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DOE HANDBOOK

RADIOLOGICAL CONTROL TECHNICIAN TRAINING



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

AREA TRNG

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Change 1
DOE-HDBK-1122-2009

	Original	Change
Part 3 1.05-1	NCRP Report No. 93 "Ionizing Radiation Exposure of the Population of the United States".	NCRP Report No. 160 "Ionizing Radiation Exposure of the Population of the United States".
Part 3 1.05-9	4) U.S. national average from diagnostic X-rays is 39 mrem/yr	Deleted
Part 3 1.05-9	3) NCRP report 93 gives the dose equivalent for medical radionuclides as 14 mrem/yr c. Both contributors to Medical Exposures combine for 53 mrem/yr major types of medical exposures (a recent draft report states it may be increased to 600 mrem equivalent dose)	3) NCRP Report No. 160 gives the dose equivalent for medical radionuclides as ~ 300 mrem/yr 1) computed tomography (total average dose ~ 150 mrem/yr) 2) nuclear medicine (total average dose ~ 75 mrem/yr) 3) radiography/fluoroscopy (total average dose ~ 75 mrem/yr)
Part 3 1.05-10		C. Total Background Radiation The average annual total effective dose to the general population (non-smokers) from naturally occurring and manmade sources is about 620 mrem.
Part 4 1.05-10	The NCRP Report No. 93 lists the average annual effective dose equivalent in the U.S. for diagnostic X-rays and nuclear medicine as 39 mrem (390 μ Sv) and 14 mrem (140 μ Sv), respectively. This gives a combined average annual effective dose equivalent from medical exposures of 53 mrem (530 μ Sv). A recent draft report states it may be increased to 600 mrem equivalent dose.	NCRP Report No. 160 gives the dose equivalent for medical radionuclides as ~ 300 mrem/yr 1) computed tomography (total average dose ~ 150 mrem/yr) 2) nuclear medicine (total average dose ~ 75 mrem/yr) 3) radiography/fluoroscopy (total average dose ~ 75 mrem/yr)
Part 4 1.05-15	Table 1 summary of radiation exposures Deleted	Total Background Radiation The average annual total effective dose to the general population (non-smokers) from naturally occurring and manmade sources is about 620 mrem.

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Change 2
 DOE-HDBK-1122-2009

	Original	Change
Part 5 Module 2.17 I. Module Introduction B. Motivation	B. Motivation Environmental monitoring plays a large role in the field of radiological control. Environmental monitoring is used to estimate human population doses, determine the impact a site has on the environment, monitor for unplanned releases as well as quantifying planned releases, and gives us data useful in determining pathway data.	B. Motivation Contamination control is used to help minimize the potential for internal contamination. Portable contamination monitoring instruments are used to provide data for the contamination control program. An understanding of these instruments is important to ensure that data obtained is accurate and appropriate for the levels of contamination. This lesson contains information about widely used portable contamination instruments.
Part 5 Module 2.17 I. Module Introduction C. Lesson Overview	C. Overview of Lesson 1. Environmental monitoring goals 2. Principles of program design 3. Radiological control responsibilities 4. Analysis of environmental samples 5. Site environmental monitoring methods 6. Transport mechanisms	C. Lesson Overview 1. General discussion/instrument selection 2. Count rate meter probes 3. Count rate meters 4. Personnel contamination monitors 5. Specialty contamination monitors

Foreword

This Handbook describes an implementation process for core training as recommended in chapter 14 to Implementation Guide G441.1-1C , *Radiation Protection Programs for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection*, and as outlined in the DOE standard, *Radiological Control* (RCS). The Handbook is meant to assist those individuals within the Department of Energy, Managing and Operating contractors, and Managing and Integrating contractors identified as having responsibility for implementing core training recommended by the RCS. While this Handbook addresses the training requirements of 10 CFR 835.103 for Radiological Control Technicians, it must be supplemented with facility specific information to achieve full compliance.

This Handbook contains recommended training materials consistent with other DOE core radiological training materials. The training material consists of the following documents:

Program Management Guide - This document contains detailed information on how to use the Handbook material.

Qualification Standard

Fundamental Academic Lesson Plans

Fundamental Academic Study Guides

Site Academic Lesson Plans

Site Academic Study Guides

Site Practical Training Manual

Oral Examination Board Manual

Facility Practical Training Attachment

This Handbook was produced in Word and has been formatted for printing on an HP 4M (or higher) LaserJet printer. Copies of this Handbook may be obtained from either the DOE Radiation Safety Training Home Page Internet site (<http://www.hss.energy.gov/HealthSafety/WSHP/radiation/RST/rst.htm>) or the DOE Technical Standards Program Internet site (<http://www.hss.energy.gov/NuclearSafety/techstds/standard/standard.html>). Documents downloaded from the DOE Radiation Safety Training Home Page Internet site may be manipulated using the software noted above.

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Part 1 of 9

Radiological Control Technician Training Program Management Guide



**Coordinated and Conducted
for the
Office of Health, Safety and Security
U.S. Department of Energy**

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Introduction

Purpose and Scope of Guide This guide defines and describes the DOE Radiological Control Technician (RCT) Core Training & Qualification Program, material development requirements, standards and policies, and administration. The guide applies to RCT Training & Qualification Programs at all DOE sites.

Compliance with 10 CFR 835 The DOE core training materials for RCT Training reflect the requirements identified in 10 CFR 835, recommendations identified in chapter 14, Radiation Safety Training, of DOE Implementation Guide G441.1-1C, *Radiation Protection Programs for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection Radiation Safety Training*, and in DOE's Radiological Control Standard (RCS). When implemented in its entirety and supplemented as noted with appropriate facility-specific information, this handbook will generally meet the requirements of 10 CFR 835.103 as they pertain to RCT training. However, it is incumbent on management of each facility to review the content of this course to ensure that the training content is sufficient to ensure the RCT can fulfill his or her responsibilities for developing and implementing radiation protection measures.

The core training described in this guide does not eliminate or reduce the need for additional site-specific training identified in the program and/or through a job evaluation. Site-specific learning objectives are flagged by a "→" in the left margin of the lesson plan. Sites should develop and implement the materials for flagged objectives as they apply to their sites. Each site is responsible for developing site-specific training as identified through a site-specific job evaluation.

Purpose of RCT Core Training The purpose of this program is to provide guidance concerning DOE's expectations for proficiency of RCTs across the DOE complex consistent with the requirements of 10 CFR 835 and the guidance in the RCS.

Organizational Relationships and Reporting Structure DOE/HS-11 is responsible for approving and maintaining the core course training materials associated with the RCT training program.

The establishment of a comprehensive and effective site RCT Training & Qualification program is the responsibility of line management and their subordinates. The training function can be performed by a separate training organization but the responsibility for quality and effectiveness rests with the line management.

Training and Qualification Program Description Next Page

Training and Qualification Program Description

Overview of RCT Program

Final approval of RCT qualification should be the responsibility of the Radiological Control Manager. RCT qualification should be granted only after assuring that all the requirements of training, examinations and work performance have been satisfied. By RCT qualification, Radiological Control management assures that the individual is capable of performing aspects of the tasks for which qualification was given.

The initial qualification process should require:

- successful completion of academic lesson examinations
- successful completion of required job performance measures
- successful completion of final comprehensive written examination
- successful completion of an oral examination
- final approval by Radiological Control Manager
- compliance with experience requirements as identified in DOE Order 5480.20A, Ch. 1

The biennial requalification process should require:

- participation in continuing training
- successful completion of a final comprehensive written examination
- successful completion of selected practical training
- successful completion of an oral examination

Description of Program

The training program is based on RCS recommendations, industry guidelines, and the *Guide to Good Practices in Radiation Protection Training*. Entry-level prerequisites should be established by each site to ensure that RCTs meet standards for physical condition and education. At a minimum, these standards should include:

- high school education or equivalency
- fundamentals of mathematics, physics, chemistry, and science
- systems and fundamentals of process, operations, and maintenance
- reading and comprehension level sufficient to follow procedures, write permits, prepare survey maps, write reports, and prepare shipping and transfer permits
- ability to work in the support role including communicating verbal instructions to others

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Training and Qualification Program Description (continued)

**Description of Program
(continued)**

- physical requirements to handle personal protective equipment, other equipment, and assist others in work location commensurate with assignment
-

Initial Training

The initial training program ensures that trainees are trained to meet performance requirements using a systematic approach to training. The initial training program contains four segments: Phase I, Phase II, Phase III, and Phase IV. Classroom instruction times may vary based on technician entry level qualifications and are not mandated.

Phase I - Academic Training:

Phase I is divided into two sections: Fundamental Academics and Site Academics. The lessons in these sections may be taught in any order provided that prerequisite lessons are completed first. Typically, the academic phase is approximately 240 hours in length.

- a. The Fundamental Academics section includes the following 13 lessons:

- 1.01 Basic Mathematics and Algebra
- 1.02 Unit Analysis and Conversion
- 1.03 Physical Sciences
- 1.04 Nuclear Physics
- 1.05 Sources of Radiation
- 1.06 Radioactivity and Radioactive Decay
- 1.07 Interaction of Radiation with Matter
- 1.08 Biological Effects of Radiation
- 1.09 Radiological Protection Standards
- 1.10 ALARA
- 1.11 External Exposure Control
- 1.12 Internal Exposure Control
- 1.13 Radiation Detector Theory

These 13 lessons contain generic fundamental theory and do not contain any site-specific information. They represent the minimal standard information recommended to be taught to an RCT. These lessons should be taught by all DOE sites.

- b. The Site Academics section contains the following 19 lessons:

- 2.01 Radiological Documentation
 - 2.02 Communication Systems
 - 2.03 Counting Errors and Statistics
-

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Training and Qualification Program Description (continued)

Initial Training (continued)

- 2.04 Dosimetry
- 2.05 Contamination Control
- 2.06 Airborne Sampling Program/Methods
- 2.07 Respiratory Protection
- 2.08 Radioactive Source Control
- 2.09 Environmental Monitoring
- 2.10 Access Control and Work Area Setup
- 2.11 Radiological Work Coverage
- 2.12 Shipment and Receipt of Radioactive Material
- 2.13 Radiological Incidents and Emergencies
- 2.14 Personnel Decontamination
- 2.15 Radiological Considerations for First Aid
- 2.16 Radiation Survey Instrumentation
- 2.17 Contamination Monitoring Instrumentation
- 2.18 Air Sampling Equipment
- 2.19 Counting Room Equipment

These lessons include objectives covering general information relative to the topic and common to all DOE sites, and objectives where the information may vary with the site (identified by "→").

Each DOE site should determine appropriate site academic lessons and objectives based on job responsibilities and requirements as identified through a site-specific job evaluation. Facilities that have not conducted a job evaluation should teach all Phase I lessons and objectives.

The standardized academics training is designed to be delivered in a classroom setting. Examples of alternate delivery methods are:

- Self-study of Phase I academic materials in support of comprehensive challenge exams for personnel who exceed entry-level pre-requisites
- Self-study for initial and continuing training
- Computer-based training

In all cases, regardless of the setting or delivery methods, examination requirements should be consistent with those specified in Chapter 6 of the RCS.

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Training and Qualification Program Description (continued)

Initial Training (continued)

Phase II - Practical Training:

Phase I academic objectives provide the bases for skills and tasks to be performed in Phase II. Practical training utilizes a mixture of classroom and hands-on training. RCTs are taught to apply academic knowledge to the site-specific tasks.

- a. The practical phase consists of two parts: training and evaluation. Further guidance on the development and conduct of practical training and evaluation is given in the "Practical Training Guide" section of this training program.
- b. Tasks should be demonstrated to the trainee with emphasis on the critical elements of the task. Explanations should be given to the importance of the tasks and the adverse effects if not performed properly. Training of tasks may occur at any time or any order provided the prerequisite learning objectives (academics) of the task have been taught and the proficiency of those objectives documented. All training should be conducted without placing either personnel or facilities at unnecessary risk. RCTs who are not qualified should be under the direct supervision of a qualified RCT. Direct supervision requires a qualified RCT to accompany the trainee and be capable of intervening, if necessary.
- c. Trainees who have demonstrated the ability to perform a task should be evaluated using the Job Performance Measures (JPMs). The JPMs identify the knowledge and skills needed to accomplish the task. The trainees should be evaluated on a satisfactory/unsatisfactory basis for each task. Once a trainee demonstrates task qualification, and has obtained the appropriate signatures, he/she may perform that task without direct supervision.

Phase III - Oral Examination Boards:

- a. Oral examination boards should be used to validate the training of candidates for RCT positions. The board should assess the individual's response to normal and emergency situations. Questioning should not be of the type that could be covered in a written examination.
- b. The Radiological Control Manager should designate the board members and appoint a chairperson. The board should be comprised of at least three persons to include a Radiological Control Supervisor, Radiological Control staff, and line

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Training and Qualification Program Description (continued)

Initial Training (continued) management operations department supervisors and staff personnel, as applicable.

- c. Further guidance on the development and conduct of oral examinations is given in the "Oral Examination Boards" section of this training program.

Phase IV - Facility Practical Training:

- a. At DOE sites with more than one facility and where RCT tasks at each facility may differ, site and facility tasks should be separated. The tasks that are common to all the facilities on the site should be included in Phase II training with the core tasks. Tasks unique to a facility should be added to the training program qualification standard as an attachment, as Phase IV training.
- b. Not all DOE sites will include Phase IV training in their programs. Phase IV training allows each site to qualify technicians to a select facility. The transfer of technicians between facilities requires that facility tasks be taught and RCT core qualification is current.
- c. Further guidance on the development and conduct of facility practical training is given in the "Facility Practical Training Guide" section of this training program.

Additional Training

Personnel entering the initial RCT training program should receive Radiological Worker II training if they are required to perform unescorted duties as a Radiological Worker or enter radiological areas prior to receiving the core academic instruction.

Qualified RCTs satisfy the requirements of Radiological Worker (RW) training. Since RCTs perform radiological workers' tasks (don/doff PCs, self-survey, comply with RWPs, etc.), radiological worker practical skills should be taught. Each site has the option of including RW training in their RCT program or to have RCTs go through the practical factors portion of RW training. The advantage of going through the RW practical factors is the resulting consistency of the program, where RCTs become refreshed on RW practices being taught and are thus less likely to direct different practices in the field.

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Training and Qualification Program Description (continued)

**Additional Training
(continued)**

RCTs may require additional training to enhance their overall performance and skills. These courses may include specialized training in CPR, first aid, hazardous material training, as well as human resources training in communication skills and assertiveness. Each contractor site should determine these requirements and ensure that they are met as applicable to RCTs at that site

Continuing Training

Continuing training programs should be designed and implemented to maintain and enhance the proficiency of RCTs. This training provides the RCTs with review of required knowledge/skills, introductions to new knowledge/skills, lessons learned from others, and verifies by examination minimum levels of proficiency. Topics addressed in continuing training should include:

- selected topics from Phase I and Phase II training
- new procedures and changes to existing procedures that have an impact on radiological controls
- new equipment and changes or modifications to existing equipment or facilities
- lessons learned from site operating experiences
- lessons learned from industry operating experiences
- identified deficiencies or poor task performance
- items identified as requiring repetitive training because of high degree of difficulty and/or criticality or infrequent performance
- annual retraining on emergency preparedness, including drills

Experience has shown that effective continuing training programs incorporate the following features of technical training:

- Lessons learned training that is embedded in lesson plans and emphasizes important points.
- Exercises that utilize procedures in training materials, such as procedure use exercises that are interesting and hold the RCTs attention.
- Concept application techniques that link theoretical concepts to practical applications.

Continuing training should include written examinations as applicable, demonstrations of proficiency controlled by qualification standards and written and oral examinations to prepare for the comprehensive biennial requalification.

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Training and Qualification Program Description (continued)

**Additional Training
(continued)**

Continuing training courses should be shared among DOE facilities to reduce redundant development effort and to maintain standardization.

All RCTs should complete a minimum of 40 hours of continuing training for each year of the biennial requalification cycle.

Requalification

A 2-year cycle of continuing training is recommended for requalification. Continuing training should serve as the basis for requalification.

Biennial requalification should encompass a representative crosssection of Phase I learning objectives, site-specific and departmentwide changes in requirements, lessons learned from operations and maintenance experience, and selected tasks.

A comprehensive written examination and oral examination board are recommended within the last six months of the biennial requalification cycle. Requalification should consist of participation in continuing training, successful performance of tasks selected for requalification, successful completion of a comprehensive written examination and successful completion of an oral examination board.

**Instructor Training and
Qualifications**

All classroom instruction should be provided by instructors qualified in accordance with the site's instructor qualification program. Training staff (contractor and subcontractor, if used) must possess both technical knowledge and experience, and the developmental and instructional skills required to fulfill their assigned duties.

Training staff responsible for program management, supervision, and development must have and maintain the education, experience, and technical qualifications required for their jobs.

Instructors should have the technical qualifications, which include adequate theory, practical knowledge, and experience, for the subject matter that they are assigned to teach

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Training and Qualification Program Description (continued)

Instructor Training and Qualifications (continued)

Methods should be in place at each site to ensure that individual instructors meet and maintain position qualification requirements.

Subject-matter experts without instructor qualification may provide training in their area of expertise. However, these subject-matter experts should be trained as instructors when this occurs routinely.

Requalification

Direct or first-level supervisors of RCTs should have qualified as RCTs prior to entering the RCT Supervisor training & qualification program.

RCT supervisors should have a greater depth of knowledge than that expected of an RCT. RCT supervisors should have supervisory and leadership capabilities to direct the work of RCTs; effectively interact with crafts, line supervisors, professional staff and other managers; and be able to respond and direct others in emergency and abnormal situations.

RCT supervisors should participate in either RCT supervisor continuing training or RCT continuing training.

RCT supervisors should be requalified every 2 years through comprehensive oral examination boards. Oral examination boards should focus on the ability to analyze radiological conditions and unusual situations and supervise subordinates. The Board constituted to evaluate RCT supervisor qualification should not include peers or subordinates as voting members.

Site Training Program Development Next

Site Training Program Development

Job Evaluations

The core course training materials provide the minimum basis for RCT training. However, in order to maintain the performance-based philosophy, a job evaluation should be performed to assess the needs of each individual DOE facility.

A job evaluation is a documented review of RCT job scope and responsibilities. While a complete job/task analysis is desirable, a job evaluation provides the minimum amount of analysis to determine the tasks performed by an RCT.

A job evaluation consists of:

- development of a list of tasks performed by RCTs at the site
 - evaluation of the task list for training applicability and methods
 - comparison of identified tasks and associated topics to the site academic materials to determine which lessons and objectives apply
 - comparison of site task list to the core task list for applicability
-

Site Academics Objectives

The Site Academics section of Phase I training provides a broad scope of topics associated with RCT tasks. Inclusion of Phase I site training materials is dependent on the site-specific RCT duties. The job evaluation should be used to provide the basis for exclusion of site-specific learning objectives ("→") from the site program.

The job evaluation should also be used to identify additional RCT tasks which require training.

Some Site Academics objectives may be satisfied by other training courses attended by RCTs.

Practical Training

Each site should determine tasks for initial practical training of RCTs at that site. Below is a list of tasks that are performed by RCTs at most DOE sites. This list should be considered for inclusion in the site task list. In addition, each site may add other site-specific tasks as appropriate. The core task list is as follows:

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Site Training Program Development (continued)

**Practical Training
(continued)**

- Perform a contamination survey
- Perform a radiation survey
- Obtain air samples
- Perform a leak test on a radioactive source
- Complete a performance test on portable hand held instruments
- Complete a performance test on health physics counting equipment
- Post a radiological area to reflect associated hazards
- Perform a radioactive material shipment survey
- Respond to a high airborne activity alarm
- Respond to an uncontrolled release of radioactive material
- Respond to a radiation alarm
- Respond to an injured person located in a radiological area
- Direct and monitor personnel decontamination

Job Performance Measures (JPMs) should be used to assess the trainee's ability to perform identified tasks. Guidance on the development of JPMs is given in the "Practical Training Guide" section of this training program.

Qualification Standards

A qualification standard states the academic and practical requirements necessary for the successful completion of the RCT Program.

Signatures on the standards should document satisfactory proficiency for the performance requirements. A list of personnel authorized to sign qualification standards should be maintained at each site.

Guidance on the development of Qualification Standards is given in the Technician Qualification Standard section of this training program.

**Training Aids, Reference
Materials**

Designated viewgraphs should be used. Site-specific training aids may be developed.

Reference materials should be cited in each lesson plan.

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Evaluations

Academic Examinations

Written examinations should be used to demonstrate satisfactory completion of academic training. Requirements for examinations include:

- The minimum passing grade for examinations should be 80%.
- Questions should be randomly selected from the supplied question bank.
- Each RCT should be tested on all learning objectives through a combination of questions in the topic (Phase I) examinations and final comprehensive examination (after Phase II) for initial qualification.
- One exam bank question may cover several learning objectives. The trainee should acknowledge, by signature, his/her participation in a post-examination review.

Each site should designate a single point of contact as an examination bank custodian. DOE will provide a copy of a sample exam bank to exam bank custodians.

An examination question bank should be maintained by the site examination bank custodian. Recommendations for exam banks and examinations include:

- The examination question bank should include at least three (3) questions per learning objective
- Each question in the exam bank should be numbered in accordance with the corresponding learning objective.
- The standardized core course examination question bank should include Phase I academic material except for Site Academics learning objectives flagged by "→" as site-specific.
- Questions may consist of multiple choice, fill in the blank, short answer, matching, and essay. In order to minimize test items requiring rote memorization, short answer and essay questions are the preferred method of testing. True/false questions should not be used.
- Short answer and essay questions should have model answers to reduce the subjectivity in grading.

All site-specific site exam-bank questions should be maintained by the site and should be developed for the flagged ("→") learning objectives.

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Evaluations (continued)

**Academic Evaluations
(continued)**

Written examinations which cover objectives from one or more academic lessons should be administered at periodic intervals during Phase I to assess trainee classroom progress.

Examinations generated by the site for academic lessons should use questions from the DOE sample exam bank and each site's site specific exam bank.

Remedial action for trainees who fail a topic examination should be the responsibility of each site.

**Final Comprehensive
Examinations Written**

A final comprehensive written examination should be administered following the completion of Phase II and within the last six months of biennial re-qualification. It should cover a representative sample of the learning objectives from Fundamental Academic and appropriate Site Academic lesson plans.

Students who fail the final comprehensive written examination should complete a formal remediation in the areas of weakness. The remediation requirements should be documented in a formal written plan and presented to the student. As a minimum, the remediation should include:

- a review of the weaknesses noted by the final written examination
- counseling to determine the depth and nature of the weaknesses and appropriate action based on the counseling
- any retraining or self-study considered necessary to upgrade the areas of weakness

Students failing three final comprehensive written examinations should be considered for dis-enrollment from the RCT program.

Challenge Examinations

Challenge examinations should be administered after a review of trainee records. The review should include:

- previous work history
- previous training and education

Challenge examinations should be utilized for individuals with prior training, NRRPT registration, education, and experience. Study materials may be provided to individuals prior to examination.

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Evaluations (continued)

**Challenge Examinations
(continued)**

Challenge examinations may be administered for a group of academic lesson plans or for individual lesson plans.

Challenge examinations should consist of questions from a representative sample of learning objectives for the lessons being challenged.

Challenge examinations should be composed of questions from the academics examination question bank.

Identified weaknesses in performance on challenge examinations should require formal remedial training and successful re-testing.

Practical Training

Qualification for each task should be achieved by actual task performance. When the actual task cannot be performed but is simulated, the conditions of the task performance, references, tools, and equipment should reflect the actual task to the fullest extent possible.

Trainees are evaluated on a satisfactory/unsatisfactory basis for each on-the-job-training (OJT) task. Trainees should be given sufficient time to practice the task before an evaluation is conducted. Any practical training completed with less than 100% proficiency on critical steps constitutes a failure. Failure of any task will require remedial action, which may include a repeat demonstration of the task by an OJT trainer/evaluator or allowing the trainee to perform the task with direct supervision.

Candidates failing three evaluations on the same task should be considered for dis-enrollment from the RCT program.

Further guidance on the conduct of practical training is given in the "Practical Training Guide" section of this training program.

Oral Examination Boards

The oral examination board provides an opportunity to identify areas of weakness related to performance of RCT duties.

Candidates who fail an oral examination should complete a formal remediation in the areas of weakness. The remediation requirements should be documented in a formal written plan and presented to the candidate.

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Evaluations (continued)

**Oral Examination Boards
(continued)**

Candidates failing three final oral examinations should be considered for dis-enrollment from the RCT program.

Guidance on the conduct of oral examination boards is given in the "Oral Examination Board Manual" section of this training program.

**Disqualification Procedures
and Policies**

Any trainee who does not successfully complete a final comprehensive examination or oral examination board should be considered for disqualification. Disqualification means that an individual cannot perform RCT tasks unless accompanied by and under the direct supervision of a qualified RCT.

Any trainee who does not successfully complete an evaluated on-the-job task should be disqualified from further performance of that task. Disqualification means that an individual cannot perform the specific task(s) unless accompanied by and under the direct supervision of a qualified RCT.

Disqualified individuals should receive a management review of individual circumstances to determine appropriate actions.

An RCT who fails to complete continuing training requirements during the requalification period should be disqualified. Site generated exceptions may be made for continuing training based on long- or short-term medical leaves, use of subcontractors, etc. These exceptions may be necessary if an RCT is unable to attend continuing training, and make-up of that cycle is not practical.

Administration Next

Administration

**Training and Qualification
Records**

Training records and course documentation shall meet the requirements of 10 CFR 835 Subpart H and should meet Chapter 7 of the DOE RCS.

Examinations should clearly identify missed questions and scores.

Recommended signatures for RCT qualification are:

a. Completion of Phase I (Academic Training):

- 1) Instructor signature on qualification standard stating trainee has met the requirements of the learning objectives through examination. Following successful completion of challenge examinations, the trainee should receive credit for the academic material covered by the challenge examination.
- 2) Trainee signature on the examination acknowledging participation in a post-exam review

b. Completion of Phase II (Practical Training):

- 1) Trainee signature on the qualification standard verifying performance of the task
- 2) OJT trainer/evaluator signature on the qualification standard verifying satisfactory trainee performance of the task

c. Completion of final comprehensive written examination:

- 1) Instructor signature on qualification standard stating trainee has met the requirements of the learning objectives through examination.
- 2) Trainee signature on the examination acknowledging participation in a post-exam review

d. Completion of Phase III (Oral Examination Board):

- 1) Signature by the chairperson of the oral examination board on the qualification standard verifying the trainee's satisfactory performance, based on the assessment of all voting members

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Administration (continued)

Training and Qualification Records (continued)

- 2) Trainee signature verifying successful completion of the oral examination

 - e. Final Approval:
 - Radiological Control Manager (or designee) signature on the qualification standard acknowledging final approval of the standardized technician position qualification.

 - f. Completion of Phase IV (Facility-specific Practical Training) - optional:
 - 1) Trainee signature on the qualification standard verifying performance of the task

 - 2) OJT trainer/evaluator signature on the qualification standard verifying successful trainee performance of the Task

 - 3) Radiological Control Manager (or designee) signature on the qualification standard acknowledging approval of facility qualification
-

Training Program Development/Change Requests

All requests for program changes and revisions should be submitted through the appropriate DOE technical standards change process.

RCT Training Program Evaluation

Verification of the effectiveness of Radiological Control training should be accomplished by surveying a limited subset of former students in the workplace. This evaluation should include observation of practical applications and discussion of the course material, and may include an associated written examination. DOE/EH has issued guidelines for evaluating the effectiveness of radiological training through the DOE Operations Offices and DOE Field Offices. These guidelines are included as an attachment to the program management guide to DOE Handbook, General Employee Radiological Training, Evaluating the Effectiveness of Radiological Training.

For additional guidance, refer to DOE-STD-1070-94, "Guide for Evaluation of Nuclear Facility Training Programs." The guidelines contained in these documents are relevant for the establishment and implementation of post-training evaluation and retention testing programs.

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Administration (continued)

**RCT Training Program
Evaluation (continued)**

In response to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 91-6, DOE committed to develop an implementation plan to upgrade radiation protection programs at DOE defense nuclear facilities. The implementation plan detailed DOE's plans to develop and implement radiation protection posttraining evaluation and retention testing programs. Post-training evaluations will be used to identify opportunities for improving course materials, upgrading instruction methods and techniques, and determining the need for additional training. Retention testing will indicate when individual performance or testing fails to meet expectations. Corrective actions for deficiencies identified in retention testing will be incorporated in the individual's development plan and the site's training program on an appropriate schedule. DOE provides guidance on retention testing programs for radiological training in an attachment to the program management guide to DOE Handbook, General Employee Radiological Training, Evaluating the Effectiveness of Radiological Training.

In addition, Chapter 6 of the DOE RCS states that sites should implement a training effectiveness verification program. This program, which is in addition to performance evaluations routinely performed by the site's training department, is to verify the effectiveness of radiological control training by surveying a limited subset of former students in the workplace. This recommendation applies to both DOE defense nuclear facilities and DOE facilities not classified as defense nuclear facilities.

Per DOE's commitment to DNFSB, it is expected that all defense nuclear facilities will implement these or equivalent programs. DOE facilities not classified as defense nuclear facilities should also strive to implement such programs. Line management should monitor progress of program implementation.

**Training for Subcontracted
RCTs**

Subcontracted RCTs should have the same knowledge and qualifications required of site technicians performing the same duties. Subcontracted RCTs should meet the requirements as outlined in Chapter 6 of the DOE RCS.

References Next

References

REFERENCES

U.S. Department of Energy, DOE-STD-1098-2008, “Radiological Control Standard.”

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U.S. Department of Energy, DOE Order 5480.2A, Ch 1, “Personnel Selection, Qualification, and Training for DOE Nuclear Facilities,” 1994.

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