(SP-97-087, December 1997, Program, Licensing Program Codes)
DATED: DECEMBER 17, 1997; SIGNED BY: RICHARD L. BANGART

ALL AGREEMENT STATES
OHIO, OKLAHOMA, PENNSYLVANIA

TRANSMITTAL OF STATE AGREEMENTS PROGRAM INFORMATION (SP-97-087)

Your attention is invited to the enclosed correspondence which contains:

INCIDENT AND EVENT INFORMATION.....

PROGRAM MANAGEMENT INFORMATION....XX NRC/OAS TRAINING WORKING GROUP FINAL REPORT

TRAINING COURSE INFORMATION.....

TECHNICAL INFORMATION.....

OTHER INFORMATION.....

Supplementary Information: At the request of the Organization of Agreement States (OAS), a Working Group was established by the Nuclear Regulatory Commission (NRC) to evaluate the ongoing evolution of the training programs for Agreement State personnel, the criteria for evaluation of Agreement State programs in the area of training qualification, and the possible training options for Agreement State personnel. The Working Group consisted of three representatives from the NRC and three representatives from Agreement States.

The Working Group completed its work in October 1997 and presented the final report to the OAS and NRC on October 16, 1997 at the annual All Agreement States meeting in Los Angeles, California. The final Working Group report is enclosed so that those Agreement States that could not attend the meeting would also have the benefit of the document.

If you have any questions about this correspondence, please contact me or the individual named below.

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Enclosure:
As stated

NRC/OAS Training Working Group Recommendations for Agreement State Training Programs

October 1997

NRC/OAS TRAINING WORKING GROUP

RECOMMENDATIONS FOR

AGREEMENT STATE TRAINING PROGRAMS

October 1997

ACKNOWLEDGMENT

The NRC/OAS Training Working Group would like to thank NRC's Office of State Programs, Office for Analysis and Evaluation of Operational Data, and Office of Nuclear Material Safety and Safeguards, and the OAS States of Illinois, Texas, and Utah for their assistance by allowing the Working Group members the time to participate in this group effort. We thank the Office of State Programs for the funding support for the travel of the State Working Group members as well as hosting several of the meetings. We also thank the Technical Training Center (TTC) for hosting a meeting and the assistance of Rod Reed and Paul Knapp during that meeting. A special thanks to William (Bill) Silva and the State of Texas for his participation and assistance in the TTC meeting. We appreciated the input from the NRC and Agreement State staff that provided comments on the work in progress and the final report.

The Co-Chairs of the Working Group would like to thank all the Working Group members for their input and assistance in making this effort successful.

Dennis M. Sollenberger
Co-Chair, NRC representative

Kathy Allen
Co-Chair, OAS representative

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INTRODUCTION

At the request of the Organization of Agreement States (OAS), a Working Group was established by the Nuclear Regulatory Commission (NRC) to evaluate the ongoing evolution of training programs for Agreement State personnel, the criteria for evaluation of Agreement State programs in the area of training qualification, and the possible training options for Agreement State personnel. The Working Group consisted of three representatives from the NRC and three representatives from Agreement States. The charter for the Working Group is presented in Appendix A.

This document includes recommendations for establishing and documenting training programs and provides guidance for determining content of individual training courses. In addition, this document contains an appendix of alternative training options, and pros and cons for these options.

METHODOLOGY

In order to ensure consistent staff training levels among Agreement States and between the NRC and Agreement States, the NRC had provided funding for Agreement States to attend training courses developed by, or contracted for the NRC. When the NRC withdrew funding for these training courses, another mechanism was needed to guarantee consistent staff training levels in Agreement States. The Working Group therefore used the NRC's existing training program as the starting point for establishing guidelines for use by Agreement States.

For NRC inspectors and license reviewers to become "certified" by the NRC, they must complete the Core and Specialized training detailed in NRC's Inspection Manual Chapter 1246 (IMC 1246), "Formal Qualification Programs in the Nuclear Material Safety and Safeguards Program Area." An inspector or license reviewer who has not completed all of the requirements for certification may be approved under "interim" qualifications. The NRC has defined its training program and developed a very detailed Training and Qualification Journal that must be completed for each inspector and license reviewer.

Recognizing that Agreement States may not have the same task divisions as the NRC, and recognizing that the number of inspector or license reviewer positions in an individual Agreement State may not warrant the development of extremely detailed qualifying procedures, the Working Group is proposing the following approach to training of Agreement State personnel:

1. Agreement States should develop lists of positions and basic training requirements for those positions, and

2. Agreement States should develop some method to sign-off on completed areas of training. (Some of the training requirements may be included in the requirements for hiring into the position.)

The Working Group prepared a comparison of the training requirements in IMC 1246 based on the training categories presented below. The comparison of NRC courses to subject areas needed for Agreement State staff training qualification are presented in Appendix B. Appendix C contains outlines for several NRC courses where the Working Group evaluated the course content and developed the essential elements for that course. The essential elements presentation also identifies the level at which this information should be taught so that a State manager may be able to evaluate a training course for use in qualification of his/her staff. The Working Group did not evaluate all of the NRC courses due to time limitations. However, the NRC is providing a copy of its training manuals to the Agreement States for their use if they choose to develop their own course or evaluate other commercial sources.

COMPARISON OF NRC AND AGREEMENT STATE TRAINING CATEGORIES

NRC Training Categories	**Agreement State Training Categories**
Core Training - Minimum formal classroom and on-the-job training required for a specific inspector or license reviewer.	**Basic Training -** Minimum formal classroom or on-the-job training required for a specific inspector or license reviewer.
Specialized Training - Additional training beyond core, necessary for certain licensed categories of use of radioactive materials.	**Specialized Training -** Additional training necessary for categories of radioactive material uses (such as medical, radiography, well logging, etc.).
Supplemental Training - Additional training used to enhance reviewer’s or inspector's expertise.	**Advanced Training -** Additional training used to enhance reviewer’s or inspector's expertise.
Refresher Training - Training designed to update and maintain qualification.	**Continuing Education -** Continuing education designed to update and maintain level of proficiency. Methods used to accomplish this may include training courses, professional meetings, staff meetings, policy and guidance documents, newsletters, access to professional journals or newsletters, etc.

PROGRAM ELEMENTS

The Working Group developed suggested program elements that could be used by the Agreement States to develop a training qualification program tailored for their program and fulfilling the overall objective of having staff meet minimum qualification requirements that provide for a national consistency in the regulatory program.

The Agreement States should document a training program that, at a minimum, contains a statement of policy, minimum qualifications for staff training, and supervisory responsibility for ensuring this policy is implemented. A sample training policy statement and a sample staff qualifications form with supervisory sign-off are included as Appendix D. A generic form could be developed or a customized form for each individual could be used.

SUMMARY OF BASIC AND SPECIALIZED TRAINING FOR AGREEMENT STATE PERSONNEL

Each individual State would establish or maintain lists of positions and the areas of training to be provided for those positions. States should establish a sign-off system to track when training is provided. The following training areas are recommended for license reviewers and inspectors.

BASIC TRAINING AREAS**:**

- Essentials of Health Physics - This is the minimum amount of health physics training necessary to perform effectively. Any of the following methods can be used to establish this minimum training:

  B.S. degree or other advanced degree in health physics; or

  B.S. or B.A. degree with equivalent training and experience in health physics; or

  Successful completion of the 5-week health physics course; or

  A training program that adequately covers the topics covered during the 5-week health physics course.

- Overall Program Orientation - This includes a description of the State radiation program.

- State Regulations - This may include information such as delineation of responsibility for development and interpretation of State regulations.

- Available Regulatory Guidance, Procedures, Resources

- Essentials of performing specific job functions:

For license reviewers, this includes performing license reviews according to the State's procedures and an overview of the function of inspectors.

For inspectors, this includes training in performing inspections according to the State's procedures and training in transportation of radioactive materials.

SPECIALIZED TRAINING**:**

Various subject areas would be covered with the license reviewer before being assigned responsibility for reviewing the corresponding types of licenses. In addition, various subject areas would be covered with the inspector before being assigned responsibility for working as the lead inspector for the corresponding types of licenses. Each Agreement State is responsible for ensuring licensing and inspection coverage for all types of licenses issued by the State.

ADVANCED TRAINING:

This includes training that may be provided to certain individuals in order to expand or develop an area of expertise.

EQUIVALENCY

Agreement State Program staff may demonstrate proficiency in a program or subject area by:

Successfully completing an NRC course; or

Passing a "screening" or "challenge" examination; or

Demonstrating an appropriate level of expertise in a particular subject area to management, because of training and experience; or

Successfully completing training that covers the essential elements for a particular subject area, as identified by the Working Group.

SUCCESSFUL COMPLETION OF NRC TRAINING COURSES

The Working Group reviewed the NRC practice for successful completion of training for NRC employees attending the materials training courses offered by the NRC. The Working Group reviewed the proposed practice to be applied to Agreement State personnel and presented the practice at the September 1996 All Agreement States meeting. Comments on the practice were requested. Following the meeting, the practice for successful completion of NRC training courses by Agreement State staff was sent to the States by All Agreement States letter (SP-96-118) dated November 20, 1996 (Appendix E).

TRAINING ALTERNATIVES

The Working Group was tasked with identifying alternatives for receiving training that were to include alternatives to traditional classroom training programs. Below is a list of courses, resources, and other options that could be used to gain the knowledge needed to regulate radioactive materials. Appendix F to this report is a list of alternative training presentation methods that the Working Group considered for delivery of the NRC training courses. Appendix F includes the advantages and disadvantages identified by the Working Group for the different alternatives.

COURSES

- Commercially available training courses (Government, Universities, National Labs, Private Companies, and others).

  NOTE: National organizations, such as the Health Physics Society (HPS) may have a list of available courses.

- Training courses provided by other government agencies (such as EPA or HHS).

- Contractors willing to develop a course to meet specific needs.

- Regional training - share costs of developing training courses or videos among several States.

OPTIONS OTHER THAN COURSES

- In-house training programs, mentoring and on-the-job training.

- Computer-based training currently available.

- Professional topical or annual meetings (AAPM, HPS, ANS, AS/NRC workshops, etc.).

- Videos that are currently available.

  NOTE: The NRC and some Agreement States have collections of videos. HPS has a collection of videos from PEP courses.

- Supplement in-house training with site visits to licensed facilities.

- Check the world wide web for new websites that may contain information to supplement training, or may have information on other training resources.

- "Audit" manufacturer's training courses.

Appendix A

Joint NRC Agreement State Working Group
To Evaluate Training for Materials Licensing and Inspection

Final Charter

PURPOSE

A working group consisting of representatives from the Nuclear Regulatory Commission (NRC) and the Agreement States has been formed to evaluate the ongoing evolution of training programs for Agreement State personnel, the criteria for evaluation of Agreement State programs in the area of training qualification, and the possible training options for Agreement State personnel.

BACKGROUND

By letter dated November 14, 1995, Mr. Richard Ratliff, Chair, Organization of Agreement States (OAS), presented OAS concerns to the NRC including concerns in the area of training and requested that an operational committee or working group be established to consider identification of core courses, identification of additional training requirements for Agreement State personnel, and identification of acceptable alternate training options. The NRC responded to the letter on December 28, 1995, agreeing to the proposal to establish a working group to address the training issues of the OAS.

Over the last several years the training program conducted by NRC for Agreement State personnel has gone through an evolution in which the training developed and conducted for Agreement States has been merged with the training program for NRC staff. The overall coordination of this combined program is the responsibility of the Technical Training Division (TTD), Office for Analysis and Evaluation of Operational Data (AEOD). Other NRC offices and Regions provide input to the course content and training needs. The Office of State Programs has collected and provided input on the Agreement State training needs.

The NRC has recently revised its training requirements for materials licensing and inspection staff. The requirements are now in one document, NRC's Inspection Manual Chapter 1246. The NRC has proposed that the Agreement State staff meet similar training requirements and that the Agreement State radiation control program directors formally establish staff qualification criteria and document that staff are qualified to independently perform work as they complete various training levels. The qualifications and training of Agreement State personnel have also been identified as one of the common performance indicators under the Integrated Materials Performance Evaluation Program (IMPEP) for evaluating Agreement State and NRC Regional materials regulatory programs. Specific criteria to benchmark this evaluation are needed to ensure uniformity for this program. This proposal was presented at the October 1995 All Agreement States meeting, which resulted in the above referenced letter from the OAS.

The Commission will discontinue the funding for Agreement State staff travel and contractor costs associated with Agreement State staff training beginning in fiscal year 1997. This action has prompted Agreement States to investigate alternate training methods to those made available by the NRC. The working group will not address the funding issue but will address possible alternate training methods.

SCOPE OF WORK

The NRC/OAS Training Working Group will address the Agreement State training issues as identified in the OAS letter of November 14, 1995 and other issues identified to the group by OAS or the NRC.

TASKS

In evaluating the potential training necessary for Agreement State personnel to have equivalent qualifications as NRC materials and inspection personnel, the Working Group will be performing the following tasks:

1. To evaluate the proposed training courses and training subject areas for the Agreement State staff that are necessary to assure equivalency with NRC requirements and forward a recommendation to the OAS and the NRC.

2. To evaluate the NRC policy for passing/failing courses and determine an acceptable policy and methods to implement a policy for the Agreement States.

3. To identify acceptable alternative training options, including the evaluation of technology and training methods that could be used to lower the cost of training courses.

WORKING GROUP ORGANIZATION AND OPERATIONS

Initially the following personnel will be on the Working Group.

NRC - Dennis Sollenberger, Office of State Programs
Catherine Haney, Office of Nuclear Material Safety and Safeguards
John Ricci, Office for Analysis and Evaluation of Operational Data

OAS - Kathy Allen, Illinois Department of Nuclear Safety
Marilyn Kelso, Texas Department of Health
William Sinclair, Utah Department of Environmental Quality

The Working Group selected Dennis M. Sollenberger and Kathy Allen to be co-chairs for the Working Group.

The Working Group collectively will be responsible for developing a work plan, monitoring progress, preparing drafts of minutes and other products. Logistical and travel support for

Working Group meetings, including travel and per diem expenses for Agreement State members, will be provided by NRC.

Working Group meetings are not subject to the requirements of the Federal Advisory Committee Act (FACA) but they will be announced in advance through the NRC Public Meeting Announcement System. Maximum use will be made of other appropriate media for facilitating interaction with the Working Group, e.g., conference calls, facsimiles, and electronic mail. Working Group meetings will be open to the public and will be held in the Washington, DC area or other locations as agreed upon by the Working Group members. Other persons attending Working Group meetings will be welcome to provide comments to the Working Group for its consideration in either written form or orally at times specified by the Working Group co-chairs. Meeting minutes and draft and final documents produced by the Working Group will be publicly available from the NRC Public Document Room at the Gelman Building, 2120 L St., N.W., Washington, DC 20037.

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Appendix B

COMPARISON OF COURSES/SUBJECT AREAS

IMC 1246 "Core" Training	IN	LI	Agreement State Training	IN/LI
Inspection Procedures	X	X	Essentials of Inspection	IN - B
Licensing Practice & Proced.		X	Essentials of Licensing	LI - B
H.P. Technology (2 weeks)	X	X	Advanced Health Physics	AD
Diagnostic & Therapeutic Nuclear Medicine	X	X	Elements of Nuclear Medicine	SP
Teletherapy & Brachytherapy	X	X	Elements of Medical Therapy	SP
Safety Aspects of Indust. Radiog.	X	X	Elements of Indust. Radiog.	SP
Transportation of Rad. Mat.	X	X	Elements of Transportation	IN - B
Root Cause/Incident Investigation	X		Elements of Investigations	AD
Inspect. for Performance (Mat.)	X			
Effective Comm. for Inspectors	X			
OSHA Indoctrination	X			
Int. Dosimetry & W.B. Counting	SP	SP		
Safety Aspects of Well Logging	SP	SP	Elements of Well Logging	SP
Irradiator Technology	SP	SP	Elements of Pool Irradiators	SP
Env. Monit. for Radioactivity	SP	SP	Elements of Env. Monitoring	SP
Air Sampling for Rad. Mat.	SP	SP		
Respiratory Protection	SP			
Rad. Surveys - Decommissioning	SP			
Health Physics Topical Review	R	R		
			Essentials of Health Physics	IN/LI-B

IN means inspectors, LI means license reviewers, B means basic training, SP means specialized training, AD means advanced training, R means refresher training

Appendix C

NRC/OAS TRAINING WORKING GROUP

ESSENTIAL ELEMENTS FOR CERTAIN TRAINING AREAS

Appendix D

SAMPLE AGREEMENT STATE TRAINING POLICY STATEMENT

We will ensure that staff will be qualified to perform licensing and inspection functions for all types of licenses issued by the State.

An individual will not be a lead inspector at a licensed facility unless the individual has demonstrated competency in the program training areas applicable to that type of license. An individual will not be a senior license reviewer for a license unless the individual has demonstrated competency in the program training areas applicable to that type of license.

The program training areas and essential elements to be covered in each program training area are described in [NRC or State Guidance document - specify the exact document].

When an individual has demonstrated competency in a particular training area to management, the training chart will be completed by that member of management.

Refresher training will be provided, as needed. This additional training recognizes that inspector and reviewer training does not stop with initial qualification, but that training should be made available for experienced inspectors and reviewers on the basis of need, special circumstances, and the necessity of keeping current with inspection and licensing programs.

1. INTRODUCTION

1.1 Atomic/Nuclear Structure [2]
1.2 Modes/Rates of Decay [1]

1.2.1 alpha, beta, gamma, x-rays, neutron
1.2.2 half-life
1.2.3 transient/secular equilibrium

1.3 Production of X-Rays [2]
1.4 Interaction with Matter [2]

1.4.1 Photoelectric Effect
1.4.2 Compton Scattering
1.4.3 Pair Production
1.4.4 Neutron Capture

1.5 Terminology (SI & Special Units) [1]

1.5.1 Activity
1.5.2 Dose
1.5.3 Exposure

1.6 Background Radiation [3]
1.7 Exposure Pathways [2]

1.7.1 Ingestion
1.7.2 Inhalation
1.7.3 Absorption
1.7.4 Contaminated Wound
1.7.5 Direct Exposure

1.8 Biology/Effects of Radiation [2]

1.8.1 Somatic/Genetic/In-Utero
1.8.2 Stochastic/Non-Stochastic (Deterministic/Non-Deterministic)
1.8.3 High Dose Effects

1.9 Regulatory Environment [2]

1.9.1 Federal (NRC/DOT/EPA/FDA/OSHA)
1.9.2 State (Agreement/Non Agreement/CRCPD)
1.9.3 Advisory Organizations (NCRP/ICRP/IAEA)

2. APPLICATIONS

2.1 Sources of Radiation [2]
- 2.1.1 sealed
- 2.1.2 unsealed
- 2.1.3 plated
- 2.1.4 machine generated

2.2 Uses [3]

- 2.2.1 Medical
- 2.2.2 Industrial
- 2.2.3 Academic
- 2.2.4 Consumer Products
- 2.2.5 Reactor/Fuel Cycle

2.3 Licensee/Registrant Radiation Safety Program [1]

- 2.3.1 facility design & engineering controls
- 2.3.2 ALARA
- 2.3.3 surveys
- 2.3.4 contamination control/spills
- 2.3.5 respiratory protection
- 2.3.6 waste handling and disposal
- 2.3.7 dose assessment
- 2.3.8 transportation

3. INSTRUMENTS

3.1 Detectors (types and modes of operation) [1]

3.1.1 Gas Filled

- 3.1.1.1 GM
- 3.1.1.2 Proportional
- 3.1.1.3 Ionization

- 3.1.2 Scintillation
- 3.1.3 Semiconductor

3.2 Measurement Systems [1]

- 3.2.1 Meters
- 3.2.2 Scalers
- 3.2.3 Multi Channel Analyzer (MCA)

3.3 Operational Parameters [2]

3.3.1 Efficiency
3.3.2 Resolution

3.4 Air Samplers [3]
3.5 Calibration [3]

4. SURVEYS/MONITORING/STATISTICS

4.1 Types [1]

4.1.1 Radiation Levels
4.1.2 Contamination
4.1.3 Bioassay
4.1.4 Effluents

4.2 Techniques [2]

4.2.1 Sample Collection
4.2.2 Evaluation of Results
4.2.3 Spectroscopy
4.2.4 Radionuclide Identification

4.3 Statistics [3]

4.3.1 Minimum Detectable Activity (MDA)/Lower Limit of Detection (LLD)
4.3.2 Counting Time
4.3.3 Dead Time

5. DOSE ASSESSMENT

5.1 Personnel Monitoring [2]

5.1.1 Devices
5.1.2 Applicability

5.2 External [1]

5.2.1 Point/Line/Area/Volume Sources
5.2.2 Submersion
5.2.3 Hot Particles

5.3 Internal [2]

5.3.1 Biological/Effective Half Life
5.3.2 Intake Retention Fraction (IRF)
5.3.3 Annual Limit on Intake (ALI)
5.3.4 Derived Air Concentration (DAC)
5.3.5 EPA Federal Guidance Report #11
5.3.6 ICRP-30
5.3.7 Medical Internal Radiation Dosimetry (MIRD)

5.4 Modelling [3]

5.4.1 Use and Limitations
5.4.2 Types (RESRAD/COMPLY/MICROSHIELD/MIRDOSE etc)

6. LABORATORY EXERCISES

Laboratory exercises are recommended to reinforce concepts and provide practical application of the subject areas.

KEY TO DEPTH OF INSTRUCTION: The numbers in [#] refer to training at an undergraduate equivalent level where:

[1] = In depth (advanced undergraduate course)
[2] = Medium depth (basic undergraduate course)
[3] = Not in depth (undergraduate survey course)

1. DIAGNOSTIC NUCLEAR MEDICINE

1.1 Equipment (gamma camera, dose calibrator) [2]

- 1.1.1 Principle of operation
- 1.1.2 Uses
- 1.1.3 Calibration and Problems Encountered if Calibration is Not Performed
- 1.1.4 Required Function Tests

1.2 Nuclear Medicine Studies (Provide the following information for various studies) [2]

- 1.2.1 Purpose of Study
- 1.2.2 Type and Quantity of Radionuclides Used (dosage)
- 1.2.3 Approximate Dose to Patients (dose)
- 1.2.4 Equipment and Material Required
- 1.2.5 Special Function/QC Tests
- 1.2.6 Additional Radiological Considerations

1.3 Positron Emmission Tomography (PET) [3]

- 1.3.1 Equipment
- 1.3.2 Sources and Function Tests
- 1.3.3 Production and Handling of Material
- 1.3.4 Mobile PET and Generators

1.4 New Modalities [3]

1.5 Radiation Safety Concerns [1]

- 1.5.1 Contamination
  - 1.5.1.1 Typical Areas of Contamination (including patient-caused)
- 1.5.2 Airborne Hazards
- 1.5.3 Engineering Controls
- 1.5.4 Receipt, Use and Transport of Material
  - 1.5.4.1 Mobile Facilities
  - 1.5.4.2 Administration in Areas Other than Nuclear Medicine Department
  - 1.5.4.3 Return of Material to Pharmacy
- 1.5.5 Waste Disposal

2. SEALED SOURCES FOR DIAGNOSIS [3]

    2.1 Types of Sources
    2.2 Uses
    2.3 Radiation Safety Concerns

3. THERAPEUTIC NUCLEAR MEDICINE

    NOTE: Focus on material not already presented in 1. above

    3.1 Equipment [3]

        3.1.1 Principle of operation
        3.1.2 Uses
        3.1.3 Calibration and Problems Encountered if Calibration is not performed
        3.1.4 Required Function Tests

    3.2 Therapy Studies (Provide the following information for several typical therapies) [2]

        3.2.1 Purpose of Study
        3.2.2 Treatment Planning
        3.2.3 Type and Quantity of Radionuclides Used (dosage)
        3.2.4 Approximate Dose to Patients (dose)
        3.2.5 Equipment and Material Required
        3.2.6 Special Function/QC Tests
        3.2.7 Additional Radiological Considerations

    3.3 New Modalities [3]
    3.4 Radiation Safety Concerns [1]

        3.4.1 Contamination

            3.4.1.1 Typical Areas of Contamination
            3.4.1.2 Patient-Caused Contamination

        3.4.2 Typical Dose Rates
        3.4.3 Airborne Hazards
        3.4.4 Engineering Controls
        3.4.5 Bioassays
        3.4.6 Training for Ancillary Personnel
        3.4.7 Receipt, Use and Transport of Material

            3.4.7.1 Mobile Facilities
            3.4.7.2 Administration in Areas Other than Nuclear Medicine Department
            3.4.7.3 Return of Material to Pharmacy

3.4.8 Waste Disposal

4. SEALED SOURCE THERAPEUTIC PLANNING [3]

4.1 Evaluation of Patient Condition
4.2 Measurement of Patient
4.3 Simulation of Treatment
4.4 Determine Accuracy of Information
4.5 Calculate Treatment Plan

5. MANUAL BRACHYTHERAPY [2]

5.1 Overview

5.1.1 Applicator
5.1.2 Radionuclides
5.1.3 Forms (Seeds, Needles, Tubes)
5.1.4 Uses (Including Superficial and Interstitial Treatments)

5.2 Radiation Safety Concerns

5.2.1 Instrumentation
5.2.2 Training for Ancillary Personnel
5.2.3 Source Inventory

6. REMOTE BRACHYTHERAPY [2]

6.1 Overview

6.1.1 Devices (High Dose Remote Afterloader (HDR) and Low Dose Remote Afterloader (LDR))
6.1.2 Applicators
6.1.3 Radionuclides
6.1.4 Uses

6.2 Radiation Safety Concerns

6.2.1 Instrumentation
6.2.2 Training for Ancillary Personnel
6.2.3 Source Inventory
6.2.4 Engineering Controls (Interlocks, etc.)
6.2.5 Special Function/QC Tests
6.2.6 Emergency Procedures

7. GAMMA STEREOTACTIC RADIOSURGERY

    7.1 Overview [3]

        7.1.1 Device Design
        7.1.2 Uses

    7.2 Radiation Safety Concerns [2]

        7.2.1 Instrumentation
        7.2.2 Engineering Controls (Interlocks, etc.)
        7.2.3 Special Function/QC Tests
        7.2.4 Source Loading

8. TELETHERAPY

    8.1 Overview [3]

        8.1.1 Device
        8.1.2 Uses (both medical and non-medical)

    8.2 Radiation Safety Concerns [2]

        8.2.1 Instrumentation
        8.2.2 Engineering Controls (Interlocks, etc.)
        8.2.3 Special Function/QC Tests
        8.2.4 Source Exchange

9. REGULATORY SKILLS

    Additional discussions or site visits may help inspectors or license reviewers draw correlations between the information presented in this course and their particular responsibilities.

KEY TO DEPTH OF INSTRUCTION: The numbers in [#] refer to training at an undergraduate equivalent level where:

[1] = In depth (advanced undergraduate course)
[2] = Medium depth (basic undergraduate course)
[3] = Not in depth (undergraduate survey course)

NOTE: This course outline assumes participant has completed a basic health physics course (see outline for Basic Health Physics course) and has reviewed the applicable regulations prior to attending this course.

A Glossary of medical and anatomical terms used in this course should be provided for students to reference.

1. INTRODUCTION [2]

    1.1 Terminology
    1.2 History of Radiography
    1.3 Other Types of NDT

2. TYPES AND USES OF SOURCES OF RADIATION [2]

    2.1 Radionuclide Sealed Sources (ANSI-N542)
    2.2 Machine Produced

3. RADIOGRAPHY EQUIPMENT [1]

    3.1 Radionuclide (ANSI-N432)

        3.1.1 Radiographic Exposure Device
        3.1.2 Crank-out
        3.1.3 Guide Tube
        3.1.4 Collimator
        3.1.5 Source Changer
        3.1.6 Film

    3.2 Machine Produced

        3.2.1 Head
        3.2.2 Power Supply
        3.2.3 Control Panel
        3.2.4 Film

4. SPECIALTY EXPOSURE DEVICES [2]

    4.1 Pipeliners
    4.2 Crawlers

5. SPECIAL CONSIDERATIONS [1]

    5.1 Radiography Personnel Qualifications
    5.2 Personnel Monitoring

        5.2.1 Direct Reading Pocket Dosimeter
        5.2.2 Alarming Rate Meter
        5.2.3 Film Badge/TLD

    5.3 Area Posting
    5.4 Storage of Exposure Devices and Sources
    5.5 Transportation of RAM

5.6 Radiation Survey Requirements
5.7 Reciprocity
5.8 Inspection Procedures (Office & Field)

6. RADIOGRAPHIC PROCESS [2]

6.1 Setup
6.2 Exposure
6.3 Exposure Verification
6.4 Breakdown

7. CASE STUDIES [2]

Source Disconnects/Retrieval
Overexposures
Transportation Incidents
Equipment Failures
Loss of Control of RAM

8. REGULATORY SKILLS

Additional discussions may help inspectors or license reviewers draw correlations between the information presented in this course and their particular responsibilities. Site visits to a radiography operation or facilty are highly recommended.

KEY TO DEPTH OF INSTRUCTION: The numbers in [#] refer to training at an undergraduate equivalent level where:

[1] = In depth (advanced undergraduate course)
[2] = Medium depth (basic undergraduate course)
[3] = Not in depth (undergraduate survey course)

NOTE: This course outline assumes participant has completed a basic health physics course (see outline for Basic Health Physics course) and has reviewed the applicable regulations prior to attending this course.

A Glossary of industrial radiography terms used in this course should be provided for students to reference.

1. INTRODUCTION

1.1 Authority (DOT, NRC, CRCPD, IAEA) [3]
1.2 Applicability [3]

1.2.1 Generator
1.2.2 Transporter
1.2.3 Receiving Facility

1.3 Definitions specific to radioactive materials transportation [1]

2. DOT RADIOACTIVE MATERIALS CLASSIFICATION [1]

2.1 Excepted materials - limited quantity instruments and articles, articles of U, DU or Th
2.2 Type A Quantity
2.3 Type B Quantity
2.4 Highway Route Controlled Quantity
2.5 Fissile Material
2.6 Low Specific Activity
2.7 Surface Contaminated Objects

3. TRANSPORTATION LIMITS [1]

3.1 Radiation Levels
3.2 Contamination Levels and Empty Packages
3.3 Thermal Levels

4. PACKAGINGS AND PACKAGES

4.1 Authorized Packagings [2]
4.2 Packaging Tests [3]
4.3 Quality Assurance [2]

5. CARRIER REQUIREMENTS [2]

5.1 Blocking and Bracing
5.2 Segregation

6. COMMUNICATION REQUIREMENTS

6.1 Marking [1]
6.2 Labeling [1]
6.3 Placarding [1]
6.4 Shipping Papers [1]
6.5 Training requirements and emergency response [2]

7. TRANSPORTATION SAFETY INSPECTION AND ENFORCEMENT [2]

    7.1 Things to look for/inspection techniques
    7.2 NRC/State Enforcement Experience (lessons learned)

8. TRANSPORTATION SAFEGUARDS [3]

    8.1 Applicability
    8.2 Requirements
    8.3 Inspections

9. TRANSPORTATION OF RADIOACTIVE WASTE [3]

    9.1 Generator requirements
    9.2 Waste Classification
    9.3 Waste Characteristics
    9.4 Uniform Radioactive Waste Manifest

10. REGULATORY SKILLS

Additional discussions or site visits may help inspectors or license reviewers draw correlations between the information presented in this course and their particular responsibilities.

KEY TO DEPTH OF INSTRUCTION: The numbers in [#] refer to training at an undergraduate equivalent level where:

[1] = In depth (advanced undergraduate course)
[2] = Medium depth (basic undergraduate course)
[3] = Not in depth (undergraduate survey course)

NOTE: This course outline assumes participant has completed a basic health physics course (see outline for Basic Health Physics course) and has reviewed the applicable regulations prior to attending this course.

A Glossary of transportation terms used in this course should be provided for students to reference.

1. INTRODUCTION [2]

    1.1 Terminology
    1.2 Drilling Rig Layout/Industrial Hazards
    1.3 Geology of Petroleum
    1.4 Drilling Process
    1.5 Drilling Muds, Cementing, Fracturing

2. EQUIPMENT [1]

    2.1 Well Logging Source Description and Uses
    2.2 Logging Tools
    2.3 Collar Markers
    2.4 Fishing Tools

3. LOGGING PROCESS [3]

    3.1 The Logging Supervisor
    3.2 Radiation Logging
    3.3 Mineral Logging
    3.4 Logging While Drilling
    3.5 Analysis of Logs

4. TRACER STUDIES [2]

    4.1 Tracer Surveys, and Handling Procedures for Tracer Materials
    4.2 Radioactive Tracer Injection to Monitor Subsurface Fluid and Gas Movement
    4.3 Methods for Radioactive Tagging of Cement and Fracture Propping Agents

5. RADIATION SAFETY PROGRAM CONSIDERATIONS [2]

    5.1 Large Operations
    5.2 Small (Single-Owner) Operations
    5.3 Procedures for Retrieval and Abandonment of Sources
    5.4 Decontamination of Well Site

6. CASE STUDIES [2]

    6.1 Well Site Fire and Sealed Sources Involved
    6.2 Other Incidents

7. REGULATORY SKILLS

    Additional discussions may help inspectors or license reviewers draw correlations between the information presented in this course and their particular responsibilities. Site visits to a well drilling or logging operation are highly recommended.

KEY TO DEPTH OF INSTRUCTION: The numbers in [#] refer to training at an undergraduate equivalent level where:

[1] = In depth (advanced undergraduate course)
[2] = Medium depth (basic undergraduate course)
[3] = Not in depth (undergraduate survey course)

NOTE: This course outline assumes participant has completed a basic health physics course (see outline for Basic Health Physics course) and has reviewed the applicable regulations prior to attending this course.

A Glossary of well drilling and logging terms used in this course should be provided for students to reference.

1. INTRODUCTION

    1.1 Types, use, and operation modes of irradiators [2]

        1.1.1 Self shielded and pool
        1.1.2 Continuous, Batch, and Off-Carrier

    1.2 Definitions specific to irradiators [1]
    1.3 Components [1]
    1.4 Federal/State Regulations and Standards (NRC, OSHA, FDA, ANSI,) [2]

2. FACILITY DESIGN AND ASSOCIATED TESTING

    2.1 Water pool requirements [1]
    2.2 Ventilation [1]
    2.3 Shielding [1]
    2.4 Product Handling [2]
    2.5 Interlocks [1]
    2.6 Fire Suppression [1]
    2.7 Seismic Consideration [2]
    2.8 Access Control [1]

3. MAINTENANCE

    3.1 Source loading [2]
    3.2 Routine [1]

        3.2.1 Leak testing
        3.2.2 Safety checks
        3.2.3 Water Pool quality
        3.2.4 Ventilation
        3.2.5 Interlocks
        3.2.6 Product Handling

4. EMERGENCY PROCEDURES [2]

    4.1 Types
    4.2 Past events/accidents

5. REGULATORY SKILLS

    Additional discussions may help inspectors or license reviewers draw correlations between the information presented in this course and their particular responsibilities. For pool irradiators, site visits are highly recommended.

KEY TO DEPTH OF INSTRUCTION: The numbers in [#] refer to training at an undergraduate equivalent level where:

[1] = In depth (advanced undergraduate course)
[2] = Medium depth (basic undergraduate course)
[3] = Not in depth (undergraduate survey course)

NOTE: This course outline assumes participant has completed a basic health physics course (see outline for Basic Health Physics course) and has reviewed the applicable regulations prior to attending this course.

A Glossary of irradiator terms used in this course should be provided for students to reference.

SAMPLE AGREEMENT STATE TRAINING QUALIFICATION FORM

Name: _____ Date of Hire : _____

Training Areas	Date Completed	Management Initials/Signature	Comments
BASIC TRAINING			
Degree in Health Physics			
Overall program orientation			
Review of State Regulations			
Review of location of Reg. Guides & reference material			
Essentials of Inspection			
Essentials of Licensing			
Essentials of Transportation			
SPECIALIZED TRAINING			
Elements of Nuclear Medicine			
Elements of Medical Therapy			
Elements of Indust. Radiog.			
Elements of Transportation			
Elements of Well Logging			
Elements of Pool Irradiators			
Elements of Env. Monitoring			
ADVANCED TRAINING			
Advanced Health Physics			
Elements of Investigations			

Appendix E

ALL AGREEMENT STATES LETTER (SP-96-118)
ON SUCCESSFUL COMPLETION OF NRC TRAINING COURSES

(SP-96-118, November 1996, Training, Training Courses)
DATED: NOVEMBER 20, 1996 SIGNED BY: PAUL H. LOHAUS

ALL AGREEMENT STATES
MASSACHUSETTS, OHIO, OKLAHOMA, PENNSYLVANIA

TRANSMITTAL OF STATE AGREEMENTS PROGRAM INFORMATION (SP-96-118)

Your attention is invited to the enclosed correspondence which contains:

INCIDENT AND EVENT INFORMATION.....

PROGRAM MANAGEMENT INFORMATION.

TRAINING COURSE INFORMATION.....XX POSITION ON SUCCESSFUL COMPLETION OF TRAINING COURSES

TECHNICAL INFORMATION.....

OTHER INFORMATION.....

Supplemental Information: This letter clarifies the Nuclear Regulatory Commission (NRC) position on successful completion of training courses by Agreement State staff.

The Technical Training Division's policy on successful completion of courses by NRC staff is described in the Technical Training Division Courses Catalog at pages viii and ix (reformatted copy enclosed).

With the goal of having equivalently trained individuals whether in Agreement States or NRC, we plan to follow the same approach regarding Agreement State staff attendance at NRC training courses. We expect Agreement State staff attending an NRC course to take any examination, if given, and grade of 70% will be considered passing. For students successfully passing courses, the certificates with the examinations will be sent via transmittal letter to their respective Program Directors to be distributed to the students. Students will receive a copy of the transmittal letter. These will be sent on a periodic basis, usually quarterly, depending on the number of courses.

Separate notifications, together with the completed exams, will be sent to Program Directors, with a copy of the letter to the students, for those individuals that have not successfully completed a course. These notifications will be made within 2 weeks of our receipt of the course results. Program Directors may request a re-examination by writing directly to Mr. Russell L. Anderson, Chief, Specialized Technical Training Branch, Technical Training Division, Osborne Office Center, Suite 200, 5700 Brainerd Road, Chattanooga, Tennessee 37411-4017.

If you have any questions regarding this correspondence, please contact me or the individual named below.

POINT OF CONTACT: Dennis M. Sollenberger
TELEPHONE: (301) 415-2819
FAX: (301) 415-3502
INTERNET: DMS4@NRC.GOV

Paul H. Lohaus, Deputy Director
Office of State Programs

Enclosure:
As stated

ENCLOSURE 1

TECHNICAL TRAINING DIVISION POLICIES ON COURSE EXAMINATIONS
(Taken verbatim from the Course Catalog)

Examination Policy

Examinations are given at the end of most TTD courses. Students required by NRC Inspection Manual Chapter 1245 (or other formal requirements) to complete a course as part of their qualification program must pass the examination. The passing grade for all TTD courses is 70% except for Site Access Training, Site Access Refresher Training, and NMSS Radiation Worker Training which require a score of 80%. Some employee qualification programs may require a higher or lower passing grade for some courses.

Examinations for TTD courses are linked to learning objectives associated with course modules. These learning objectives are provided to students at the beginning of courses and are normally included as part of the course manual. Examinations for reactor technology courses and some specialized technical training courses are normally randomly generated by a Computerized Examination Bank System which contains validated questions.

After course examinations have been graded, course reporting memoranda with actual course grades will be sent to the appropriate region or program office via the training coordinator and to the NRC Training Systems Administrator. Students will receive a copy of this letter along with the completed examination if the examination was not previously returned. Course reporting memoranda for students who satisfactorily complete a course (or course series) will reflect that the minimum requirements have been met, and a training certificate will be provided.

Since there is typically no pre-course examination, the final course examination grade is not necessarily indicative of the level of effort expended by the student. Examination results indicate only the knowledge level of the student at the conclusion of a course, and the numerical grade should not be used as a performance indicator.

Examination results are normally considered final. If a question concerning the grading of an examination arises, the examination will be regraded provided the examination has been discussed with the student's management; the student's management requests the regrading of the examination in writing, to the appropriate TTD Branch Chief; and the original examination is returned to the TTC. The complete examination will be regraded by an instructor who was not associated with the original examination. Any regraded examination is considered as the final grade for the examination and will be returned to the student’s management.

Equivalency Examination Policy

Equivalency examinations may be given to experienced personnel for required courses that are part of formal qualification programs to allow validation of the course. These examinations must be requested by the employee's immediate supervisor to the cognizant TTD Branch Chief. Students who validate courses typically miss out on regulatory insights and perspectives, emerging technical issues, and technical interactions with their peers. Equivalency examinations may be taken at the TTC or in the employee's regional or program office and are normally taken on the regular examination day for the course that is being validated.

Reexamination Policy

Written reexaminations may be given to students who receive failing grades, subject to certain limitations. Reexaminations are rarely given to students who received a course grade of less than 50%. No reexaminations are given, regardless of the grade, if the course which has been failed is not required training for the individual unless a request is received from the student's management. Only one reexamination will be given to a student for any given course. Any student who fails a reexamination must repeat the course to satisfy the training requirement.

Reexaminations must be requested by the student's management to the cognizant TTD Branch Chief. Such requests must be received by the TTD within 30 working days from the date the examination letter identifying the failure was mailed to the student and immediate supervisor. A prepared reexamination will then be mailed with a cover letter to the student’s immediate supervisor. This letter will indicate how the reexamination should be administered. The completed reexamination must be returned to the TTC immediately upon completion.

Appendix F

TRAINING ALTERNATIVES FOR TECHNICAL COURSE PRESENTATION

TRAINING ALTERNATIVES FOR TECHNICAL COURSE PRESENTATION

Introduction

The Working Group reviewed several references on distance learning and selected the major methods for evaluation. The report defines the general terms and methods used in distance learning and presents the advantages and disadvantages for the training methods evaluated by the Working Group.

Definitions

Distance learning - any learning that takes place without the physical presence of the instructor with the learner. This can include technologies yet to be developed as well as technologies, such as correspondence courses, that have been around for many years.

Teleconferencing - Two-way electronic communication between two or more groups, or three or more individuals, who are in separate locations; includes group communication via audio, audiographics, video, and computer.

Teletraining - One-way electronic communication (instructor to learner) with limited feedback to the instructor via telephone, fax, keypad, or other communication method.

Methods Considered as Training Presentation Alternatives

The Working Group evaluated the following training methods:

Traditional Classroom - The learner and the instructor are at the same site. This is the traditional classroom training environment. The instructor receives immediate feedback from the students both visually and audibly.

Video Teleconferencing - The learners can see and hear the instructor, and the instructor can see and hear the learners. It is sometimes referred to as “two way, two way,” referring to the two-way transmission of both an audio and video signal. With video teleconferencing, the equipment is often the same at both the instructor and the learner sites. This provides the flexibility for any of the sites within the system to become an instructor site.

Interactive Video Teletraining - The learners can both see and hear the instructor by watching a television monitor. It is different from static television in that the instructor receives immediate feedback from the learners either from audio systems, keypad viewer response system, telephone, fax, or a combination of the above.

Audio Teleconferencing - The learners can hear the instructor and the instructor can hear the learners in an interactive environment. Audio teleconferencing is greatly enhanced with the distribution of prepared learner materials, such as print-based workbooks, videotapes, 35-mm slides, or other audiovisual aids.

Audiographics - In addition to audio teleconferencing, the instructor and learners are able to share computer-generated graphics and slides. This technique requires that the instructor and the learner sites have the equipment needed for audio teleconferencing as well as a personal computer, audiographics software, a special modem, and an interactive tablet.

Computer Based Training - The learner uses a desk top computer to improve skills and knowledge. This can use inter/intra-net, CD-ROM, or other media.

Internet/Intranet - Interactive communications via the computer through the inter/intra-net through the use of chat rooms or other techniques.

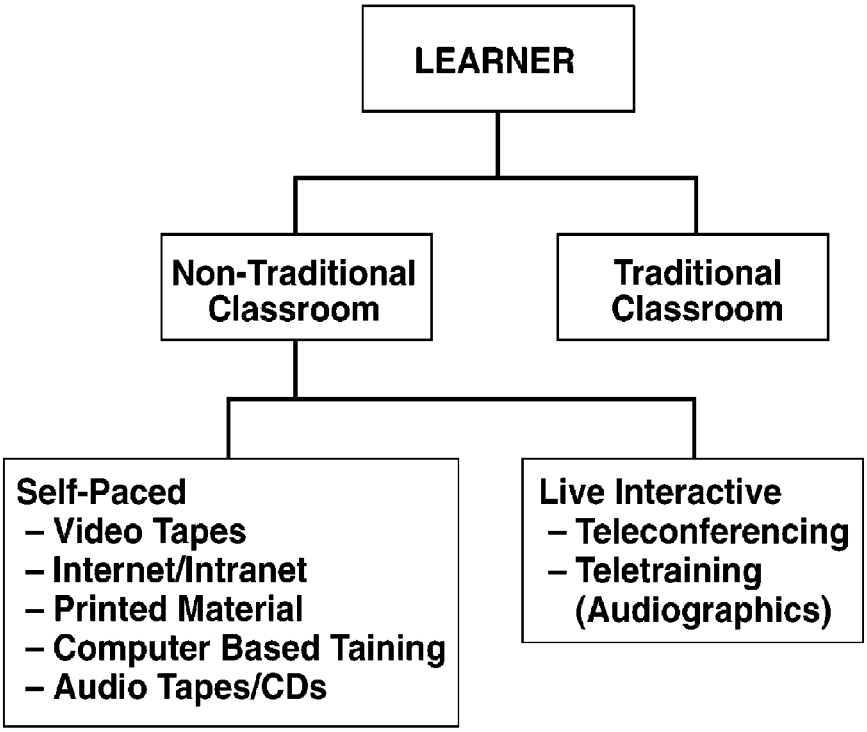
Printed Material - The instructor prepares written instructional material that is distributed and used at the learner's discretion. May provide for limited interaction with the instructor via telephone or fax on an as needed basis.

Video Tape - A video tape is prepared of the instructor presenting the subject material.

Audio Tape - An audio tape is prepared of the instructor presenting the subject material.

These alternative methods for presentation of technical courses are logically divided into the following flow diagram.

LEARNER INFORMATION TRANSFER ENVIRONMENT



The presentation of advantages and disadvantages of the course presentation alternatives are grouped according to the logic flow above.

TRADITIONAL CLASSROOM

TRADITIONAL CLASSROOM TRAINING ADVANTAGES	**TRADITIONAL CLASSROOM TRAINING** DISADVANTAGES
● More flexibility in terms of material presented ● Highly interactive - can request special assistance ● Allows hands-on demonstrations, use of training aids, field trips ● Immediate feedback on learner comprehension ● Fewer distractions ● Traditional training, no technophobia ● Materials readily available	● Physical limitation of classroom size ● Travel/per diem costs ● Ability to see/hear instructors ● Each group receives slightly different training ● Quality of instructors varies ● Instructor availability

NON-TRADITIONAL CLASSROOM

VIDEO TELECONFERENCING ADVANTAGES ● Can easily be recorded for future use ● Everyone receives identical information ● Trainer sees learners ● Instructors and learners have the flexibility of selecting the most convenient training site ● Learners can interact with each other ● Reach people that normally would not be reached	**VIDEO TELECONFERENCING** DISADVANTAGES ● High cost for transmission - need ISDN phone lines ● High cost for equipment ● Difficult to manage visual interactions at several sites ● Focus is on technology instead of interaction (movement of cameras) - distractions to instructors ● Pre-distribution of materials ● Limited time for transmission of information (different time zones) ● Decreased informal interaction among students ● Reliability of transmission ● Scheduling conflicts with equipment and/or room ● Instructor cannot deviate from script due to time constraints
INTERACTIVE VIDEO TELETRAINING ADVANTAGES ● Valuable for large groups at several sites ● Instructor can monitor feedback from learners ● When feedback mechanisms are used, learners are more accountable for attending and interacting	**INTERACTIVE VIDEO TELETRAINING** DISADVANTAGES ● Uses keypad or fax to gain response from students ● Only useful for multiple choice (A,B,C,D) type questions ● Predistribution of materials needed ● Instructor cannot deviate from script due to time constraints ● Extensive equipment ● Satellite downlink dishes at remote sites ● Thorough equipment training at remote site ● Scheduling conflicts with equipment and/or room

AUDIO TELECONFERENCE ADVANTAGES ● Inexpensive ● Simple setup ● Minimal equipment training ● Uses existing phone lines **AUDIOGRAPHICS ENHANCEMENT** ADVANTAGES ● Ability to share digitized information ● Trainer can write information	**AUDIO TELECONFERENCE** DISADVANTAGES ● Not appropriate if live video is needed ● Requires pre-distribution of visual materials **AUDIOGRAPHICS ENHANCEMENT** DISADVANTAGES ● May require pre-distribution of image files ● Requires computer literacy to develop course materials
COMPUTER BASED TRAINING ADVANTAGES ● Very flexible once developed -self paced training ● Inexpensive ● Evaluation built into instruction ● Can use existing videos/visuals ● Convenient ● Tracking of student progress	**COMPUTER BASED TRAINING** DISADVANTAGES ● High development costs - need contractor help ● Lengthy development/timeliness (12-18 months) ● Moderate computer literacy needed to use ● Very few programs available on a commercial basis ● Distractions, computer glitches ● Question of exam availability/security
AUDIO TAPES OR CDs ADVANTAGES ● Inexpensive ● Equipment available ● Simplest technology ● Convenient ● Private ● Self paced ● May be able to modify when information changes ● Unlimited access ● Mass distribution ● Can mark tapes for review ● As technology advances, CDs, DVDs may be considered	**AUDIO TAPES OR CDs** DISADVANTAGES ● Non-interactive ● Quality varies (studio vs live, tape length) ● Labor intensive to produce well ● Could be boring if not done well

VIDEO TAPES ADVANTAGES ● View parts of course that could not be done with audio only ● Can view places that are not accessible ● Familiar technology ● Easily edited ● Unlimited access ● Mass distribution ● Can mark tapes for review	**VIDEO TAPES** DISADVANTAGES ● Becomes obsolete as information changes ● Non -interactive ● Quality varies (tape length) ● Labor intensive to produce well
INTERNET/INTRANET WEB-BASED TRAINING ADVANTAGES ● Materials readily updated ● Inexpensive distribution costs ● Access to multiple training with single software ● Accessible by 27 million people ● Cross platform access ● Trainers have ability to update as needed	**INTRANET/INTRANET WEB-BASED TRAINING** DISADVANTAGES ● Computer literacy to create web site ● Video/audio transmission limited ● Security considerations (unauthorized access or possible tampering with files) ● CBT does not work well on the Web (large versus small files) and interactiveness ● Access speed and reliability (graphics are especially a problem) ● Limited interactivity ● Finding location of site ● Differences in viewers/browsers may result in need for standardization

PRINTED MATERIAL ADVANTAGES	**PRINTED MATERIAL** DISADVANTAGES
● Material can be converted to electronic format ● Inexpensive ● Can highlight, can reproduce easily ● Easily revised ● Adaptable to in-house training, can convert to specialized training for staff ● Very flexible, go anywhere you want, easily reviewed ● Not technologically dependent ● Recyclable	● Large amount of paper used ● Bulky in a hard copy format ● Distribution costs ● Labor intensive to maintain current ● Can be boring as compared to more visual stimulating programs

The distinct advantages and disadvantages of each method of training presentation need to be considered in any decision to proceed to implement any specific methodology or combination of methodologies. The status quo would be to continue with the traditional classroom teaching environment for NRC training with Agreement States always having the option to use other training alternatives. Conversion to any of the other methodologies would require significant time and resources to modify the current materials to be presentable in the selected mode.

The costs for conversion and presentation identified at this time are:

- Course material conversion (This may be accomplished in-house or via a contractor depending on the complexity of the method and the material.)

- Trainer training and practice given the media selected

- Media presentation development (video/audio tapes, scripting for live presentations)

- Equipment purchase/rental/scheduling and technical support for NRC/States

The references reviewed by the Working Group recommend that a team of professionals be assembled to develop materials for presentation using the newer electronic media. This team should include technical specialists, training specialists, and communications specialists.

The Working Group discussed several technical courses that would have the potential for modification for presentation using electronic communications. The general criteria used by the group were:

- The course is mainly lecture presentation.

- The course does not require field trips or extensive small group interaction.

- The course length should be relatively short or the course should be amenable to being broken into modules for presentation.

The Working Group reviewed the courses currently being presented by the Technical Training Division of NRC using the general criteria above. The courses identified as potentially convertible at this time were:

H-117 Introductory Health Physics (1 week, NRC staff taught)
H-120 Radiological Surveys In Support of Decommissioning (2 days, contractor taught)
H-201 Health Physics Technology (2 weeks, NRC taught)*
H-312 Internal Dosimetry and Whole Body Counting (1 week, contractor taught)
H-401 Health Physics Topical Review (3 days, contractor taught)
H-901 Health Physics Technology Overview (1 week, NRC taught)
G-109 Licensing Practices and Procedures (1 week, NRC taught)**

* (Daily quizzes would require the presence of an on-site facilitator. Quizzes cannot be graded locally but must be returned to the instructors. Quizzes are normally graded each night to provide students with instant feedback and to permit students to become familiar with the grading process. This would not be possible for remote audiences.)

** (Individuals at remote sites can do workshops among themselves assuming there is more than one person at the site. Results can be discussed for general review by all participants; however, cross fertilization/exchange of ideas between NRC Regional/Headquarters and State participants during the workshop analysis will not occur, only during final discussions.)

The limited number of courses identified was partly due to the lack of experience in electronic media presentation as well as the number of courses that have site visits and special group activities that may not be easily accomplished through the above training techniques. The Working Group also recognized that the resources to convert these course have not been specifically included in the technical training budget. Therefore, the Working Group suggests that NRC consider a pilot or trial program to evaluate NRC's ability to convert a course to an alternative presentation mode and evaluate the costs of conversion and implementation of the converted course. The Working Group did not identify any references that discussed distance learning experience with courses in the week or longer range. Such information would aid in the conversion and implementation process.

References

"Distance Learning, A Step-by-Step Guide for Trainers," K. Mantyla and J.R. Gividen, American Society for Training Development, 1640 King Street, Box 1443, Alexandria, VA 22313-2043, July 1996.

INFO-LINE, "Practical Guidelines for Training and Development Professionals, Effective Distance Learning," American Society for Training Development, 1640 King Street, Box 1443, Alexandria, VA 22313-2043, 1997

"Course Catalog," Technical Training Division, U.S. NRC, March 1997.

Inspection Manual Chapter 1246, "Formal Qualification Programs for the Nuclear Material Safety and Safeguards Program Area," U.S. Nuclear Regulatory Commission, July 1996