questions to spot-check the trainee's knowledge. Questions asked during the test need not be restricted to those stated verbatim in the evaluation standard. The instructor may rephrase or expand them as appropriate. The instructor should also keep in mind that the trainee's answer will usually not be a verbatim answer. The instructor should record on the evaluation standard whether the trainee's response was satisfactory or unsatisfactory, and if unsatisfactory, the given response.

If questions are not included as a part of the evaluation standard, the instructor should ask questions to assess knowledge and record them as previously described.

The instructor has the option of asking several different types of questions during the performance test. This applies equally well to developing questions as part of an evaluation standard or to the instructor who is administering a performance test that was developed without questions. The two most common question types are the open-ended question and the closed-ended question. A good mix of these two types of questions should provide the instructor with enough information to determine whether the trainee has adequate knowledge.

The open-ended question places the burden of conversation on the trainee and gives the instructor time to analyze what the trainee is saying. It reduces the total number of questions asked and is very useful when starting a line of questioning in a new subject area. The following are two examples of open-ended questions:

- Describe the procedure for starting the recirculation pump.

- Explain how other systems are affected by performing this task.

Closed-ended questions are specific questions that are often answered with only one or two words (e.g., Yes, No, Open, Closed, 150 psig). They may be used to clarify a statement the trainee made in response to an open-ended question. Closed-ended questions place the burden of conversation on the instructor in that he/she spends much more time thinking of and stating the question than it takes the trainee to answer it. The following are two examples of closed-ended questions:

- Is there a danger of electrical shock while working on an energized motor controller?
- What indications of a loss of pump prime are available to you at this control panel?

Use of leading questions should be minimized or avoided altogether. In a leading question the instructor gives the trainee a partial answer and expects the trainee to complete it, or gives the complete answer and expects the trainee to agree or disagree.

All questions asked during a performance test should relate to the evaluation standard. Questions may include theory, system equipment, and a discussion of routine and/or emergency procedures. Most facilities require the trainee to memorize the immediate actions of an emergency procedure and expect the trainee to be able to rapidly locate the supplementary or follow-up actions in the procedures. In many instances an employee in the trainee's job classification does not perform all of the steps in a procedure. The instructor should ask why the trainee does not perform these procedural steps, who does, how the actions of others affect the task, and how he/she would know when to continue with his/her part of the procedure.

The trainee may answer a question incorrectly during a performance test. The instructor's response to the wrong answer should be as neutral as possible. The instructor may rephrase the question and if the trainee still does not respond correctly, record it in the evaluation standard and move to a different area. At the completion of the performance test the instructor should clarify any misconceptions or have the trainee look up what he/she did not know.

It should be noted that evaluation standards contain 100% of the required knowledge. For most tasks, the trainee is usually not required to know everything in the evaluation standard. Many facilities require that the trainee accomplish the skills portion of a performance test with 100% accuracy and achieve at least 80% of the information required by the evaluation standard. Other facilities require 100% accuracy on the skill requirements and a satisfactory or unsatisfactory assessment of the knowledge requirements. Facility-specific procedures or the OJT program's training administrative guidance should establish the task-specific skill and knowledge levels.

At the completion of a performance test the instructor must make a judgment call. Compared to the evaluation standard--did the trainee have satisfactory knowledge and skills or not? The use of a detailed evaluation standard which includes questions and answers will reduce the subjectivity of this decision. There are many possible outcomes of a performance test. The following three are generic examples:

- Satisfactory skills and knowledge; no weak points. The instructor signs the trainee's OJT checklist.
- Satisfactory skills and knowledge; the trainee lacked information on some minor details. The instructor may cover those details during the debrief and sign the trainee's OJT checklist.
- Unsatisfactory; the trainee lacked necessary skills or showed a significant lack of knowledge and understanding. The instructor should counsel the trainee as to the remediation required and what to practice or study and request the OJT program coordinator to reschedule additional training and another evaluation. The instructor should also discuss the trainee's performance with the program coordinator and/or the trainee's supervisor.

5.1.4 Debriefing the Trainee

At the completion of a performance test the instructor should conduct a detailed review of the trainee's performance. The instructor should tell the trainee if he/she passed or failed the test. The instructor should make positive comments while reviewing the performance test results. Based on the outcome of the test, the instructor should either discuss the knowledge items missed with the trainee or require the trainee to find the correct answers.

5.1.5 Documenting Performance Test Completion

If the trainee has satisfactorily performed the task, the OJT checklist should be signed and dated by the instructor. If the task has multiple levels of accomplishment, the instructor should indicate on the OJT checklist the level at which it was accomplished.

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APPENDIX A
PERFORMANCE TEST CODE GUIDELINES

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PERFORMANCE TEST CODE GUIDELINES

1. The following questions may help determine the most applicable performance code for a given performance test item. For each question, circle an "S" or a "P."

	<u>YES</u>	<u>NO</u>
Can the task be performed under actual job conditions?	P	S
Is the task observable under actual job conditions?		P S
Is the task hazardous or does it involve any unnecessary exposure* to radiation or other hazardous materials?		S P
Is performing the task on the job costly?	S	P
If performed, could the task adversely affect facility operations?	S	P

* There may be cases where some exposure is necessary to gain the greatest benefit from the training; however, ALARA concepts should always be considered.

2. After the results have been determined, use the table below as an aid in determining the performance code:

<u>Results</u>	<u>Performance Code</u>
All Ps	Perform
Ps and Ss	Perform or Simulate
All Ss	Simulate

For the cases where "Simulate" is indicated as the result of the table, but where manipulative skill demonstration is important to the evaluation of adequate task performance, a "Perform" may still be warranted. Conversely, if a "Simulate" is indicated, but the cost, the effect on facility operations, or the risks involved due to radiation exposure and/or other hazards are considered excessive, a "Discuss" may be the recommended performance code. Additionally, if manipulative skills are not a factor and group evaluation is considered adequate, "Observe" may be an acceptable performance code recommendation.

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APPENDIX B
EXAMPLE OJT CHECKLISTS

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DOE-HDBK-1206-98
APPENDIX B
PRACTICAL FACTORS CARD

Position/Job: Reactor Operator

Duty Area: Power Plant

Name: _____

Instructions: The trainee must perform, simulate, or observe (as required and indicated by the Xs) all practical factors listed on this card. Activities indicating a single performance level **may not** be changed: activities indicating more than one performance level (**P**erform, **S**imulate, **O**bserve) may be satisfied by completing any one. The order of preference for the actions shall be (1) perform, (2) simulate, (3) observe.

Upon satisfactory completion of each activity, a qualified instructor or qualified operator shall circle the action taken, and sign (using full signature) and date in the appropriate place.

FUNCTIONAL LOGS	P	S	O	Signature	Date
Complete Log 1-A (Section 3)	X				
Complete Log 1-A (Section 10)	X				
Complete Log 1-D	X	X			
Complete Log 7-B	X				
FEEDWATER AND CONDENSATE SYSTEMS	XX				
Fill the hotwell and condensate system (including No. 2 feedwater heater)	X	X			
Fill yard lines	X	X			
Recirc. yard lines	X				
Fill the steam drum with SUFWP	X				
Line up to fill steam drum with MFP's	X				
Line up to fill steam drum with ECP	X	X			
COOLING-WATER SYSTEMS	XX				
Start up condenser cooling-water system	X	X			
Route CCW to tower basin using local operators	X	X			
Drain main cooling-tower basin	X	X			
Cross-connect cooling-water systems		X			
Reset main cooling-tower-fan vibration switch	X	X			
Put steam on cooling-tower basin	X	X			
Drain main cooling-tower risers	X	X			
Monitor and control basin level	X	X			
MAIN STEAM SYSTEM	XX				
Draw vacuum on main condenser	X				
Warm up main steam header	X				
Warm up turbine chest	X				
Place auxiliary steam cross-connect in service	X				
Shift gland seal to main steam	X				
Blow down superheaters during standby	X				

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 APPENDIX B
PRACTICAL FACTORS CARD

Position/Job: Reactor Operator

Duty Area: Power Plant

Name: _____

FUNCTIONAL LOGS	P	S	O	Signature	Date
TURBINE GENERATOR	XX				
Start up oil system on turbine generator and test	X				
Test overspeed trip of turbine generator	X				
Shift and inspect L.O. strainers	X				
Start up turbine generator	X				
Route generator H, to atmosphere	X				
Route generator H, to casing	X				
Purge generator with CO ₂	X	X			
Reset auto transfer scheme	X				
Parallel turbine generator with INEL loop	X				
Place both LO coolers in service	X	X			
Fill generator with H ₂	X	X			
Place turbine generator on turning gear	X				
Shift and replace hydrogen bottles	X				
POWER-PLANT EVOLUTIONS	XX				
Plant heat up	X	X			
Plant cool down	X	X			
Start up power plant from hot standby to full power	X				
Shut down power plant from power to hot standby	X				
Cool down and drain steam, feed, and condensate systems	X	X			
Recover from loss of normal power	X	X			
Perform monthly running equipment switchover	X				
Place a sight glass in service	X				
Chemical analysis of all water chemistry			X		
LOG READINGS	XX				
Take six sets of power-plant log readings: Three sets must be 0030 readings (midshift), and one set (0030) readings on Monday (midshift).	XX				
No. 1 - 0030 (midshift)	X				
No. 2 - 0030 (midshift)	X				
No. 3 - 0030 (midshift)	X				
No. 4 - 0030 Monday, (midshift)	X				
No. 5	X				
No. 6	X				

I hereby verify that the named individual has satisfactorily completed all power-plant-area practical factors and has demonstrated the necessary abilities to perform the indicated activities.

_____/_____
 Alternate Reactor Shift Supervisor / Date

DOE-HDBK-1206-98
APPENDIX B
PRACTICAL FACTORS CARD

Position/Job: Reactor Operator

Duty Area: Reactor

Name: _____

Instructions: The trainee must perform, simulate, or observe (as required and indicated by the Xs) all practical factors listed on this card. Activities indicating a single performance level **may not** be changed: activities indicating more than one performance level (**P**erform, **S**imulate, **O**bserve) may be satisfied by completing any one. The order of preference for the actions shall be (1) perform, (2) simulate, (3) observe.

Upon satisfactory completion of each activity, a qualified instructor or qualified operator shall circle the action taken, and sign (using full signature) and date in the appropriate space.

FUNCTIONAL LOGS	P	S	O	Signature	Date
Complete Log 1-A (Section 2)			X		
Complete Log 1-A (Section 4)	X				
Complete Log 1-A (Section 5)			X		
Complete Log 1-A (Section 8)	X				
Complete Log 1-A (Section 9)	X				
Complete Log 1-C	X	X			
Complete Log 7-A	X				
Participate in reactor startup or restart	X	X	X		
Perform reactor startup or restart	X				
Participate in reactor shutdown (anticipatory)	X	X	X		
Perform reactor shutdown (normal)	X				
Plot CO/CN during startup	X				
Perform control-rod rebank	X				
Complete ascending PRD calculation	X				
Participate in reactor interlock checks (at console)	X				
Participate in fuel-handling interlock checks (at console)	X				
Complete reactivity plot calculation	X				
Compute reactor MWhr	X				
Complete control-rod calibration	X				
Perform rod drops at power	X	X			
Complete calorimetric determination of power (Log 7-B)	X				
Complete CO/CN plots during unrestricted fuel handling	X				
Perform control-rod comparison without use of DAS		X			
Calculate reactor 60-s period	X				
Calculate critical rod position for reactor restart, then 60-s period	X				

I hereby verify that the named individual has satisfactorily completed all reactor-area practical factors and has demonstrated the necessary abilities to perform the indicated activities.

_____/_____
Alternate Reactor Shift Supervisor / Date

DOE-HDBK-1206-98
APPENDIX B
ON-THE-JOB TRAINING/EVALUATION GUIDE

ADMINISTRATIVE INFORMATION		
TEST ID# <u>00000000000110-SP</u>	REV.# <u>0</u>	PAGE <u>1</u> OF <u>7</u>
(1) TASK #:	TASK TITLE:	AVG. TIME TO PERFORM
00000000000110	REPLACING SPARK PLUGS	0.5 HOURS
(2) PREREQUISITES:		
1. Course 00234 "Use of Hand Tools"		
2. Course 00254 "Small Engine Repair"		
(3) REFERENCES:		
1. Spark Plug Replacement Procedure 110.A		
(4) TASK SPECIFIC INSTRUCTIONS TO EVALUATOR:		
1. Ask student questions from prerequisite materials to ensure he/she understands terminology, the use(s) of each tool, and the reasons for using only high quality tools.		
(5) TASK SPECIFIC INSTRUCTIONS TO CANDIDATE:		
NONE		
(6) PERSONNEL/EQUIPMENT SAFETY:		
1. Follow all Crook Engine Repair safety policies		
2. Avoid excessive force during assembly and disassembly to prevent damage to tools and materials or personal injury.		
3. Be alert for any pinch points and sharp edges.		
(7) TOOLS/EQUIPMENT:		
Head, procedure, ratchet handle, 13/16" and 3/4" sockets, gaping tool, and a brush.		
(8) PERFORMANCE TERMINAL OBJECTIVE:		
Given all necessary tools and parts, change a spark plug according to procedure 110A.		
(9) INITIAL CONDITIONS:		
All materials are available, inspected, and ready for use.		
(10) INITIATING CUES:		
Directed by evaluator to begin.		

DOE-HDBK-1206-98
APPENDIX B
ON-THE-JOB TRAINING/EVALUATION GUIDE

ADMINISTRATIVE INFORMATION			
TEST ID# <u>00000000000110-SP</u>		REV.# <u>0</u>	PAGE <u>1</u> OF <u>7</u>
(1) TASK #: <u>00000000000110</u>		TASK TITLE: <u>REPLACING SPARK PLUGS</u>	AVG. TIME TO PERFORM: <u>0.5 HOURS</u>
(11) PERFORMANCE EVALUATION			
	Action Step	Standards	*
P	A1. Obtain references.	Trainee obtained the latest revised copies of the procedures	C
P	A2. Remove the boot	All the remaining steps are in accordance with procedure #110A. Did not tug on the wire, twisted gently off the plug.	S
P	A3. Remove any dirt	So that none will fall onto the hole.	S/C
P	A4. Remove the plug	The correct socket is seated straight on the plug and turned counterclockwise.	S/C
P	A5. Determine the condition of the plug.	Plug determined to require replacement	S/C
P	A6. Gap the plug	Gap is correct for type of plug, either 0.025 - 0.027" or 0.033 - 0.035".	S/C
P	A7. Install the plug	Tightened 1/4 turn beyond finger tight in the clockwise direction.	S/C
P	A8. Install the boot	Twisted gently onto the plug	S/C
P	A9. Used Procedure	Procedure was out and referred to for each step	C
<p>(12)</p> <p>CODES (S) Sequence is important. This step must be performed only after preceding step(s)</p> <p>(C) Critical step. Failure to meet standard for this item constitutes failure of evaluation.</p> <p>P & S refer to OJT performance evaluation levels of Perform and Simulate.</p>			

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ADMINISTRATIVE INFORMATION		
TEST ID# <u>00000000000110-SP</u>	REV.# <u>0</u>	PAGE <u>1</u> OF <u>7</u>
(1) TASK #:	TASK TITLE:	AVG. TIME TO PERFORM
00000000000110	REPLACING SPARK PLUGS	0.5 HOURS
(13) KNOWLEDGE REQUIREMENTS:		
The evaluator will randomly select a minimum of 6 questions from the following for each performance evaluation. Questions 1 and 5 must be asked on each evaluation.		
ORAL QUESTIONS	CRITICAL CONTENT FOR ACCEPTABLE ANSWERS	
K1. State the safety precautions associated with replacing a spark plug.	Follow all CER safety precautions and be alert for any pinch points and sharp edges.	
K2. How is the boot removed?	Twist gently off the plug.	
K3. Why is dirt removed from around spark plug prior to removing it.	To prevent dirt from falling in the hole thus into the cylinder which could lead to engine damage.	
K4. What direction is the spark plug turned to remove it?	Counterclockwise.	
K5. How do you determine if the spark plug needs replaced or not?	Refer to the Spark Plug Condition Guide pages 4 & 5 of the procedure.	
K6. How do you adjust the gap of a spark plug?	Bend the side electrode (never the center electrode) with the gapping tool.	
K7. Which direction is the spark plug turned to install it?	Clockwise.	
K8. How tight do you install a plug?	1/4 turn past finger tight.	

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TEST ID# <u>00000000000110-SP</u>	REV.# <u>0</u>	PAGE <u>1</u> OF <u>7</u>
(1) TASK #:	TASK TITLE:	AVG. TIME TO PERFORM
00000000000110	REPLACING SPARK PLUGS	0.5 HOURS
(14) EVALUATION SHEET		
Candidates Name _____ Payroll number _____		
Instructions to the candidate on evaluation were read and understood prior to the conduct of this evaluation.		
Candidates Signature _____ Date _____		
Evaluators Signature _____ Date _____		
KNOWLEDGE ITEMS COMPLETED		
QUESTION [K1] [K2] [K3] [K4] [K5] [K6] [K7] [K8]		
PERFORMANCE REQUIREMENTS		
ACTION STEP [A1] [A2] [A3] [A4] [A5] [A6] [A7] [A8] [A9]		
DEVIATIONS/COMMENTS (NOTE: COMMENT REQUIRED FOR ANY UNSAT RESPONSE)		
Circle all knowledge items or action steps evaluated as satisfactory (SAT). Place an X on all knowledge items or action steps evaluated as unsatisfactory(UNSAT).		

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ADMINISTRATIVE INFORMATION		
TEST ID# <u>00000000000110-SP</u>	REV.# <u>0</u>	PAGE <u>1</u> OF <u>7</u>
(1) TASK #:	TASK TITLE:	AVG. TIME TO PERFORM
00000000000110	REPLACING SPARK PLUGS	0.5 HOURS
(15) SCORING/REMARKS		
Candidates Name _____ Payroll number _____		
Total number of questions: _____		
Total number of correct responses: _____		
Overall Grade _____%		
Action steps performed out of sequence: _____		
(Performing step out of sequence constitutes failure of performance evaluation)		
Number of critical steps missed: _____		
(Failure to pass a critical step constitutes failure of a performance evaluation)		
Number of non-critical steps missed: _____		
OVERALL EVALUATION: Pass ___ Fail ___		
Additional training recommended:		
OVERALL COMMENTS:		
Check if candidate requires remediation (If yes fill out remediation form) _____		
EVALUATOR'S INITIALS _____		DATE _____
TRAINEE'S INITIALS _____		DATE _____

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APPENDIX C
FACTORS THAT INFLUENCE LEARNING AND MOTIVATION

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FACTORS THAT INFLUENCE LEARNING AND MOTIVATION

Numerous factors can have a significant influence on a trainee's learning and motivation during the OJT process. Instructional technologists should consider these factors as they develop OJT guides. OJT instructors should be familiar with and use these factors to improve their delivery of training.

Prerequisites--Trainees are more likely to learn something new if they have satisfied all the prerequisites. Past learning may be the most important factor in determining success or failure in learning. Completion of prerequisite tasks should be documented by the instructor's signature(s) on the OJT checklist.

Meaningful--A trainee may be motivated by relating to previous experience, future goals, interests, and values. Explain to the trainee how this subject relates to the job, his/her previous experience, and how this increases his/her potential for advancement. The trainee should then be able to see a direct link between OJT and the job.

Positive Conditions and Consequences--A trainee is more likely to continue learning if the conditions during instruction are made as pleasant as possible. Instructors should be aware of and try to minimize any negative conditions to which a trainee may be exposed. The following negative conditions are often associated with OJT:

- Trainees may be bored if the instructor does not tailor the training to the individual trainee. Teaching material that the trainee already knows, or that is not meaningful, will contribute to boredom. (Pre-testing and exceptions to training may minimize this factor.)
- Trainees may be frustrated by being given OJT when they have not completed prerequisite training.
- Trainees may be subjected to unpleasant physical conditions. Extreme heat/cold, radioactive contamination, high noise levels at the job site (exposure to these conditions may be minimized by the use of a mockup or simulator followed by limited time at the actual job site), and distractions such as the presence of peers during OJT may contribute to unpleasant physical conditions.

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- Trainees may be hurt emotionally. The instructor should make positive comments, avoid making comparisons to other trainees, and never ridicule the trainee's efforts. Trainees need to be rewarded (positive reinforcement) for their efforts; at first for doing the task nearly correctly, and after proficiency is gained for doing the task correctly.

Open Communications--A trainee is more likely to learn if OJT is structured so that the instructor's messages are open to the trainee's inspection. To improve open communications the instructor should:

- Clearly state the terminal and enabling learning objectives. The learning objectives tell the trainee exactly what is expected of him/her.
- Point out relationships. Give cues and prompts to the trainee to be sure he/she understands what has been said.
- Avoid using technical terms without explaining them to the trainee (do not assume that he/she knows).
- Talk about a system or component of that system at the location of the item if possible. Make full use of being at the job site to stimulate as many sensory inputs (sight, sounds, smell, touch) as possible. Make sure the trainee can see and hear everything that is explained and demonstrated as it takes place.
- Ask the trainee questions to verify comprehension. Open communication is a two-way street--the trainee should also feel free to ask the instructor questions.

Modeling--This is the very foundation of on-the-job training. The instructor provides a model performance for the trainee to emulate. It is very important that the instructor presents the material in the proper sequence and observes all applicable procedures and safety requirements. The trainee will emulate improper performance just as readily as proper performance. Therefore, the instructor must perform the task correctly.

Active Appropriate Practice--Learning is more likely to take place if the trainee takes an active part. OJT is an active hands-on process. Practice should be as similar to the actual job task as possible.

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Distributed Practice--A trainee is more likely to learn if practice is scheduled in short periods distributed over time. It is a good idea to limit practice sessions to one hour or less with a break between sessions. By distributing practice over a period of time, mistakes that are caused by exceeding the trainee's attention span or fatigue limits during the practice session can be minimized.

Fading--A trainee is more likely to learn if the instructor gradually withdraws instructional assistance. Following the initial practice session the instructor should systematically withdraw or decrease the coaching and helpful hints. The rate of fading is important: too slow and the trainee becomes dependent on the prompts--too fast and the trainee makes errors.

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CONCLUDING MATERIAL

Review Activity:

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(Instructions on Reverse)

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