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OAK RIDGE NATIONAL LABORATORY ENVIRONMENTAL SAFETY AND HEALTH TRAINING OPERATIONS PLAN

Prepared by:
TECHNICAL RESOURCES AND TRAINING SECTION
Environmental Compliance and Health Protection Division

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ORNL Environmental Safety and Health Training

Operations Plan Transmittal Record

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OAK RIDGE NATIONAL LABORATORY ENVIRONMENTAL SAFETY AND HEALTH TRAINING OPERATIONS PLAN

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PREFACE

The Department of Energy (DOE) has experienced controversy and interruption in operations in recent years as environmental and health safeguards have gained increasing public and Congressional review. The growth of Congressional legislation in this area has risen dramatically since the National Environmental Policy Act in 1969 and has yet to level off. In addition, DOE has mandated additional operating requirements in these areas, particularly in radioactive materials management. Today DOE complies with these DOE and other regulatory requirements through permits, memoranda of understanding, interagency agreements, operational plans, and other forms of control.

Compliance with environmental and health regulations requires that an effective environmental management strategy is designed and adopted for all DOE operations. The close interaction between environmental management and human health protection must also be taken into consideration. Cohesive and comprehensive planning must be implemented, with each element of control clearly defined and documented.

An important component of this environmental management strategy is the assurance that the operating personnel understand and adopt the management objectives and use them in the performance of their daily duties. This requires that the environmental management strategy include the proper emphasis on training of personnel in the content of the regulations and the installation- or facility-specific implementation of the regulations.

The building of an effective environmental safety and health (ESH) technical training program at ORNL became a necessity to enable the Laboratory to ensure that its employees have adequate knowledge of their complex workplace and the necessary skills to protect both themselves and the environment when

handling potential radiation, chemical and safety hazards. Through management's commitment to the provision of adequate Environmental Safety and Health (ESH) support and training to all ORNL operations, the ESH technical training program provided by the Technical Resources and Training Section (TRT), Environmental and Health Protection Division (EPHD), has flourished and grown into a training team dedicated to maintaining and improving overall operational excellence. The strong support from ESH management has been essential to our growth; our thanks go to D. C. Parzyck and R. S. Wiltshire for establishing our function, and T. H. Row, J. H. Swanks, O. B. Morgan, and F. R. Mynatt, for their continuing support and encouragement. The EHPD Section Heads--H. M. Butler, Radiation Protection; J. S. Bogard, Radiation Monitoring; P. S. Rohwer, Environmental Monitoring and Compliance; D. T. Duncan, Industrial Hygiene; T. F. Scanlan, Waste Management; L. D. Bates, Remedial Action; C. E. Pepper, Environmental Projects; and L. E. Stratton, Environmental Programs Coordination--have also supported TRT's efforts by working in a close matrix to provide appropriate training to their own staff members as well as to other ORNL staff.

Many others in ORNL and throughout the DOE Contractor community have made it possible for TRT to grow to meet its functions quickly. Within ORNL, Jane Eggers, Cindy Kendrick, Mike Martin, Bill Culbert, K. G. (Butch) Edgemon, Joe Inman, and many members of the EPHD have been instrumental in our growth. Through active participation in the Training Resources and Data Exchange (TRADE), the DOE Contractors training organization operated through the Oak Ridge Associated Universities, we have been assisted by many other DOE training personnel. Key among those are Philip Croll, John Robinson, Andy Smith, Norris Johnson, Bill White, Susie Tung and others. This also includes TRADE staff such as Tina McKinley, Director of TRADE, Marcus Weseman, Cynthia Schenley, Lisa Carroll, Mike Wetzel, Nancy Bessler, and John Doggett. Additional support has been provided through the Nuclear Facilities Training Coordination Program, based at EG&G Idaho and currently headed by Matt Jones.

Additional thanks go to members of the Martin Marietta Energy Systems family who also shared information with us. Through our

membership in the Energy Systems Technical Training Committee and its several issue-specific subcommittees, we have developed close cooperative relationships with other Energy Systems installations and with H. Duane Hymer, Energy Systems Technical Training Manager. Others worthy of mention are Irv Speas, Gary Love, Mike Mitchell, Charles Emery, and Mike Knazovich of Central Staff; John Bolling and Steve Giles of Oak Ridge Gaseous Diffusion Plant; and Tom Barron, Bill Mooney, and John Gray of Paducah Gaseous Diffusion Plant.

We would be remiss if we did not include a note of appreciation for the invaluable assistance of Donna McConkey Russell and Hazel Burum in turning all of our documentation into an orderly plan for publication and into standard operating procedures. In these endeavors, as in all of our training tasks, they have provided constant and consistent support.

Emily D. Copenhaver

ACRONYM LIST

ACM -	Asbestos-containing Material
ALARA -	As Low As Reasonably Achievable
ALI -	Annual Limit on Intake
ANSI -	American National Standards Institute
APR -	Air Purifying Respirator
ASTD -	American Society for Training and Development
BOD -	Biological Oxygen Demand
CAA -	Clean Air Act
CBT -	Computer-Based Training
CERCLA -	Comprehensive Environmental Response, Compensation and Liability Act
CFR -	Code of Federal Regulations
CWA -	Clean Water Act
DAC -	Derived Air Concentration
DHHS -	Department of Health and Human Services
DOE -	Department of Energy
DOELAP -	Department of Energy Laboratory Accreditation Program
DOS -	Disk Operating System
DOT -	Department of Transportation
DSO -	Division Safety Officer
EHPD -	Environmental and Health Protection Division
ELO -	Enabling Learning Objective
EPA -	Environmental Protection Agency
EPO -	Environmental Protection Officer
ESH -	Environmental Safety and Health
FSAR -	Facility Safety Analysis Report
GET -	General Employee Training
HP -	Health Physics
HWOG -	Hazardous Waste Operations Group
IATA -	International Air Transport Association
ICRP -	International Congress on Radiation Protection

IHD -	Industrial Hygiene Division
INPO -	Institute for Nuclear Power Operations
ISD -	Instructional Systems Development
JHA -	Job Hazard Analysis
JTA -	Job Task Analysis
LLLW -	Liquid Low-Level Waste
NCRP -	National Congress for Radiation Protection
NFTCP -	Nuclear Facility Training Coordination Program
NIOSH -	National Institute of Occupational Safety and Health
NRC -	Nuclear Regulatory Commission
NPDES -	National Pollutant Discharge Elimination System
NSPI -	National Society for Performance and Instruction
OJT -	On-the-Job Training
ORAU -	Oak Ridge Associated Universities
ORO -	Oak Ridge Operations
OSHA -	Occupational Safety and Health Administration
PBT -	Performance-Based Training
QA -	Quality Assurance
RAD -	Radiation Absorbed Dose
RCO -	Radiation Control Officer
RCRA -	Resource Conservation and Recovery Act
REM -	Radiation Dose Equivalent
RM -	Radiation Monitoring
RP -	Radiation Protection
RWOG -	Radioactive Waste Operations Group
RWP -	Radiation Work Permit
SARA -	Superfund Amendments Reauthorization Act
SCBA -	Self-Contained Breathing Apparatus
SIG -	Special Interest Group
SLLW -	Solid Low-Level Waste
SPCCCP -	Spill Prevention, Control, Countermeasures and Contingency Plan
SWP -	Safety Work Permit
SWSA -	Solid Waste Storage Area
TAP -	Training Accreditation Program

TOC -	Total Organic Carbon
TDS -	Total Dissolved Solids
TLD -	Thermoluminescent Dosimeter
TLO -	Terminal Learning Objective
TRADE -	Training Resources and Data Exchange
TRT -	Technical Resources and Training
TRU -	Transuranic
TSA -	Technical Safety Appraisal
TSD -	Treatment, Storage, and Disposal (waste)
UOR -	Unusual Operating Report
USCG -	United States Coast Guard

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1. SUMMARY

The type of equipment and the nature of the work performed at a multipurpose national research laboratory are unusual and subject to requirements far beyond those of more conventional industries. Of primary importance are requirements regarding the qualifications and training of the individuals performing radiation and hazardous materials work at nuclear facilities.

This document deals with the policies and practices for ORNL Environmental Safety and Health (ESH) Training in regard to (1) the General Employee Training (GET) of all ORNL personnel and visitors and (2) the training, qualification, and requalification of reactor facility personnel, nonreactor nuclear facility personnel, waste treatment and handling personnel, waste site operations personnel, transportation personnel, construction and contract personnel, and ESH and maintenance support personnel for the above activities. For Environmental and Health Protection Division (EHPD) personnel, more detailed training in their respective areas must be provided. This ESH training is developed and implemented by the Technical Resources and Training Section (TRT) under the authority given to the Division Director by the Associate Director for Support and Services. The program is funded through a mix of financial arrangements, based on what is appropriately programmatic versus overhead expense.

This document does not address the process or operational task portions of the training for reactor operating personnel, nonreactor nuclear facility personnel, technical support personnel, emergency response personnel, maintenance personnel, fire-protection personnel, security personnel, or medical personnel. Only the environmental, safety and health-related portions of these programs are provided by the Technical Resources and Training Section. In most cases, there are special training programs available in the operational divisions to cover the process and operational tasks. TRT does provide operations training within the EHP for radiation protection and monitoring,

environmental compliance, industrial hygiene, and waste operations personnel.

2. ESH TRAINING PHILOSOPHY

Goals and Objectives

The Technical Resources and Training Section's Program has been developed to ensure that qualified personnel operate and maintain the facilities at ORNL in a safe and environmentally sound manner and that training, testing, documentation, etc., are in compliance with DOE and ORNL requirements.

The broad objectives of the program are to:

- Provide knowledge of personal protection and environmental awareness to all ORNL employees.
- Enhance the safety and security of all ORNL personnel.
- Heighten individual responsibility awareness.
- Increase employee flexibility within the overall ORNL organization.
- Provide ESH training components to the programs to qualify operations personnel for each operating facility.
- Expand employee knowledge of the facilities and the processes and equipment contained therein.
- Provide a formalized, auditable program that meets the intent of DOE Orders and other regulatory requirements.

These broad objectives are achieved through the development and implementation of a comprehensive, job-performance-based training program which is administered and delivered by TRT. To accomplish these objectives TRT must perform the following tasks:

1. Review the existing training programs in use dealing with environment, safety, and health (ESH) at ORNL.

2. Keep abreast of new ESH training requirements being generated by new laws and regulations, quality assurance, environmental documentation, and by perceived informational needs.

3. Review the training programs to ensure that they meet the intent of DOE Orders and other regulatory requirements.

4. Analyze jobs requiring mandatory ESH training objectively to determine the skills and knowledge required for successful performance.

5. Develop and implement, in consultation with EHP supervisors, a formalized, auditable, job-performance-based training program for personnel in the EHP Division, including Radiation Protection, Radiation Monitoring, Industrial Hygiene, Environmental Monitoring and Compliance, and Waste Operations.

6. Develop and implement, in consultation with the operating and research divisions, a job-performance-based training program for personnel requiring ESH training such as General Employee Training (GET), Radiation Protection, etc.

7. Provide specialized and/or remedial training as deemed necessary or as requested by laboratory management, facility supervision, and oversight functions.

8. Maintain documentation of personnel qualifications and of specific training delivered to each employee.

9. Revise the various training courses as necessary to keep training current with ORNL operations and equipment as well as new developments in subject matter and changes in regulatory guidance.

10. Assist facility supervision in administering evaluations and determining qualifications.

11. Keep abreast of new teaching techniques and new equipment utilized for lesson delivery. Modify techniques and procure instructional aids as appropriate, to ensure effective training of personnel.

12. Participate in the various DOE sponsored training conferences and workshops in order to remain current on training problems, accomplishments, and needs at other DOE nonreactor facilities. Evaluate these areas to determine applicability to this site.

13. Provide ESH and training technical resources for special assignments for ORNL, Martin Marietta Energy Systems, and the DOE community, such as DOE task forces, Advisory Committees, and troubleshooting (tiger) teams.

14. Maintain college and university liaison in the areas covered by ESH disciplines. Develop and implement internship programs to provide feeder pools of technically trained ESH personnel.

Compliance Requirements

The ever increasing regulatory-required technical environmental, safety and health training is creating a complex and overlapping training environment for all DOE contractors. Figure 2.1 shows just how rapidly the health and environmental regulatory picture has been changing. Though our radiation protection training mandates come directly from DOE Orders, the DOE Orders also reflect this voluminous growth in health and environmental regulation over the last two decades and are changing to match the increasing attention to health protection, risk assessment, information and training as related to personal, corporate and governmental responsibility. Some of the laws, regulations and orders impacting ORNL employees are listed under REGULATORY DOCUMENTATION.

Coordination and Consolidation of Training

When a comparison is made of the curricula developed by ORNL to comply with environmental and health regulations, many training needs may overlap. For example, the most significant difference between RCRA and SARA training is the emphasis on worker protection and health hazards under SARA versus hazardous waste management procedures and emergency

Fig. 2.1

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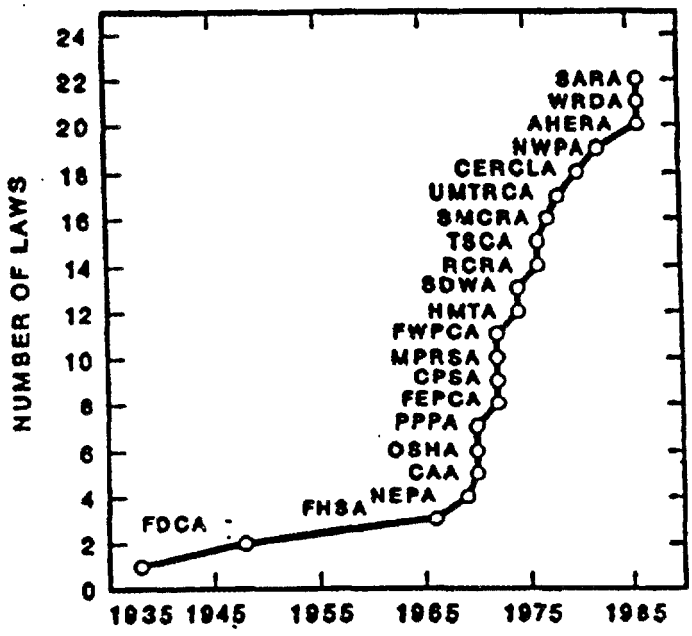
GROWTH OF HEALTH AND ENVIRONMENTAL PROTECTION LAWS



FDCA - FEDERAL DRUG AND COSMETICS (1938)
FIFRA - FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE (1948, 1972, 1975, 1983)
FHSA - FEDERAL HAZARDOUS SUBSTANCES (1966)
NEPA - NATIONAL ENVIRONMENT POLICY (1969)
PPPA - POISONIOUS PACKAGING PREVENTION (1970)
OSHA - OCCUPATIONAL SAFETY AND HEALTH (1970)
CAA - CLEAN AIR (1970, 1977)
FWPCA - FEDERAL WATER POLLUTION CONTROL (CLEAN WATER) (NOW WATER QUALITY) (1972, 1977, 1987)
MPRSA - MARINE PROTECTION, RESEARCH, AND SANCTUARIES (1972)
CPSA - CONSUMER PRODUCT SAFETY (1972)
FEPCA - FEDERAL ENVIRONMENTAL POLLUTION CONTROL (1972)
SDWA - SAFE DRINKING WATER (1974, 1977, 1986)
HMTA - HAZARDOUS MATERIALS TRANSPORTATION (1974, 1984)
RCRA - RESOURCE CONSERVATION AND RECOVERY (1976, 1978)
TSCA - TOXIC SUBSTANCE CONTROL (1976)
SMCRA - SURFACE MINE CONTROL AND RECLAMATION (1977)
UMTRCA - URANIUM MILL TAILINGS RADIATION CONTROL (1978)
CERCLA - COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (1980)
NWPA - NUCLEAR WASTE POLICY ACT (1982)
AHERA - ASBESTOS HAZARD EMERGENCY RESPONSE ACT (1986)
WRDA - WATER RESOURCES DEVELOPMENT ACT (1986)
SARA - SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (EXTENSION OF CERCLA) (1986)

response under RCRA. ORNL is reviewing the RCRA, SARA,and other related training programs and are increasing coordination of all of the above training efforts to develop a more orderly overall program. In addition, a team has been identified to work toward coordination of required technical training in environment, safety, and health by listing key opportunities for technical training modules and cross-qualification. The strategy for developing the training matrix will allow for the development of performance-based training modules in major areas such as employee rights and responsibilities; hazard recognition; health effects and risk; monitoring methods and equipment; sampling methods and equipment; contamination control including decontamination; transportation; emergency response and treatment, storage, and disposal of wastes. Each of these and additional modules will address the subject content in accordance with several regulations such as those listed above and DOE and Department of Transportation regulations. This should eliminate duplicate training to meet each regulation, resulting in considerable time and cost savings for the company.

ORNL Authority

The responsibility for the identification, development, and implementation of the ESH training needed to meet compliance requirements has been assigned to the Technical Resources and Training Section by the Associate Director for Chemical, Environmental, and Health-Protection Technologies of ORNL, through the Director of the Environmental and Health Protection Division, where the Section resides. Therefore, the TRT is a line organization with both line and matrix responsibilities, as are all other sections of the Environmental and Health Protection Division.

The Section is funded with overhead and programmatic commitments, via a variety of costing mechanisms designed to maximize the accountability to those ORNL projects benefitting from the specific training courses. All financial arrangements have been negotiated by or with the agreement of the EHP Division Director and/or the ORNL Associate Director for Chemical, Environmental, and Health-Protection Technologies.

3. TRAINING ORGANIZATION STRUCTURE AND RESPONSIBILITIES

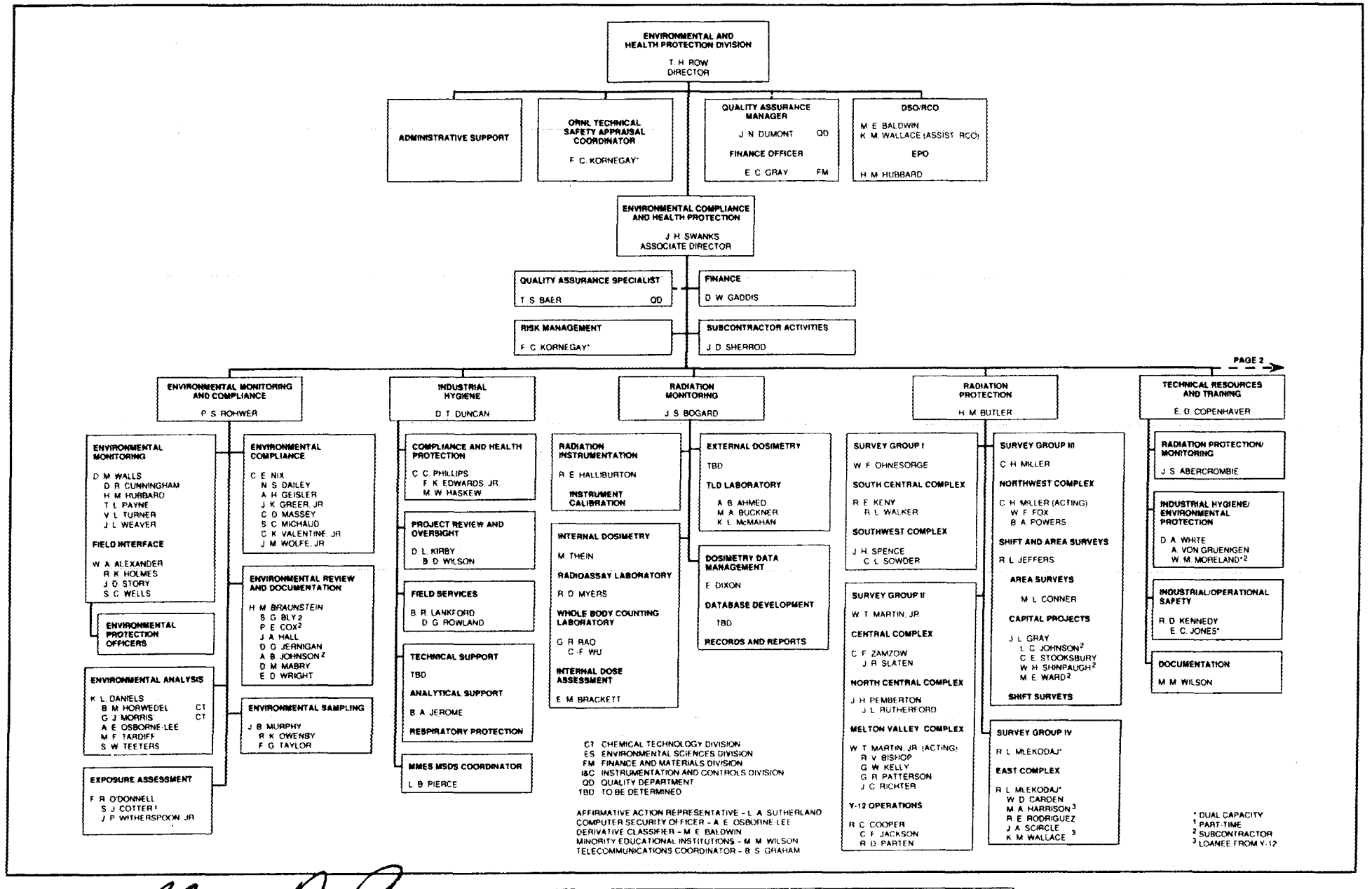
The Technical Resources and Training Section is staffed by personnel representing many disciplines including health physics, industrial hygiene, environmental compliance, industrial safety, and technical and adult training. The TRT Section resides in the Environmental and Health Protection Division (Figure 3.1), with the ESH Training Manager (TRT Section Head) reporting directly to the Associate Division Director for Environmental Compliance and Health Protection. In addition, some TRT staff members have joint appointments with other EHP sections, thereby strengthening the ties between the ESH operations sections and the ESH training program. Like the other EHP departments, it serves a support function for all the operational and research divisions of ORNL(Figure 3.2), and works closely with other training organizations within ORNL to accomplish the overall objective of ensuring that a competent work force is in place at ORNL. Figure 3.3 shows the current structure of the TRT Section. The ORNL ESH Training Manager also reports to the Martin-Marietta Energy Systems Technical Training Manager (located in Energy Systems Personnel) to assure coordination of technical training across Energy Systems. Figure 3.4 shows the proposed structure of the Central Energy Systems program.

Staff Responsibilities

ESH Training Manager (TRT Section Head)

The TRT Section Head should have a minimum of three years of experience in ESH operations in ORNL or an equivalent facility. He/she must be able to interact well with all levels of

REPORTS TO ASSOCIATE DIRECTOR FOR CHEMICAL, ENVIRONMENTAL, AND HEALTH-PROTECTION TECHNOLOGIES



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ENVIRONMENTAL AND HEALTH PROTECTION DIVISION
MARTIN MARIETTA ENERGY SYSTEMS, INC.

EFFECTIVE DATE JULY 1989

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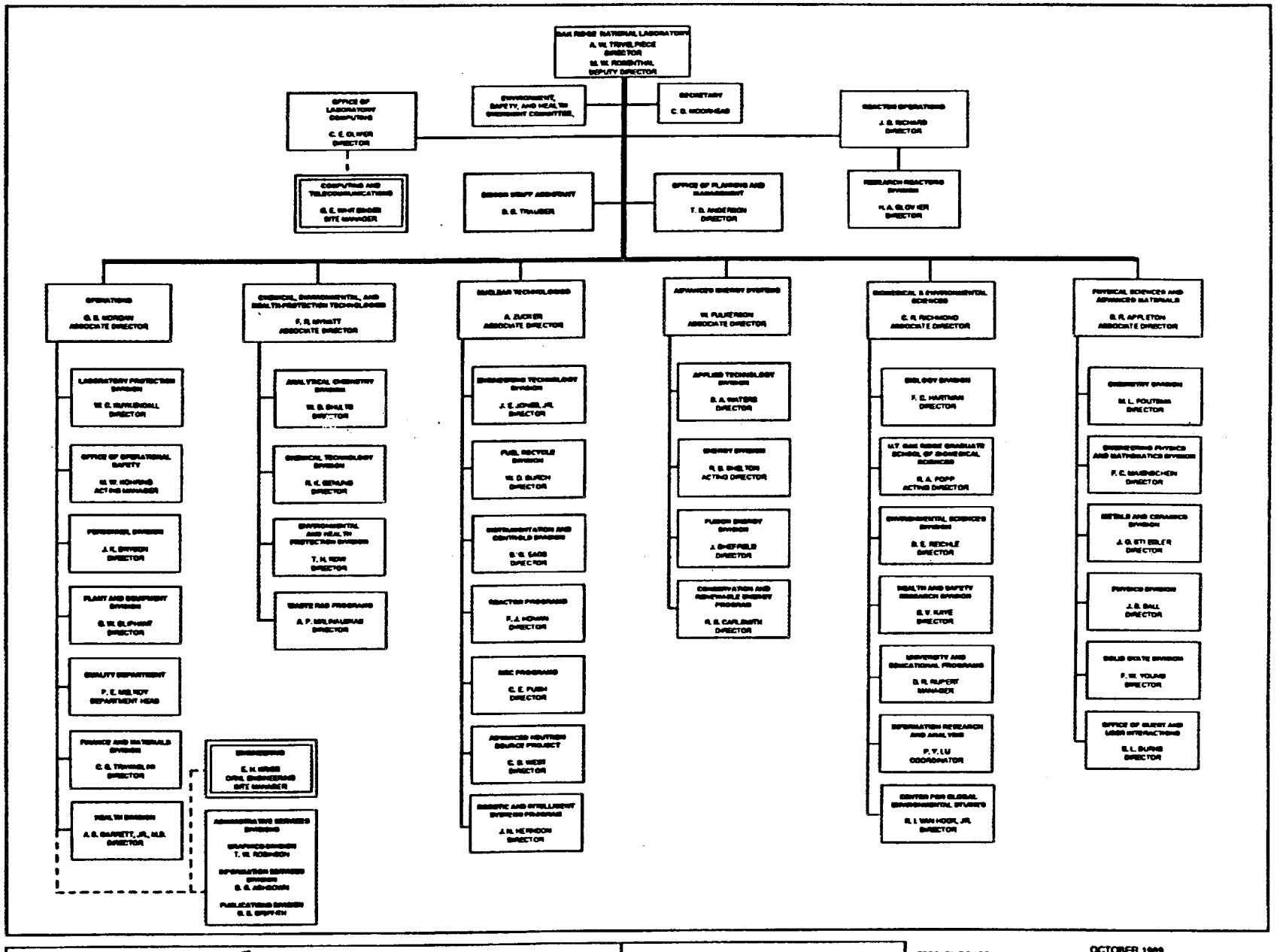
Fig. 3.1

REPORTS TO SENIOR VICE PRESIDENT



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ORGANIZATION CHART:

OAK RIDGE NATIONAL LABORATORY

MARTIN MARIETTA ENERGY SYSTEMS, INC.

EFFECTIVE DATE OCTOBER 1989

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Fig. 3.2

Fig. 3.3 Technical Resources and Training Section Structure

TECHNICAL RESOURCES AND TRAINING SECTION
ENVIRONMENTAL AND HEALTH PROTECTION DIVISION
OAK RIDGE NATIONAL LABORATORY

Emily D. Copenhaver, Section Head

Sandra Elliott, Secretary

RADIATION PROTECTION/MONITORING

J. Lynn Anderson, Leader
B. C. Jean Thorpe
Scott Taylor
Jennifer Taylor, Asst.

INDUSTRIAL HYGIENE/ENVIRONMENTAL PROTECTION

D. Allen White, Leader
Allison V. Keebler
W. Michael Moreland*
Donna S. McConkey Russell, Asst.
A. Fay Frederick, Asst.
Teresa Presley/ F. Kenneth Edwards**

INDUSTRIAL/OPERATIONAL SAFETY

R. Don Kennedy, Leader
Edith Jones
Hazel Burum, Asst.

DOCUMENTATION

Mary Wilson

QUALITY ASSURANCE

Teresa Baer***

*Full-Time Consultant
**Liaisons with Industrial Hygiene Section
***Serves as QA Specialist for the Environmental Compliance and Health Protection Organization

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Fig. 3.4 Proposed Structure for Energy Systems Technical Training Central Function

MARTIN MARIETTA ENERGY SYSTEMS , INC.
CENTRAL PERSONNEL STAFF

H. Duane Hymer, Technical Training Manager

Reporting Directly:

Compliance Staff Person

Accreditation/FOTAP/PBT Staff Person

Central Staff Training Staff Person

TMIS Staff Person

Reporting in Matrix:

Kathy M. White, ORGDP Site Manager

Al D. Officer, ORNL Site Manager

Emily D. Copenhaver, ORNL ESH Manager

Jane L. Eggers, ORNL Reactors Manager

Bill Mooney, PAD Site Manager

Jim Yocum, PORTS Site Manager

Mike C. Willard, Y-12 Site Manager

9/89

management within ORNL. The individual should have a minimum of three years of supervisory experience.

The Section Head is responsible for establishing a long-range training plan, obtaining and maintaining adequate training personnel, setting group objectives, maintaining liaison with appropriate plant personnel, ensuring the continuity of the training effort, and serving as focal point for external coordination of the training efforts. He/she maintains an adequate organizational structure to meet ORNL's ESH training commitments. For example, the current ESH Training Manager represents Oak Ridge National Laboratory on the Martin Marietta Energy Systems ESH Technical Training Committee, who meets quarterly to coordinate ESH training activities within the corporation.

Training Group Leaders

The Training Group Leaders should be experienced in the development and delivery of technical training, preferably in the area of environment, health, and safety or equivalent experience in radiation protection, industrial hygiene, waste operations, health, or safety. He/she supervises the activities of the training group and other Section personnel involved in the development and delivery of training programs.

Currently, there are three training groups -- Radiation Protection/Monitoring, Industrial Hygiene/Environmental Protection, and Industrial Safety/Operations -- loosely organized around these ESH disciplines (see Fig. 3.3).

Instructors/Coordinators

An instructor must be experienced in the jobs which exist in a facility or the tasks involved in a skill area or be extensively trained in the relevant professional discipline related to the skill area. An instructor must be familiar with the facilities involved. In addition, the individual should be knowledgeable of ESH needs in the facility. The instructor should have good communication skills and a desire to assist others in learning or improving their job skills. As coordinator of a specific ESH training area, the instructor is responsible for: developing and maintaining training schedules and records for all courses developed and delivered;

assisting the Documentation and Materials Control Coordinator in maintaining training records for personnel; directing the development and implementation of qualification methods, and other duties as assigned. Current coordinator assignments include the following: General Employee Training, Radiation Protection, Radiation Monitoring, Environmental Compliance, RCRA, Construction/Contractor Training, SARA/OSHA, Transportation, Waste Generators, and Waste Operations.

Technical Training Assistants

A Technical Training Assistant should be experienced in set-up of instructional environments, be able to assist in the preparation of trainee and instructor materials, be knowledgeable of training record requirements, and be able to assist the Instructors/Coordinators in the more routine tasks involved in conducting and documenting training courses. A technical training assistant is expected to assist in the following (but is not limited to the listed duties):

- schedule classroom
- schedule trainees
- check out instructional equipment
- assemble trainee materials
- print/revise audio-visual aids
- set up classroom
- videotape drills
- assist in demonstrations
- assist in grading exams
- assist in recordkeeping

The Technical Training Assistant enables instructors/coordinators to devote more attention to the technical requirements of the training being offered by absorbing administrative functions to the extent possible.

Documentation and Materials Control Coordinator

The Documentation and Materials Control Coordinator should be experienced in the development, maintenance, and evaluation of records and data. This person is responsible for developing and

maintaining training records management system; developing and maintaining training materials management system to control the training aids generated to support TRT training programs, and other duties as assigned.

Quality Assurance Specialist

The Quality Assurance Specialist must be experienced in the development and implementation of quality assurance throughout the program of the Technical Resources and Training Section. This function is currently shared with other sections in the Environmental Compliance and Health Protection Organization as shown on Figure 3.1. Where appropriate, the following elements of quality assurance must be addressed: organization; quality assurance program; design control; procurement document control; instructions, procedures, and drawings; document control; control of purchased items and services; identification and control of items; control of processes; inspection; test control; control of measuring and test equipment; handling, storage, and shipping; inspection, test, and operation status; control of non-conforming items; corrective action; QA records; audits; and software.

Instructor Training and Qualifications

TRT instructors are typically chosen by their disciplinary training and experience in ESH fields such as industrial hygiene, health physics, waste management, etc. In most cases personnel assigned to the training group as instructors will have little experience or training as an instructor. However, one or more of the instructors are chosen specifically for technical and adult education and experience. Initial and continuing instructional skills and technical skills development activities shall be conducted to help ensure the maximum effectiveness of the training program. This section describes the initial and continuing skill development programs used to enhance and develop the educational and professional skills of the instructors.

Instructor Skills Qualification

As soon as possible after initial assignment to the training group, all newly assigned instructors shall participate in the Instructor

Skills Workshop. The Instructor Skills Workshop is a 24-hour workshop designed to provide instructors with instruction in areas such as adult learning theory, teaching methodologies, communications, and group dynamics. The Instructor Skills Workshop is structured to take advantage of the experiences of the new instructor and to prepare instructors to develop, present, and evaluate training programs. Figure 3.5 contains a description of the curriculum for the Instructor Skills Workshop.

Technical Skills Qualification

Instructors who develop, present, or evaluate technical instruction should possess technical qualifications consistent with their assignments. Technical qualifications should include theoretical and practical knowledge and practical work experience at or above the level that is required of the trainee population.

ESH Technical Instructor Qualification Process

Qualification of instructors is accomplished by completion of the following:

- Instructor Skills Workshop
- Demonstrated classroom performance
- Verification of technical skills

Appendix B provides a checklist of documents which may be used as evidence of technical instructor qualifications, the initial qualification form, and the requalification form for ESH instructors. The Qualification File for each instructor shall be reviewed by the Instructor Verification Official and the TRT Section Head. After instructor and technical skills qualifications have been verified, the instructor will be issued an Qualification and Certificate signed by the Instruction Verification Official, Section Head, and Division Director. Instructors must requalify every two years.

Requalification will be based on the following:

- Acceptable ratings on annual Instructor Evaluations
- Participation in two Instructor Skills Updates per year

Figure 3.5. Instructor Skills Workshop Course Curriculum

Adult Learning Concepts - Examine how adults learn. Discuss key assumptions about adult learners. Discuss trainers' responsibility for guiding learning process. Identify and assess trainees needs to design class to maximize learning skills, and knowledge.

Instructional Systems Development - Examine performance-based system used for planning, developing, implementing, and evaluating training programs. Use of this strategy ensures that trainees are taught the knowledge and skills necessary for successful job performance.

DOE Documentation Requirements - Review requirements by DOE and other regulatory agencies for documentation of training records.

DOE Accreditation Program - Review requirements of proposed DOE Accreditation Program, using TAP-1, -2, and -3 documents.

Methods of Teaching - Discuss variety of methods used to achieve learning goals, focusing particularly on techniques and skills needed to effectively transfer technical information.

Developing Technical Lesson Plans - Discuss what to include in a training plan, outline what will be expected from instructors, reinforce the benefits of a training plan to the instructor.

Presentation Skills - Discuss personal platform skills instructors will need: delivery style, voice, rate of delivery, use of gestures. Discuss principles of group dynamics.

Visual Aids - Identify types of audiovisual aids that will best communicate the major points to the trainees. Discuss how to use audiovisual aids effectively.

Test Construction and Evaluations - Identify methods to evaluate learning. Discuss types of written tests. Review NRC regulations concerning validity of tests. Construct and evaluate written tests. Identify other methods to evaluate learning, such as walk-throughs and on-the-job training.

- Demonstrated participation in professional development activities

Documentation for requalification will be maintained in the Qualification file for each Instructor.

Continuing Development of Instructors

Maintenance of effective instructor skills by the instructors is of vital importance in maintaining an effective, viable training program. To aid in continued instructor skills development, special topical training shall be conducted each quarter. To maintain qualification, instructors shall attend at least two Instructor Skills Update training courses a year.

Instructors will also work closely with other ORNL and Energy Systems training staffs to exchange ideas. An example of this type exchange is a quarterly meeting series established by Energy Systems Technical Training personnel to exchange information among the five installations. In addition, periodic instructor training and seminars offer the instructors the opportunity to confer with outside educational experts concerning training group needs and problems.

TRT staff with adult training backgrounds shall be responsible for organizing, conducting, and scheduling Instructor Skills Update training activities.

TRT instructors work in close liaison with the ESH disciplinary groups and with technical operational personnel to maintain technical skills and to keep current on ORNL operating policies, procedures, and facilities within the areas of their technical responsibility.

Professional Development

Training group personnel are encouraged to participate in the activities of professional training organizations such as Training Resources and Data Exchange (TRADE), National Society for Performance and Instruction (NSPI), and the American Society for Training and Development (ASTD), and in professional societies in their specific technical areas such as Health Physics, Industrial Hygiene, Engineering, etc. For example, one member

of the TRT staff is serving on the TRADE Executive Committee, two are serving on the steering committees for the TRADE Radiation Protection and Industrial Hygiene Special Interest Groups, and all actively participate in TRADE activities. Two members of the TRT staff have been certified by Development Dimensions International's Interaction Management: one as a Master Trainer and one as an Instructor.

In addition, each instructor is encouraged to participate in at least one outside skill enhancement program per year. Those wishing to make recommendations or make specific requests concerning attendance to outside skill enhancement programs should submit their recommendations and requests to the TRT Section Head. TRT instructors are encouraged to maintain professional ties with their technical disciplines as well, and to prepare and present papers detailing the work of the Program and other special technical assignments as the opportunity arises. Opportunities for additional education and training are encouraged, and some instructors are also assigned to technical support groups in their area of expertise.

Instructor and Course Evaluations

The evaluation of TRT instructors shall include the results of observations made of the instructor while conducting a training class (see Instructor Evaluation Guide, Appendix C), the results of feedback received from completed Instructor and Course Evaluation forms, and supervisory feedback.

At the conclusion of the specific training courses, each instructor shall request that each trainee complete an Instructor and Course Evaluation form (see Appendix I for an example). The Instructor and Course Evaluation form serves as the trainee's primary method of providing feedback to the training group. The completed Instructor and Course Evaluation form shall be reviewed by the instructor for future reference and will be retained by the Documentation and Materials Control Coordinator. The comments from the Instructor and Course Evaluation form shall be summarized for each training program and shall be reviewed by the TRT Group Leader and Section Head.

Each instructor shall be evaluated for continued effectiveness as an instructor at least once every two years by the TRT Section Head or designated evaluator. This evaluation shall include the results of observations made of the instructor while conducting a training class (see Instructor Evaluation Guide, Appendix C), the results of feedback received from completed Instructor and Course Evaluation forms, and supervisory feedback. The findings of the evaluation shall include areas of excellence and areas for improvement. The results of the evaluations shall be reviewed with the instructor. The evaluation results shall be filed in the instructor's Qualification File and shall remain business confidential.

4. TRAINING POLICIES AND PROCEDURES

This document establishes the instructional policies and procedures which will guide the Technical Resources and Training Section in its efforts to enhance job skills of individuals and increase the use of health and environmental protection practices in the ORNL work environment.

Basic Instructional Philosophy

All ESH training courses are developed using the Performance-Based Training (PBT) model. The PBT Model (pictured in Figure 4.1) consists of five major steps: Analysis, design, development, implementation, and evaluation and control.

Though largely sequential, these steps can be reiterated at any time during the establishment and implementation of a training program.

Analysis

For those training programs where training is mandatory to meet regulations, an initial determination of whether or not training is needed is not applicable. For other training dealing with existing or potential performance problems, it is necessary to do performance problem analysis, and a systematic review of circumstances, problems, and practices, which leads to a decision as to whether training will help solve the problem. Problems directly traceable to faulty equipment, procedures, or attitudes are not necessarily amenable to a training solution. ORNL ESH training

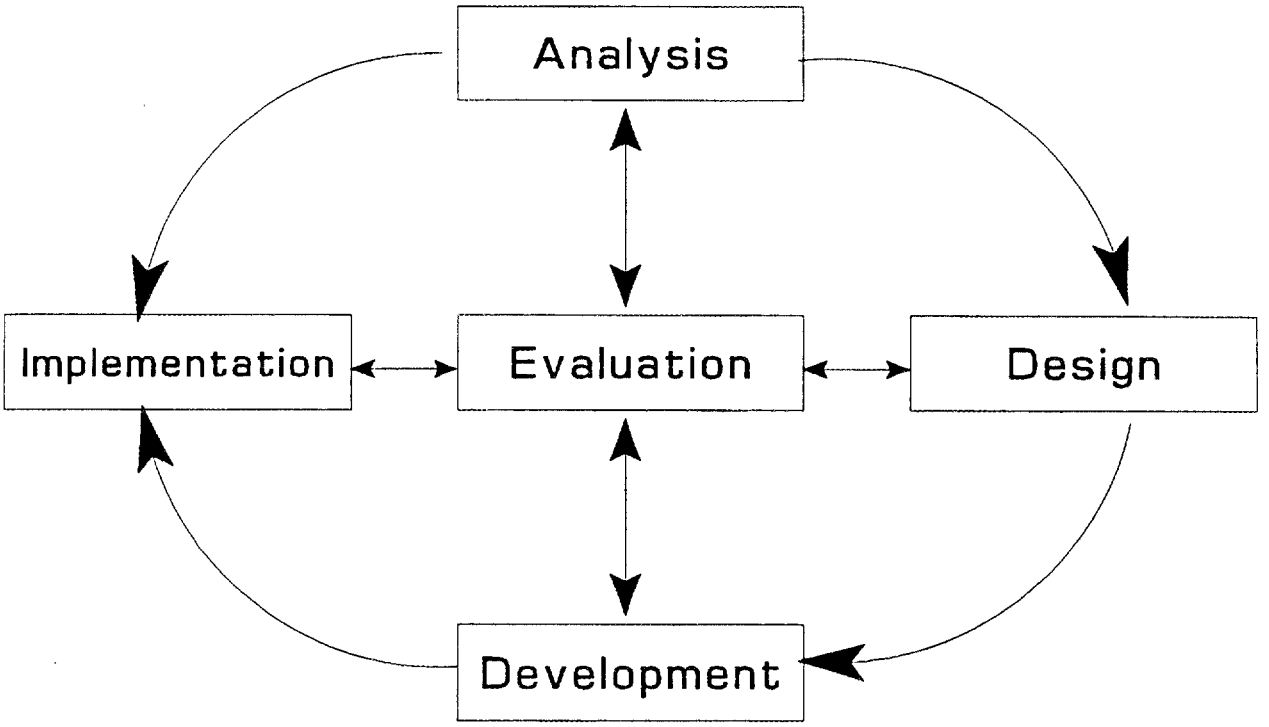

Fig. 4.1 The basic Performance-Based Training (PBT) model

programs fall into both categories: mandatory and performance improvement.

Organizational Analysis

The next level of analysis identifies organizational needs such as adherence to regulatory guidelines, improved productivity and safety via expanded knowledge of facility operations and personal and environmental protection, and commitment to quality. These organizational needs must be included in training program requirements. Examples of areas to be analyzed in this step include policies and procedures, DOE stance on regulatory/industry standards and guidelines, Facility Safety Analysis Reports (FSARs) and audit commitments, and management-directed training on topics not covered by regulatory constraints.

Job/Task Analysis

The job/task analysis is an investigation, consistent with industry standards, of the specific tasks, knowledge, skills, and abilities associated with the performance of a job. The analysis identifies the job tasks critical to competent performance; these tasks may be high-priority, highly frequent or repetitive, difficult, or have a high probability of error associated with them. For ESH training, the specific environmental, safety and health impacts of the tasks must be identified. The analysis establishes standards and conditions for task performance and the knowledge and skills which must be possessed by a competent employee. Training program content is determined in this step.

Typical methods which may be used are :

- Review of job descriptions.
- Review of available studies employing task analyses of relevant jobs (e.g., DOE, Edison Electric Institute, INPO, NRC).
- Review of procedures, training materials, work aids, manuals, and other written materials which provide information relevant to the job position(s).
- Observation of job incumbents performing the tasks.

- Interviews with managers, supervisors, job incumbents, training group personnel, and employee relations departments personnel for needs analysis.
- Completion of job analysis questionnaires by job incumbents and supervisors. These questionnaires also require rating the impact of improper task performance on the plant, personnel, and public safety.
- Collection and classification of critical incidents of extremely effective or ineffective performance.
- Analysis of records, such as past work requests, personnel errors, Unusual Occurrence Reports (UORs), and job hazard analyses (JHAs).

In a multipurpose organization such as ORNL, it is necessary to maintain some flexibility in carrying out this analysis function, since most ESH courses will have to be altered regularly to meet the multiple audiences involved. Where possible, the guidelines contained in the DOE Technical Accreditation Manual (TAP 2) should be followed.

Design and Development

Training program design is based on the results of the above analyses. Tasks and associated knowledge and skills identified by the analyses are critical to the development of learning objectives, development of course training plan and choice of instructional format, lesson plans, and construction of adequate testing strategies. Development of a course training plan helps to keep the course and lesson plans focused on the objectives (Appendix E).

Learning Objectives

Each lesson plan shall contain specific written objectives describing the precise behavior a trainee should be expected to demonstrate after training. In addition, each objective shall specify the conditions under which the trainee will be expected to perform and the criteria which will be used to evaluate the success of the trainee's performance.

Each lesson plan shall contain one or more terminal learning objective(s) (TLO). A TLO is an instructional or training goal expressed in terms of measurable performance related to accomplishing a task. The TLO(s) shall state what the trainee must do to demonstrate mastery of the job or task.

Each lesson plan may contain one or more enabling learning objective(s) (ELO). The ELO(s) shall state the knowledge, skills, or example that the trainee must learn to satisfy the terminal objective.

Each type of objective shall contain the three critical elements: Behavioral action, performance conditions, and attainment standards. Whenever possible, the objectives should approximate real work/task conditions as closely as possible. Use of learning objective worksheets may be made in support of formulating and using learning objectives. This facilitates sequencing the objectives. Proper sequencing of the learning objectives is necessary for building upon previous instruction.

Lesson Plans

The content of each lesson presented to personnel shall be documented by a lesson plan. The lesson plan shall provide the necessary information to assist the training specialist in preparing for and conducting instruction on a lesson by lesson basis. While there is not a single format required within TRT for lesson plans, lesson plans which illustrate approved TRT lesson plan format and content are shown in Appendix D.

Lesson Outline. Each lesson plan shall contain a lesson outline describing its contents. The lesson outline shall be detailed enough to adequately describe the major ideas of the subject matter to be presented. The outline shall begin with an introduction section that includes an introduction to the lesson, a brief discussion of the importance of the lesson to the trainee, and a thorough review of the lesson's learning objectives. The outline shall contain a description of the major topics sequenced in the most logical manner to best teach the desired learning objective(s). Site-specific examples, photographs, and applications shall be incorporated into the lesson. The outline shall contain a section describing the results of inadequate, incomplete, or non-

performance of the important tasks given in the learning objectives. Review sections should be used where appropriate to highlight important points emphasized during the lesson presentation. The final summary shall contain a restatement of the learning objectives as well as the key points of the lesson which support each enabling objective.

Instructional Activities. Each lesson plan shall specify instructional activities designed to encourage the desired learning outcome. Instructor notes provide guidance to the instructor on the teaching method(s) judged to be the most appropriate for delivery of the subject matter. In addition, the instructor notes should enhance and encourage learning by providing guidance to the instructor on maintaining trainee interest and participation, measuring trainee comprehension, and planning reviews at strategic points. Trainee notes, like instructor notes, specify all the planned activities of the trainee during the instruction process. These activities should enhance and encourage productive learning and must be appropriate for the knowledge, skill and/or attitude being taught. Trainee activities should be designed to allow the trainee to practice and attempt mastery of the enabling objectives.

Review and Approval. Completed lesson plans are reviewed by other TRT staff and representatives from other ORNL organizations where appropriate, and approved by the TRT Section Head prior to use in the training program. Reviews shall be documented on a TRT Training Lesson Plan Routing Sheet (see Appendix F). Each lesson plan shall be reviewed for consistency with standard industrial training practices, adherence with approved training section procedures and practices, and conformity with accepted ORNL training standards. Upon approval the Documentation and Materials Control Coordinator shall file the lesson plan for future use.

Lesson Plan Revision. Each instructor shall be responsible for revising and updating current lesson plans. Whenever such revisions are made, the instructor making the revisions shall ensure that the revised lesson plan is properly approved and that up-to-date copies are maintained by the Documentation and Materials Control Coordinator.

Training Aids Preparation

Training aids are necessary to enhance the presentation of the instructional materials. Training aids are used to clarify, illustrate, and/or emphasize major points; reinforce concepts; maintain interest; add realism; and bring in non-classroom experiences. Media used may be either static, dynamic, or interactive in form; thus, training aids may include: video tapes, films, models, slides, flip charts, chalk boards, tape recordings, and vu-graphs or transparencies. Each instructor is responsible for preparing or for ensuring the preparation of all audio-visual aids such as overhead transparencies, films, videotapes, handouts, and 35 mm slides needed during presentation of the lesson.

In addition, each instructor should ensure that all needed audio-visual and laboratory equipment is available and operable. If such equipment is in need of repair or is otherwise not available, then the instructor shall make the appropriate temporary adjustment in his/her lesson material and shall report the malfunction or unavailability to the Documentation and Materials Control Coordinator. All audio-visual equipment usage shall be scheduled through the Documentation and Materials Control Coordinator or his/her designated representative.

Trainee Materials

Trainee materials refer to all resources covered by the lesson plan and used by the trainee during a training program. They may include: textbooks, procedures, instructor-prepared handouts, technical publications, work aids, manuals, etc. These materials shall reflect the learning objectives, be appropriate to the trainees in depth and proficiency level, be technically accurate and current, and good reproduction quality.

Each instructor shall work with the Documentation and Materials Control Coordinator to maintain an up-to-date, technically correct, adequate supply of such materials.

Implementation

Implementation of ESH training programs at ORNL is accomplished by the TRT training staff, alone or in concert with other training programs at ORNL. Implementation involves the identification of personnel requiring training and assignment of personnel to training, selection of appropriate instructional format and training environment, presentation, and retraining. Because ORNL's research and operations programs are quite diverse in nature and have great variability in ESH needs, TRT finds it necessary to be flexible in providing services to this diverse group.

Identification and Assignment of Personnel to Training

The ORNL Standard Practice Procedure on ESH Technical Training requires that management categorize each employee so that TRT, in conjunction with compliance personnel and divisional management, can identify and assign personnel to training based on regulatory requirements, job requirements, management direction, and special commitments (Appendix J). Division management is ultimately responsible for ensuring that their personnel are trained.

Qualified personnel may be exempted from training under the following constraints:

- Review of previous training records show satisfactory completion of training programs comparable in content and in performance standards,
- Personal interviews, and
- Validation examinations, if appropriate. Some ESH training program documentation is very specific on exemption conditions (e.g., health physics technician training).

Choice of Instructional Formats

Training can be accomplished in many different types of settings or formats. It is important to match the training objectives to the appropriate format for transmitting those objectives. Different formats also require differing training guidelines. This section specifies the guidelines for the following three types of training

formats: Group Instruction Guidelines, On-The-Job Instruction Guidelines, and Self-paced or Programmed Instruction Guidelines.

Group Instruction Guidelines. Group instruction consists of standard classroom instruction and is conducted primarily by the training staff, using the learning objectives, lesson plans, and training aids described above.

It is proper for transmitting most types of technical material and may enhance learning by appropriate group dynamic processes, but may be limited in its ability to give "hands-on" experience to trainees.

On-The-Job Training Guidelines. On-the-job training consists of additional training provided in the form of work experience and is often conducted in the facility to which the employee is assigned. The on-the-job training follows the formal classroom training. At present, TRT is involved in on-the-job training in the area of radiation protection, radiation monitoring, and environmental monitoring and compliance, transportation, and waste generations, and waste operations.

The appropriate TRT instructor/coordinator shall be responsible for providing the supervisor with the On-The-Job Training Record. This record lists the procedures applicable to the specific Knowledge and Skills Area which the trainee must learn. The instructor/coordinator shall be responsible for providing reasonable support and guidance as needed. The instructor/coordinator shall interact with the immediate supervisor to ensure that on-the-job training schedules are being maintained and progressing satisfactorily.

The trainee's immediate supervisor shall be responsible for conducting the on-the-job training activities by either personally conducting the training or by delegating the task to an experienced technician or support staff member. The delegation of on-the-job training to an experienced technician or support staff member shall not relieve the supervisor of that responsibility. The supervisor shall be responsible for coordinating the trainee's daily schedules and assignments to ensure that the trainee is

adequately trained in all the required tasks of the specified knowledge and skills area.

Upon completion of the on-the-job training, the immediate supervisor shall sign the On-the-Job Training Record (see Appendix G for an example), verifying that the training was conducted and has been completed. The completed form shall then be forwarded to the proper instructor/coordinator and becomes part of the trainee's permanent training record.

The trainee shall be responsible for exerting the effort necessary to comply with the requirements outlined. The trainee shall display reasonable interest, meet schedules, and demonstrate cooperation with effort to learn. It is the trainee's responsibility to ask questions and request additional assistance when needed. The trainee shall initial and date the applicable portions of the record of on-the-job training, as the training is completed.

Self-Paced or Programmed Instruction. Self-Paced or Programmed Instruction refers to a training system in which the trainees proceed through the training program at their own pace. This includes computer-based training modules and interactive systems, as well as study guides. Programmed Instruction Training should provide trainees with some means of evaluating the accuracy of their performance via an answer key or comparison with an acceptable model. This section provides guidance to training group personnel as to the roles the instructor and trainee have with regards to self-paced or programmed instruction training.

The instructor/coordinator shall be responsible for providing the trainee with the necessary instructional materials and for assisting the trainee in finding appropriate work space. The instructor/coordinator shall monitor the progress of the trainees as they advance through the programmed instructional material and shall be available to provide the trainee with individual tutorial service if needed. The instructor/coordinator shall administer and evaluate examinations or demonstrations required by the programmed instructional material.

Trainees shall be active in interacting with the instructional material and must frequently demonstrate what was learned. The

trainees shall be responsible for requesting any assistance of the instructor/coordinator as needed.

Training Environment

Training environment refers to the physical location at which a training program is presented. Training shall be conducted in a setting that aids in the successful transfer of information. Each instructor shall be responsible for ensuring that the learning environment is appealing, warm, inviting, and conducive to learning--to the extent possible, in ORNL's limited quarters available for training purposes. The instructor shall ensure that all building and training equipment are in proper working order before use or initiate corrective action, as required. Outside noises, phone calls, building pages, etc. are disruptive to an effective learning environment. Each instructor should take appropriate steps to minimize distractions. The lack of suitable classroom space may make it difficult to comply with the standard.

Each instructor shall be responsible for maintaining a safe and orderly classroom. At the conclusion of each day's training activities, the instructor shall check to ensure that all chairs are placed in order, that all books or papers have been appropriately stored, that writing surfaces have been thoroughly erased (unless material is to remain until next session), and that any papers on the floor are placed in wastebaskets.

Each instructor shall ensure that all sensitive training equipment is secured or returned to its proper storage location at the end of the training session.

Retraining

Retraining can be structured in one of two modes:

- Intermittent training followed by re-examination, or
- Re-examination followed by remedial training.

Retraining for personnel in qualification program will be continued throughout the year on an intermittent basis on new or problem area information, with re-examination and on-the-job walkthrough conducted biyearly. The mode most appropriate to

achieving the desired objectives shall be chosen for other employees. In some cases, the type of retraining is mandated by regulation.

Flexibility in TRT Program Implementation

TRT provides several types and levels of ESH training which must be defined by needs and job analysis with each differing segment of the plant population. TRT's primary modes of operation are:

- Developing and implementing programs,
- Advising on programs, and
- Approving programs.

In the majority of cases, TRT develops and delivers the needed ESH training after doing a needs or job analysis with the user group. The amount of time required for a training program may range from 2 to 40 hours depending on the type of training needed. The level of training needed is based on the needs assessment, as well as on the recommendations of the ESH support staff, the level of hazard or radiation protection coverage needed for the tasks, regulatory requirements, worker knowledge level, and job/task criteria. Examples of this type of program given by TRT include:

- Facility and support personnel at reactor and nonreactor facilities,
- Construction workers, and
- Special visitor groups.

Some divisions have resources that permit them to develop and implement training that strongly integrates the ESH within other technical training programs. When this opportunity arises, TRT serves in an advisory role: reviewing materials, suggesting changes, and giving final approval. For example, specific ORNL divisions may have potential safety hazards (such as high-level pulsed-phase radiation, electricity, and lasers) that are quite different from most of the other ORNL operations. After a needs assessment by TRT and the division staff, it may be determined that special skills are needed to develop appropriate ESH training and that the expertise may exist within the research division.

Some programs have special requirements that may make contracted training a reasonable alternative to in-house training. In this instance, TRT performs a needs assessment: reviews the training program content, instructor competency, and documentation plans; and approves it if it is consistent with the goals of ORNL's program. Sometimes an additional testing requirement is imposed by TRT, as is done with some subcontracted radiation protection staff members. Another example is the training being developed by the subcontractors for the ORNL environmental characterization program, which shall be reviewed and approved by TRT as part of the operating agreement with the subcontractors.

Another area where flexibility is required in TRT programs is in content level. The varying levels of worker knowledge, job/task criteria, and availability of supplemental health protection coverage make it necessary to develop most of the health protection information at several comprehension levels. While TRT has several core curricula already developed, these curricula are modified per the performance-based needs of the trainees.

Evaluation and Control

The last area of the PBT model, evaluation, is interactive with every other step given in the model and is reiterated throughout the analysis, design, development, and implementation of the training program. Evaluation is covered in more depth in Section 6 of this document.

Quality Assurance

Quality assurance activities are a part of each step in the PBT model and Figure 4.2 shows how the quality assurance program tracks TRT activities to ensure that operating standards are developed, evaluated, and implemented at every level in section activities. A quality assurance specialist assists TRT in all QA functions, and the Environmental and Health Protection Division QA Offices conduct periodic audits and surveillances of TRT programs.

Fig. 4.2

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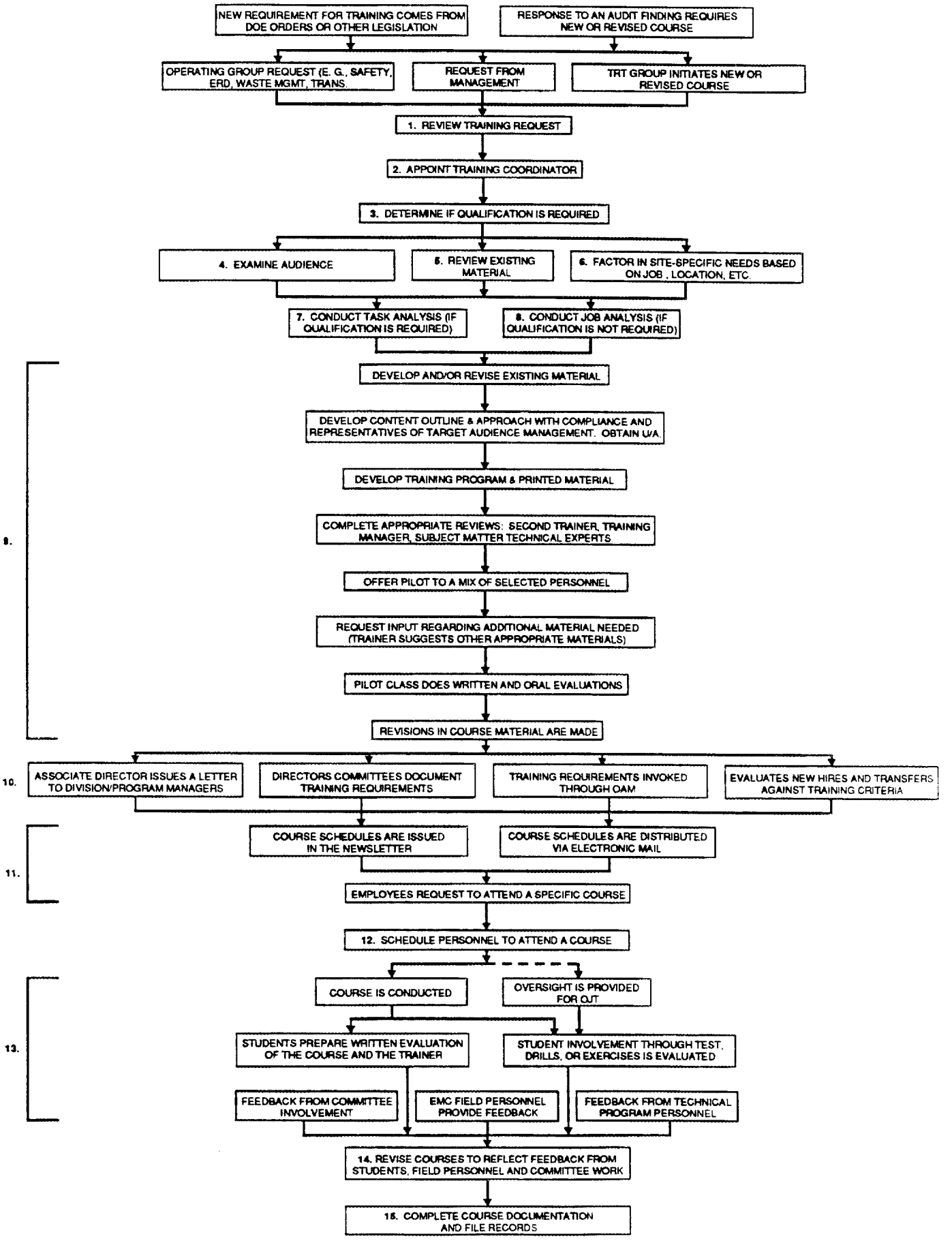

5. TRAINING CONTENT AND STRUCTURE

The Technical Resources and Training Section provides ESH training to all ORNL personnel requesting such training. This training may be mandatory (i.e., required by Federal or DOE regulations), performance improvement, or, in the ideal, a combination of mandatory and performance improvement. While much of the training is mandated clearly by specific requirements, other courses have been designed to meet less explicit but no less important quality controls and operational needs. Table 5.1 summarizes the current courses being offered by TRT.

Training Content

Whether it is to meet mandatory requirements or in order to improve existing performance, the content of the training is based on a needs analysis related to the jobs being performed by those being trained. The level of detail covered, the type of information conveyed, and the level of examination required is based on the job requirements defined.

Training Structure

The training may be structured as a formal course with regularly scheduled offerings or as informal sessions such as safety meetings within an ORNL division. Those offerings that have become formalized are grouped primarily by discipline in the following listings; they may be taught by training staff from TRT, by divisional staff, and/or by staff from the ESH disciplines involved. Each course is characterized by regulatory/administrative source, target audience, approach, materials, documentation/examination, and name of coordinator(s).

technical resources & training

Table 5.1

Environmental Safety and Health Training Courses at ORNL

TITLE	TARGET AUDIENCE	DURATION	RETRAINING REQUIRED ANNUAL	RETRAINING REQUIRED BIANNUAL
General Employee Training (GET)	All employees, extended guests	1 hr.		1 hr.
General Radiation Safety	Non-radiation workers	Varies:1-3 hrs.		
Radiation Worker	All radiation workers (persons assigned to reactors and non-reactor nuclear facilities primarily)	8 hrs. classroom & facility-specific		8 hr.
Radiation Protection Worker	Radiation Protection technicians and other employees of Section as designated by Section Head	40 hrs. (may vary, based on individual CBT variations)		20 hrs.
Radiation Monitoring Worker	Radiation Monitoring technicians and other employees of Section as designated by Section Head	40 hrs. (may vary, based on individual CBT variations)		20 hrs.

TITLE	TARGET AUDIENCE	DURATION	RETRAINING REQUIRED ANNUAL	BIANNUAL
ALARA (As Low As Reasonably Achievable)	Employees working in or around radiation	2 hrs.		
Radiation Work Permit	Employees working in areas where radiation work permits are required	2 hrs.		
X-Ray Machine Radiation Safety	All employees who are custodians and/or users of X-ray generating machines	2 hrs.	2 hrs.	
Construction/Contract Workers Basic Safety & Health Training	All construction/contract workers involved in construction projects	1 1/2 hrs.		*
Construction/Contract Managers Safety & Health Training	All construction/contract managers involved in construction projects	3 hrs.		*
Construction/Contract Workers Advanced Safety & Health (Radiation Category 3)	All construction/contract workers performing work in areas classified as Radiation Category 3	8 hrs.		
Environmental Protection Officer (EPO)	All EPOs from ORNL divisions	~ 1 hr. quarterly	Ongoing	
Environmental Sampling Technician	Environmental Sampling technicians in EHPD and other ORNL employees as designated by division management	24 hrs.		8 hr.*
RCRA Waste Operations	All employees assigned to facilities permitted under Resource Conservation & Recovery Act	40 hrs.	8 hrs.	

TITLE	TARGET AUDIENCE	DURATION	RETRAINING REQUIRED ANNUAL	BIANNUAL
SARA/OSHA Basic for General Waste Site Workers	All personnel working at CERCLA or RCRA 3004u waste sites; treatment, storage & disposal facilities; remedial action, emergency response, monitoring, surveillance, oversight at waste sites.	24 hrs.	8 hrs.	
SARA/OSHA Remedial Action Workers	Personnel engaged in waste site remedial action characterization or closure or oversight of such.	16 hrs.		
SARA/OSHA Managers/Supervisors	Managers or supervisors of waste site activities listed above.	8 hrs.		
SARA/OSHA Refresher for Waste Site Workers	Update required for all General Waste Site Workers shown above	8 hrs. (retraining)		
Solid Low-Level Waste Generators	Required for personnel in activities that result in generation of low-level radiological wastes	2 hrs.		2 hrs.
Hazardous Waste Generator	Required for personnel in activities that result in generation of hazardous wastes	2 hrs.	2 hrs.	
TRU Waste Certification	Required for personnel in activities that result in generation of TRU radiological wastes	2 hrs.		2 hrs.
Medical & Infectious Waste Generator**	Required for personnel in activities that result in generation of medical and infectious wastes			

TITLE	TARGET AUDIENCE	DURATION	RETRAINING REQUIRED ANNUAL	BIANNUAL
Waste Minimization	For personnel in activities where waste minimization is desirable	1 1/2 hrs.		
Transportation Safety:DOT Regulations for Packagers/Shippers	Required for personnel responsible for packaging, handling, and transporting hazardous materials.	20-32 hrs. (depending on job)		
Transportation Safety:DOT for Vehicle Operators	Required of vehicle operators who transport hazardous materials	16 hrs.	4 hrs.	
Transportation Safety:DOT for Incidental Materials Handlers	Required of personnel responsible for handling, loading & storing hazardous materials.	8 hrs.*		8 hrs.
Safety Work Permit	Personnel working in areas requiring the use of safety work permits	2 hrs.		
Confined Space Entry	Personnel who enter confined work spaces to fulfill all or part of their assignments	1 hr.		
Spill Response	Personnel who are likely to become involved in spill situations	1 hr.		
Industrial Safety for Supervisors***	First Line Supervisors	4-6 hrs.		
Respirator Protection	Required of all routine and potential wearers of respiratory equipment at ORNL (Available from Industrial Hygiene)	1 hr.	1 hr.	
Hazard Communications	Required of all employees (Available from Industrial Hygiene)			

TITLE	TARGET AUDIENCE	DURATION	RETRAINING REQUIRED ANNUAL	BIANNUAL
Asbestos Protection	Required for all personnel identified as asbestos workers (Available from Industrial Hygiene)	3 hrs.	3 hrs.	
Instructor Skills Workshop	Required for instructors in technical training	24 hrs.	X	
Instructor Skills Update	Qtrly. update for instructors on specific issues	2-4 hrs.		

CBT = Computer Based Training

* Not yet in place

** Available 3 months after ORNL Official Guidance adopted

*** Available Fall 1989

9/05/89

TECHNICAL RESOURCES AND TRAINING SECTION
ENVIRONMENTAL AND HEALTH PROTECTION DIVISION
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, Tennessee 37831-6107
Phone 574-6675 or 576-5010

GENERAL EMPLOYEE TRAINING

Regulatory/Administrative Source: DOE Orders 5480.5, 5480.6, 5480.11

Audience: At ORNL over three-fourths of the workers do not routinely come into contact with radiation or extremely hazardous materials. This broad category of workers is required to receive basic radiation hazard training because of an ORNL management decision that, for training purposes, the entire physical plant would be viewed as a nuclear facility. A relatively small percentage of ORNL workers have been identified as needing a level of radiological protection training required for personnel who have access to protected areas and work in areas controlled for radiological protection purposes.

Approach: A dual structure training program has been established to provide General Employee Training (GET). Level I GET is required of all employees. Following Level I training is a progression to Level II training for various specialized subgroups such as those radiation workers identified earlier. These specialized subgroups are likely to be covered by more rigorous training requirements through other DOE Orders and Federal regulations under EPA and OSHA. Examples of such subgroups are workers in reactor nuclear facilities, non-reactor nuclear facilities, waste treatment, storage and disposal operations, and transportation groups.

Development and implementation of an effective GET program requires a slightly different approach to training than those job/task analysis approaches useful in training for position-specific duties and assignments such as radiation protection technicians and hazardous waste operators. While the job/task analysis function cannot be ignored in GET, it must be translated into a more generalized framework that will accommodate a large number of employees in a more broadly defined work definition.

This more generalized framework can be developed using a Checklist for Course Development and Implementation that examines the intended audience, technical material content, and program delivery options (see Appendix H).

For the large general group ORNL uses a highly focused videotape with a kit containing several job performance aids. To get the initial training to the existing employees as quickly as possible, the program has been developed so that it can be administered by the division safety officers during the regularly scheduled quarterly safety meetings. New employees receive this training as part of a previously established orientation course acquainting them with facility operations, company policies and administration, plant layout, and management personnel.

Level II training in specialty areas giving more detailed, site-specific reviews is usually given by Divisional Technical Training staff, the facility supervisor, and sometimes by use of special outside training contracts. This activity is coordinated by the ORNL General Employee Coordinator, primarily for the purpose of verifying its existence and general applicability.

Materials: The GET videotape has been edited to a length under 33 minutes and addressed only the most vital information. Every effort is made to show actual sites and ORNL employees .

The handout is a red GET desktop reference guide which contains a brochure repeating the information on the videotape; a listing of important telephone numbers pertinent to the areas of safety and health protection, emergency response, and environmental protection; an ORNL map with key denoting locations of reactors, accelerators, fusion energy devices, radiochemical laboratories, and biological/environmental laboratories; an average personal radiation dose worksheet; and a worksheet on which to note site-specific hazards and emergency response information, including evacuation routes.

Documentation/Examination: An interactive awareness worksheet is filled out by the employee back on the work-site, reviewed by the supervisor, signed by both employee and supervisor, and retained as the permanent training record. The worksheet deals with the people/departments that are responsible for protecting employee health and safety as well as emergency instructions for the employee.

Coordinators: Mary M. Wilson (574-6673)
Emily D. Copenhaver (576-7555)

RADIATION SAFETY (GENERAL)

Regulatory/Administrative Source: DOE Orders 5480.5, 5480.6, 5480.11

Audience: Employees whose assigned duties may result in contact with radiation but not to the extent of radiation workers.

Approach: At ORNL, the wide range of activities and types of facilities in the individual operating and research divisions create widely varied needs in radiation protection. Radiation Protection/Monitoring Training Group of TRT interacts with the Division training coordinators and the radiation protection staff assigned to those divisions to develop these programs. This training program is required to meet mandates of employees who may work near radioactive sources but not to the extent of radiation workers.

To date, information on radiation protection has been developed at three different levels of detail to meet the needs of the various work groups within these divisions. TRT attempts to develop a training program designed to the needs of each operating or research group; over fifteen ORNL divisions currently receive some level of this training.

Materials: Materials provided include a copy of the class presentations, plus appropriate handout information relative to the subject domain. The technical content and level of training centers on subject material commensurate with the worker's assignment and the level of radioactive materials present. Such material encompasses these areas: radioactivity and radioactive decay, characteristics of ionizing radiation, man-made radiation sources, acute/chronic effects of radiation, risks associated with occupational exposures, special considerations in the exposure of women of reproductive age, dose-equivalent and committed dose-equivalent limits/determinations, modes of exposure, basic protective measures, site-specific procedures for maintaining exposures as low as reasonably achievable (ALARA), survey instrumentation, and radiation monitoring programs and procedures.

Documentation/Examination: All radiation workers are tested and evaluated following training, and that documentation is on file at the facility and also recorded on the TRT documentation data base.

Documentation and Examination:

1. Cognitive Examination
2. Performance Examination
   a. ALARA Suggestion Form.

Coordinators: J. Lynn Anderson (574-6673)
B. C. (Jean) Thorpe (576-5106)

RADIATION WORKERS

Regulatory/Administrative Source: DOE Orders 5480.5, 5480.6, 5480.11; 5480.xx (DOE Training Accreditation Draft).

Audience: Those individuals whose job assignment involves exposure to radiation, while working on, with, or in the proximity of radiation producing machines or radioactive materials and is likely to be exposed above 0.1 rem (0.001) sievert) per year, which is the sum of the annual effective dose equivalent from external irradiation and the committed effective dose equivalent from internal irradiation (DOE Order 5480.11). those working in reactors and nonreactor nuclear facilities, radioactive waste disposal, remedial action/cleanup in radiation areas, and in nondestructive testing are automatically labeled radiation workers; others potentially at risk may be researchers, technicians, sampling and field personnel. aN external radiation dose rate guideline averages about 0.05 Mrem/h. aN internal exposure guideline would include anyone handling a total amount of radioactive materials that exceeds 2% of the Annual Limit on Intake (ALI) (for ingestion or inhalation) provided in ICRP-30. Appendix D in the Standard Practice Procedure on Environmental Safety and Health Training lists action levels for more commonly encountered radioactive materials; the division radiation control officers (RCOs) or the Radiation Monitoring Department can offer further clarification.

Approach: At ORNL, the wide range of activities and types of facilities in the individual operating and research divisions create widely varied needs in radiation protection. The TRT training staff interacts with the Division training coordinators and the radiation protection staff assigned to those divisions to develop these programs. Some are required to meet the training mandates of the Reactor and Nonreactor Nuclear Facilities training orders, but others are not as specifically ordered.

To date, information on radiation protection has been developed at three different levels of detail to meet the needs of the various work groups within these divisions. TRT attempts to develop a training program designed to the needs of each operating or research group; over fifteen ORNL divisions currently receive some level of this training.

Materials: Materials provided include a copy of the class presentations, plus appropriate handout information relative to the subject domain. The technical content and level of training centers on subject material commensurate with the worker's assignment.

Structure of ORNL Radiation Worker Program encompasses 6 units:

UNIT 1 - Radiation and Radioactive Decay

Structure of Matter
Radioactive Delay
ORNL Sources

UNIT 2 -Biological Effects of Ionizing Radiation

Acute Effects of Exposure
Risks With Occupational Exposure
Modes of Exposure
Special Considerations

UNIT 3 - Radiation Protection/Monitoring

Personnel Dosimetry
Radiation Control Areas
Instrumentation
Eggress Monitoring Stations
Radiation Work Permits

UNIT 4 - ALARA

Program Structure
ORNL Goals
Application
Suggestion Form

UNIT 5 - Contamination Control

Personal Protective Clothing

UNIT 6 - Facility Specifics

OJT
Review with HP
Walkthrough

Documentation/Examination: All radiation workers are tested and evaluated following training, and that documentation is on file at the facility and also recorded on the TRT documentation data base:

1. Cognitive Examination
2. Performance Examination
   a. ALARA Suggestion Form
   b. Contamination Control Training Lab Drill
3. Facility Specific Review
   a. OJT With Area HP
   b. Walkthrough Checklist.

Coordinator: J. Lynn Anderson (574-6673)

RADIATION PROTECTION WORKERS

Regulatory/Administrative Source: DOE Orders 5480.5, 5480.6, 5480.11, 5480.XX (DOE Training Accreditation Draft)

Audience: Radiation Protection Technicians and other assorted members of the Radiation Protection Department, Environmental Compliance and Health Protection Division, ORNL. Provide survey services to all radiation activities at ORNL.

Approach: At ORNL the radiation protection worker serves a vital role in protecting personnel and their surrounding environment from the hazards of radiation. These individuals rely on their technical knowledge, skills, and abilities to survey and monitor various project-related activities. In addition to performing surveillance tasks they must also provide guidance in project design, development, and implementation. These combined efforts assure that protective measures are taken in accordance with applicable standards.

ORNL has established a performance-based training program for these employees (ORNL/TM-10119). The program incorporates job-specific information on the diverse facilities and activities monitored with basic fundamentals of radiation protection. Successful completion of this program includes passing both a qualification exam and an on-the-job skills review.

The purpose of the formal training program is to qualify radiation protection employees to work at the various ORNL reactor and nonreactor nuclear facilities. Many of the staff positions are filled by individuals with academic training and/or specialized degrees in health physics. These professional staff members are evaluated before assignment, and are not subject to the Technician Training Program unless it is deemed that they can benefit from review of one or more sections of the training.

Materials: Materials provided to the radiation protection worker include copies of the training presentations, reference data for use as job-performance aids, and handout materials relevant to the subject domain. Detailed instruction centers on these major subject areas: mathematics and science fundamentals, radiation protection theory, biological effects and prenatal

exposure, radiation protection concepts and procedures, radiation protection equipment, and applicable facility design, operation, procedures, and emergency procedures and abnormal conditions.

Documentation/Examination: Qualification of technicians is based on successful completion of the formal training program and written and operating examinations administered by the department training coordinator, though many of them may also have academic training or specialized degrees in health physics. Training credentials are reviewed by the Department Head and then submitted to the Division Director in order to evaluate the individual and finalize the necessary qualification documentation. Qualification is for a two-year time period and applies only to a specific work area.

The program plan is documented and signed off at DOE/ORO level in ORNL/TM-10119 (Technical Qualification Requirements and Training Programs for Radiation Protection Personnel at Oak Ridge National Laboratory, E. D. Copenhaver, April 1986).

Coordinator: J. Lynn Anderson (574-6673)
B. C. (Jean) Thorpe (576-5106)

RADIATION MONITORING WORKERS

Regulatory/Administrative Source: DOE Orders 5480.5, 5480.6, 5480.11, 5484.15 (DOELAP), 5480.xx (DOE Training Accreditation)

Audience: Radiation Monitoring Technicians and other assorted members of the Radiation Monitoring Department, Environmental Compliance and Health Protection Division, ORNL. Provide dosimetry and personal monitoring services to all radiation activities at ORNL.

Approach: This program operates much the same as the one for Radiation Protection workers. Because the groups providing support services operate the thermoluminescent dosimetry badging, the whole-body counter, the radioassay laboratory, dosimetry records, and the calibration facility, very specific training is required. Some off-site training is being used to partially fulfill these training requirements.

Materials: Materials provided to the radiation monitoring worker include copies of the training presentations, reference data for use as job-performance aids, and handout materials relevant to the subject domain. Detailed instruction centers on these major subject areas: mathematics and science fundamentals, radiation protection theory, biological effects and prenatal exposure, radiation monitoring concepts and procedures, radiation monitoring equipment, radiation exposure recordkeeping, and applicable equipment and facility design, operation, procedures, and emergency procedures and abnormal conditions.

Documentation/Examination: Qualification of technicians is based on successful completion of the formal training program and written and operating examinations administered by the department training coordinator, though many of them may also have academic training or specialized degrees in health physics. Training credentials are reviewed by the Department Head and then submitted to the Division Director in order to evaluate the individual and finalize the necessary qualification documentation. Qualification is for a two-year time period and applies only to a specific work area.

The program plan is documented and signed off at DOE/ORO level in ORNL/TM-10119 (Technical Qualification Requirements and Training Programs for Radiation Protection Personnel at Oak Ridge National Laboratory, E. D. Copenhaver, April 1986).

Coordinator: B. C. (Jean) Thorpe (576-5106)
J. Lynn Anderson (574-6673)

ALARA (AS LOW AS REASONABLY ACHIEVABLE)

Regulatory/Administrative Source: DOE Order 5480.11, ORNL Health Physics Procedures 6.1, 6.2, 6.3, 6.4, and 6.5

Audience: Radiation Protection personnel, Radiation Monitoring personnel, managers, supervisors, and group leaders who manage work with radioactive materials and all other employees whose job duties require them to work in and or around radioactive materials.

Approach: Oak Ridge National Laboratory's policy states that operations are to be conducted so that radiation exposures to employees, the general public, and the environment are reduced or maintained as low as reasonably achievable (ALARA). Given the current technology, sound economics, and good operating procedures, this concept is consistently realized. The foundational basis of such achievements are made through the utilization of an active ALARA program. This involves not only design considerations, monitoring, personal exposures controls, and program evaluation, but also the training and education of the work force in the content and applications of the ALARA philosophies and procedures.

This training program serves as the vehicle to communicate information concerning the diverse elements of ALARA. It provides an explanation of the cognitive tools used to help reduce exposures on specific tasks, facility designs, etc. and allow us insights into situations that have a potential for further dose reduction.

Materials: A general information handbook on ALARA is provided, including ALARA dosage reduction efforts, ORNL total penetrating dosage for current years, and a copy of the ALARA suggestion form.

Documentation/Examination: To document participation in this training program, participants are given an examination based on the learning objectives and the ALARA suggestion form.

Participants are also required to complete a feedback evaluation questionnaire at the close of the session.

Coordinator: J.Lynn Anderson (574-6673)

RADIATION WORK PERMIT TRAINING PROGRAM

Regulatory/Administrative Source: DOE Order 5480.11, INPO 88-010, H.P. Procedure 3.6, MMES Policy Procedure ESH-7, H.P. Procedure 6.1, H.P. Procedure 3.1

Audience: Responsible employees working in areas where radiation work permits are required by regulations or procedures.

Approach: The Radiation Work Permit Training Program has been designed to meet the needs of various personnel involved in radiological work. Training time is 2 hours.

Materials: The program uses various media: overhead transparencies, handouts, worksheets. Participants receive program handouts, a copy of Health Physics Procedure 3.6 covering Radiation Work Permits, and other handout materials as necessary.

Documentation/Examination: Participants must complete a Radiation Work Permit (RWP) in class from information provided to them in a scenario covering a particular project involving specified radiological conditions.

Coordinator: R. D. Kennedy (576-5106)

ORNL X-RAY MACHINE SAFETY TRAINING PROGRAM

Regulatory/Administrative Source: DOE Order 5480.11, NCRP 61; Tennessee Rule 1200-2 .

Audience: All registered custodians and users of x-ray machines at ORNL.

Approach: Oak Ridge National Laboratory's policy states that exposure of personnel to radiation produced by x-ray generating equipment be controlled through use of physical safeguards and enforcement of relevant operating procedures. Health Physics procedure 2.8 (Installation, Registration, and Operation of X-Ray Equipment) states that only qualified personnel operate and manipulate x-ray equipment. This training session is provided to transfer the required information. Included in this program is a review of the fundamentals of x-rays, associated biological effects, the type x-ray machines in use at ORNL, their associated safety systems and elements of ORNL's x-ray machine radiation protection program. Upon successful completion of this training participants will have obtained the required information to safely operate the three primary types of x-ray machines in use at ORNL (vault, open beam, enclosed beam).

Materials: Materials provided to trainees include copies of the vu-graphs used to present the information. Other training aids include pictures of ORNL x-ray machines, of their safety systems, and of x-ray burns. The film "Double-Edged Sword" is also used.

Documentation/Explanation: Successful completion of this program is achieved by (1) scoring at least 70% on a cognitive exam, (2) identification of the type machine in use at assigned work area, and (3) identification of the type safety system employed with assigned x-ray machine.

Coordinator: J. Lynn Anderson (574-6673)

CONSTRUCTION/CONTRACT WORKERS - BASIC SAFETY AND HEALTH

Regulatory/Administrative Source: 29 CFR 1926, (OSHA); Response to Investigation Report of the Release of Strontium-90 from the Building 3517 Cell Ventilation Improvements Construction Site on November 29, 1985, ORNL/M-111/R1 (January 21, 1986).

Audience: All ORNL and construction/contract personnel involved in construction projects.

Approach: Because of the increasing work on monitoring and characterization of the laboratory environment and the resulting potential for contamination during this work, ORNL has implemented training on several levels for ORNL workers and subcontractors in construction-related work. This 1 1/2-hour training program emphasizes basic health, safety and environmental procedures required during construction activities. The program includes: fundamentals of radiation protection and control; spill prevention, control, and cleanup; emergency procedures; zoning regulations; and other health, safety, and environmental protection procedures.

Materials: Various media are used in this training program: transparencies; flipcharts; color videotapes; handouts, including 3 x 5-in. pocket cards printed with emergency numbers and special instructions. The pocket cards were developed to encourage the construction workers to carry the information with them (i.e., in a coverall pocket) for immediate access in case of an accident.

Documentation/Examination: All participants are given a written examination following the training program. That documentation is maintained in the TRT training file. Pertinent information is also recorded on the TRT documentation data base. An instructor notebook is available for this program.

This program is reviewed periodically to identify changes to procedures, equipment, and subject matter. A two-year

retraining cycle will provide for keeping the knowledge and skills of applicable long-term construction workers current.

Coordinator: R. Don Kennedy (576-5106)

CONSTRUCTION/CONTRACT MANAGERS SAFETY AND HEALTH

Regulatory/Administrative Source: 29 CFR 1926 (OSHA); DOE 5480.11; Response to Investigation Report of the Release of Strontium-90 from the Building 3517 Cell Ventilation Improvements Construction Site on November 29, 1985, ORNL/M-111/R1 (January 21, 1986).

Audience: All ORNL and construction/contract personnel involved in construction projects.

Approach: Because of the increasing work on monitoring and characterization of the laboratory environment and the resulting potential for contamination during this work, ORNL has implemented training on several levels for ORNL workers and subcontractors in construction-related work. This 3-hour training program emphasizes the need for managers of construction work to include health, safety and environmental procedures as an integral part of compliance with health, safety and environmental guidelines because these planning skills and techniques allow for better control of radioactivity and hazardous materials. This program includes: overview of the roles of several organizations in hazards control, identification of potential hazards, personnel protection, waste management, emergency actions, and project planning.

Materials: Various media are used in this training program: transparencies; flipcharts; color videotapes; handouts, including 3 x 5-in. pocket cards printed with emergency numbers and special instructions.

Documentation/Examination: All participants are given a written examination following the training program. That documentation is maintained in the TRT training file. Pertinent information is also recorded on the TRT documentation data base. An instructor notebook is available for this program.

Coordinator: R. Don Kennedy (576-5106)

CONSTRUCTION/CONTRACT WORKERS - ADVANCED SAFETY AND HEALTH (RADIATION CATEGORY 3)

Regulatory/Administrative Source: 29 CFR 1926 (OSHA); DOE 5480.11; Health, Safety, and Environmental Protection Procedures for Excavation Operations, ORNL/M-116 (February 1988).

Audience: All ORNL personnel performing construction work in areas classified as Radiation Category 3 by knowledgeable personnel in Environmental Compliance and Health Protection.

Approach: In addition to a basic orientation for workers/laborers and a management program, ORNL has developed a more comprehensive, hands-on training for workers engaged in characterization work on-site in areas with potential for radiation exposure. This 8-hour program includes: biological effects of radiation; risks associated with exposure to radiation; personnel monitoring techniques; correct procedure for donning and removing protective clothing; review of proper use of respiratory protection equipment; contamination control management and techniques (includes decontamination); and waste disposal. Part of the training involves worker demonstration of dress out techniques and an emergency management review.

Materials: Various media are used in this training program: transparencies, demonstrations, flipcharts, color videotapes, and handouts.

Documentation/Examination: All participants are given a written examination following the training program. That documentation is maintained in the TRT training file. Pertinent information is also recorded on the TRT documentation data base. Certificates are given to each participant who has obtained at least 70% on the written examination and who has a current respirator card. A copy of the certificate is also kept in TRT training files. An instructor notebook is available for this program.

This program is reviewed periodically to identify changes to procedures, equipment, and subject matter.

Coordinator: R. Don Kennedy (576-5106)

ENVIRONMENTAL PROTECTION OFFICERS

Regulatory/Administrative Source: Environmental Protection Procedure EPM-7.0, Resource Conservation and Recovery Act of 1976, Public Law 94-580 and as amended, Occupational Safety and Health Act of 1970 and as amended. There are no explicit training requirements for the activities that the Environmental Protection Officer (EPO) is responsible for under 40 CFR 240-271 or 29 CFR 1910 Subpart C. However, ORNL Environmental Protection Officers are trained on a quarterly basis to increase EPO awareness and knowledge of environmental monitoring and compliance activities and to maintain an effective quality assurance program for environmental monitoring and compliance activities.

Audience: Divisional Environmental Protection Officers working with the Environmental Monitoring Group, Environmental Compliance and Health Protection Division.

Approach: Environmental Protection Officers are given one-hour training sessions on a quarterly basis to increase the EPO's awareness and involvement of important environmental monitoring activities that are being conducted. Representatives from the Environmental Monitoring Group support the development of the training materials and actually conduct parts of the training.

Materials: EPO's are given copies of the Vu-graphs which are used by the instructors as well as any pertinent environmental monitoring procedures which might be discussed. Quarterly sessions make use of videotapes and/or slide presentations if there is a need.

Documentation/Examination: Records are kept on each EPO which include a copy of the vu-graphs materials that were presented and a copy of the examinations which are given at the conclusion of each quarterly EPO training session.

Coordinator: Allison Keebler (574-1482)
W. Michael Moreland (576-7712)

ENVIRONMENTAL SAMPLING TECHNICIANS QUALIFICATION

Regulatory/Administrative Source: Federal Water Pollution C-Ontrol Act (Clean Water Act or CWA), Public Law 92-500 and as amended, Resource Conservation and Recovery Act of 1976, Public Law 94-580 and as amended, Clean Air Act (CAA) of 1970, Public Law 94-580 and as amended, DOE Order 5484.1, Chapter III, and DOE ORder 5820.2. There are no explicit training requirements under 40 CFR 50-99, 40 CFR 100-140 or 40 CFR 240-271 for employees supporting discharge monitoring activities regulated under CWA, CAA, and/or RCRA. However, ORNL Environmental Sampling Technicians are trained to increase employee awareness and knowledge of environmental monitoring and compliance and to maintain an effective quality assurance and control program for sampling activities.

Audience: Environmental Sampling Technicians under the Environmental Sampling Group, Environmental and Health Protection Division (EHPD). Other ORNL employees engaged in sampling may also be included, though the curriculum is developed for EHPD.

Approach: The Environmental Sampling Technician Training Program consists of five separate modules: NPDES Sampling, RCRA Well Sampling, Air Sampling, Radiological Sampling, and Chain-of-Custody. Environmental Sampling Technicians are initially given a classroom presentation outlining the regulatory basis which requires the monitoring and sampling activities. Then tours are given of all major monitoring points throughout ORNL and the Oak Ridge Reservation. A separate tour is given for each type of sampling. Upon completion of the program, technicians will have visited RCRA well sampling sites, NPDES monitoring and discharge points, Air Monitoring Stations, Solid Waste Storage Area (SWSA) sampling locations and locations where fish and milk samples are taken. In the next phase of training, technicians participate in an intense review of the sampling procedures which are conducted to support RCRA, CWA, and CAA compliance activities. This is accomplished by classroom review of the written procedures, demonstrations, and/or a review of videotaped sampling activities. Lastly, each technician will

perform in accordance with the "Procedures for Environmental Monitoring and Surveillance" all tasks which must be performed weekly or biweekly by the sampling group. Each task is indicated on a checkoff sheet which the supervisor will date and sign once the task is completed correctly.

Materials: Each technician is given a copy of the procedures, sampling data forms, a copy of the vu-graphs used in the training program, an on-the-job training checklist, and a notebook. Classroom instructional aids include vu-graphs, slides, and videotapes.

Documentation/Examination: Examinations are given on each major module of the training. Records are kept on each sampling technician which include copies of on-the-job training checklists, sampling data form worksheets, and final examinations.

Coordinator: Allison Keebler (574-1482)
W. Michael Moreland (576-7712)

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) WASTE OPERATIONS

Regulatory/Administrative Source: Resource Conservation and Recovery Act of 1976 (RCRA), Public Law 94-580, October 21, 1976, 90 Stat. 2795. The training requirements for employees working at facilities permitted under RCRA are contained in 40 CFR Part 264.16.

Audience: Employees working at facilities permitted under RCRA, waste generators.

Approach: 40 CFR Part 264.16 requires that the RCRA training program at a minimum must teach facility personnel hazardous waste management procedures relevant to the positions in which they are employed and enable them to respond to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including where applicable: procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment; key parameters for automatic waste feed cut-off systems; communication or alarm systems; response to fires or explosions; response to hazardous material spills; and shutdown of operations.

Materials: A variety of training techniques and aids are used in presenting the RCRA training, including commercial video tapes, lectures, site-specific pictures and procedures manuals, and handouts for the students. Hands-on demonstration and practice is also used.

Documentation/Examination: All RCRA workers are tested following training, and that documentation is on file at the facility and also recorded on the TRT documentation data base. Program plan is documented in ORNL/TM-10311 (B. D. Barkenbus. Resource Conservation and Recovery Act (RCRA) New-Employee Training Manual for the Operations Division RCRA Personnel, ORNL/TM-10311, Oak Ridge, Tennessee, 1987).

Coordinator: W. Michael Moreland (576-7712)

SARA/OSHA BASIC TRAINING FOR GENERAL WASTE SITE WORKERS

Regulatory/Administrative Source: Superfund Amendments and Reauthorization Act of 1986 (SARA), Public Law 99-499, October 17, 1986, 100 Stat. 1613; Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120, Federal Register-54 FR 9294, March 9, 1989.

Audience: This training requirement applies to employees involved in the following operations:

- Clean-up operations conducted at uncontrolled hazardous waste sites (such as those sites listed on or recommended for the EPA's National Priority List or listed on state priority lists). This includes initial investigations of these sites to ascertain the presence or absence of hazardous substances.
- Corrective actions involving cleanup operations at sites covered by RCRA.
- Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by RCRA or under agreement with the U.S.E.P.A. to implement RCRA regulations.
- Emergency response operations for releases of, or substantial threats of releases of hazardous substances without regard to the location of the hazard.

Personnel providing technical support for these operations such as that offered in the areas of environmental compliance, industrial hygiene, radiation protection, and industrial safety are covered also covered by the scope of this training.

Approach: 29 CFR 1910.120 recognizes that those facilities involved in hazardous waste treatment, storage, and disposal operations as regulated by 40 CFR Parts 254 and 265 pursuant to RCRA generally have more routine working conditions and the hazards are better identified and controlled than at those hazardous waste disposal sites created prior to passage of RCRA. For this reason, 24 hours of training is specified as appropriate to

these working conditions. At ORNL, Basic SARA/OSHA Training for General Site Workers is offered to comply with this regulatory-based training requirement.

Twenty-four hours of training is also specified for workers on a hazardous waste site only occasionally for a specific limited task (such as ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits or published exposure limits.

Workers regularly on a waste site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, should receive a minimum of 24 hours of instruction as well.

This twenty-four hour training course is offered toward fulfillment of training requirements for employees who participate, or are expected to participate, in emergency response to hazardous substance incidents.

This course is offered as a prerequisite to additional training required for those employees who may engage in remedial action hazardous waste clean-up operations and for managers and supervisors of hazardous waste operations (see next course listings).

Basic Training for General Site Workers includes major fundamentals of industrial hygiene presented to the workers in a format that encourages them to assume responsibility for their own safety and health protection. Consistent with health and safety guidelines for hazardous waste site activities developed jointly by NIOSH/OSHA/USCG/EPA, this program addresses the following topics:

- Overview of Regulations
- Types of Hazards
- Sources of Information
- Toxicology
- Respiratory Protection
- Personal Protective Clothing

- Site Control
- Site Characterization
- Medical Surveillance
- Decontamination
- Emergency Response

Much of this course is concerned with recognition of the types of hazards that may be encountered in hazardous waste operations and what the worker may do to minimize those hazards. General categories of hazards that are discussed include chemical hazards, ionizing radiation, confined spaces, noise, heat stress, cold stress, asbestos, biological hazards, and safety hazards.

Each of the topics listed above as well as each type of hazard has been developed into a complete training "module" with lesson plan and supporting visual aids and/or demonstrations. Each module contains the following types of information:

- Learning Objectives
- Basic generic information
- Site-specific information
- Review of key points.

Several of the topics included in the Basic course are appropriate for training a much broader audience than hazardous waste workers. Development of stand-along "modules" imparts flexibility to the program and facilitates additional applications of the material. For example, the training modules on heat stress, confined space entry, and spill response have been effectively utilized in safety meetings and other training outside the SARA/OSHA Program at ORNL.

While much basic generic information must be presented in this course, modules include site-specific application of the principles discussed. Because of a need to intersperse site-specific information throughout the course, extensive use of commercially available videotapes has not been made.

Because of the broad range of concepts to be communicated and the amount of in-class instruction involved, the 24-hour course has been structured into six 4-hour sessions given over a two-week

period. This timing permits grouping of concepts and facilitates better learning and retention of new information than does presenting the same information in three full days of instruction. However, to accommodate certain groups of shift workers who need the training, a three-day schedule is occasionally implemented.

In development of this training an attempt has been made to provide an optimum mix of instructors, presentation methods, demonstrations, exercises, and drills to present the material in a manner that holds the attention of the trainee and is most conducive to learning. A review of some of the methods used follows:

Worksheets. Worksheets have been developed for several modules such as toxicology, chemical hazards, and spill response that allow the student to follow along and respond to questions as the training is taking place. This approach is particularly advantageous when a large amount of material is being presented; questions can be used to alert the trainee to those points of the presentation that are most important. Also the worksheet is less intimidating than a formal testing procedure and allows for a more relaxed atmosphere. If needed, the sheets can be used as a review at the end of a session.

Protective Clothing and Equipment. Protective clothing and equipment are a major emphasis in this training program. ORNL has workers that routinely don protective clothing and equipment that protect against radioactive contamination, and workers that less often need to wear protective clothing and equipment when dealing with a potentially hazardous chemical environment. Proper equipment for these different environments are shown as part of this training and a basic dress-out procedure is demonstrated.

Use of site-specific photographs. A historical perspective of ORNL waste practices is given as a part of our site characterization training, utilizing photographs and report descriptions of sites over several decades. This has been a very popular session of the course, and many of the course participants are able to add to or comment on the material as the module is presented. This module helps the newer workers to understand how the ORNL

site has developed over time and what types of problems may be encountered in aging systems under renovation.

Involvement of personnel from various areas of expertise to conduct training and demonstrations. The SARA/OSHA training program at ORNL has enjoyed the support of a number of personnel from different areas of expertise such as industrial hygiene, health physics, fire protection, hazardous waste operations, and environmental protection. These persons are a valuable source of information for training program content and, in some cases, are asked to present training material or provide a demonstration. Having an experienced and qualified "expert" discuss a topic or perform a demonstration commands respect of the trainee and imparts accuracy and technical merit to the presentation. The variety of presenters also avoids monotony and makes the training more enjoyable. Examples of how support personnel often participate in the SARA/OSHA training program are given below:

Presenter(s)	**Topic or Demonstration**
Industrial Hygiene Personnel	Airpurifying Respirators, Air Monitoring Instrumentation, Hazard Communication Labeling, Material Safety Data Sheets
Health Physics Technicians	Protective Clothing for Radioactive Contamination
Emergency Response Planner/ Coordinator	Emergency Response, Tour of Emergency Response Facilities
Fire Department Training Captain	Self-Contained Breathing Apparatus, Fire Extinguishers

Exercises and drills. The final and summary activity for the 24-hour Basic course is a simulated hazardous chemical spill response involving the class in role-playing and hands-on activity. This drill activity, videotaped by one of the instructors, requires incorporation or consideration of many of the topics discussed in the course. Following the drill, the videotape is played and the class and instructors critique their performance.

Materials: Each trainee is provided a notebook of all the class presentations, a copy of the Occupational Safety and Health Guidance Manual For Hazardous Waste Site Activities, and several other commercially prepared handouts on hazardous materials.

Instructor notebooks or lesson plans exist for all modules.

Documentation/Examination: Documentation is accomplished by signed attendance roster and by completion of several worksheets during module reviews and one videotaped exercise involving all trainees.

ORNL and Oak Ridge Associated Universities who manage the Training Resources and Data Exchange (TRADE) network for DOE have worked together to publish generic portions of this ORNL training program in a TRADE document entitled Instructional Materials for SARA/OSHA Training, Volume I: General Site Worker Training. These training materials have been recognized as a model across the DOE system and have been distributed to about 150 staff members at approximately 60 DOE facilities and offices.

Coordinator: D. Allen White (574-1482)

SARA/OSHA TRAINING FOR REMEDIAL ACTION WORKERS

Regulatory/Administrative Source: Superfund Amendments and Reauthorization Act of 1986 (SARA), Public Law 99-499, October 17, 1986, 100 Stat. 1613; Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120, Federal Register-54 FR 9294, March 9, 1989.

Audience: Employees engaging in or providing technical support for remedial action cleanup of hazardous wastes and waste sites.

Approach: Provisions of 29 CFR 1910.120 for site workers engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards include a minimum of forty hours of training. This requirement addresses needs of employees involved in remedial action cleanup operations at CERCLA sites, certain RCRA sites, and sites designated by state and local governments for clean-up.

ORNL, like many other DOE sites, is embarking upon some large scale remedial action cleanup activities. It is anticipated that much of the site remediation and cleanup will be performed by outside contractor personnel. Prior to arriving on site, contractor personnel must receive forty hours of SARA/OSHA training, with clearly defined training plans and auditable documentation. Training requirements are being written into contracts and provision is made for review of this type of outside training by our Section.

For those ORNL workers engaged in remedial action activities on site, an additional 16-hour course is offered to build upon the pre-requisite 24-hour course and meet the forty hour training requirement. Compared to the Basic course, this training allows more time for site-oriented exercises, "hands-on" activities, and more intensive practice with protective clothing and equipment involving all of the trainees.

SARA/OSHA Training for Remedial Action Workers:

- Acquaints the trainee with various planned and ongoing remedial action projects at ORNL,
- Provides more detailed information on site characterization and decontamination techniques,
- Introduces trainees to risk assessment,
- Discusses handling of drums and other containers,
- Provides intensive training with the use and limitations of a self-contained breathing apparatus,
- Gives hands-on training in the use of select monitoring instrumentation, and
- Involves the trainee in protective clothing dress-out and decontamination exercises.
- Practices the trainee in site safety planning.

Materials: Each trainee is provided a notebook containing the class presentations.

Documentation/Examination: Documentation is accomplished by completion of worksheets concerning monitoring instrumentation and safe handling of drums and containers. A large scale drill activity is videotaped in which drum handling and sampling activities are used to involve the entire class in protective clothing dressout and decontamination exercise. There is no formal written testing procedure.

Lesson plans and instructor notes are available for all modules.

ORNL and Oak Ridge Associated Universities who manage the Training Resources and Data Exchange (TRADE) network for DOE have worked together to publish generic portions of this ORNL training program in a TRADE document entitled Instructional Materials for SARA/OSHA Training, Volume III: Remedial Action Worker Training. This resource is meant to be used across the DOE system as a resource in development/implementation of this regulatory-based training.

Coordinator: D. Allen White (574-1482)

SARA/OSHA TRAINING FOR MANAGERS/SUPERVISORS

Regulatory/Administrative Source: Superfund Amendments and Reauthorization Act of 1986 (SARA), Public Law 99-499, October 17, 1986, 100 Stat. 1613; Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120, Federal Register-54 FR 9294, March 9, 1989.

Audience: On-site management and supervisors directly responsible for or who supervise employees engaged in hazardous waste operations.

Approach: Managers and supervisors who are directly responsible for site operations must have the same training as that of the employees they supervise plus additional specialized training related to management of hazardous waste operations. Since these managers and supervisors are responsible for directing others, it is necessary to enhance their ability to provide guidance and to make informed decisions. 29 CFR 1910.120 provides for eight hours of additional training for managers and supervisors.

An eight-hour course is offered at ORNL to meet this training requirement. This training begins with an overview of factors influencing remedial action strategies at ORNL sites. Other topics covered in this training include Selection of Personal Protective Equipment, Emergency Response and Community Right-to-Know, and Legal Aspects of Worker Supervision. Handling the Press and the Media discusses strategies to be utilized in interview situations. An out-of-class exercise accessing the computerized Material Safety Data Sheet System is included. Because the interim final rule requires three days of training in the field under direct supervision of a trained and experienced supervisor, a workshop in on-the-job training skills is included, with discussions about documentation of this type of training. A group-oriented exercise in potential problem analysis and contingency planning applied to clean-up of a hazardous waste site completes the day of training.

Materials: Each trainee is provided a notebook containing the class presentations and additional handouts designed for use as job-performance aids.

Documentation/Examination: There is no formal testing procedure. Documentation of attendance is accomplished by sign-in sheets.

Lesson plans and instructor notes are available for all modules.

ORNL and Oak Ridge Associated Universities, who manage the Training Resources and Data Exchange (TRADE) network for DOE, have collaborated on a TRADE publication which represents generic portions of this ORNL training program. Instructional Materials for SARA/OSHA Training, Volume II: Managers and Supervisors Training are meant to be used by other DOE facilities as a resource for development and implementation of this regulatory-based training.

Coordinator: D. Allen White (574-1482)

SARA/OSHA ANNUAL REFRESHER TRAINING

Regulatory/Administrative Source: Regulatory/Administrative Source: Superfund Amendments and Reauthorization Act of 1986 (SARA), Public Law 99-499, October 17, 1986, 100 Stat. 1613; Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120, Federal Register- 54 FR 9294, March 9, 1989.

Audience: This eight-hour retraining requirement applies to employees who have completed either SARA/OSHA BASIC TRAINING FOR GENERAL WASTE SITE WORKERS or SARA/OSHA TRAINING FOR REMEDIAL ACTION WORKERS. Please refer to these sections for more information regarding the target audience included in the scope of this training.

Approach: This eight-hour course is structured to provide a basic review of relevant matters such as review of health hazards and the use of personal protective equipment. Employees in hazardous waste operations and activities may face serious health and safety risks. Reminders are needed of this and of work practices necessary to avoid hazards. Topics reviewed include chemical health hazards, radiation protection, confined space hazards, site characterization, waste area control, decontamination, and small spill response. This training also gives opportunity to update employees on changes in regulations and standard practices and procedures. New training topics not covered in the initial training, such as "Trenching and Excavation Safety" are introduced as needed. A forum at the end of each session provides the opportunity for trainees to discuss health and safety concerns provided anonymously earlier in the day. Incidents occurring during the past year may be used in this course as training examples.

Employees are notified of the need for retraining based on date initial training was completed.

This course is restructured at least annually from the time first implemented in June of 1989. Course content is updated as necessary.

Materials: Each trainee is provided a notebook containing reference handouts related to the topics covered as well as copies of overhead transparencies used in the training.

Documentation/Examination: Documentation training is accomplished by signed roster and completed worksheets.

Lesson plans and instructor notes are available for all training modules.

Coordinator: D. Allen White (4-1482)

SOLID LOW-LEVEL WASTE GENERATOR TRAINING

Regulatory/Administrative Source: DOE Orders 5480.3 and 5820.2A, Resource Conservation and Recovery Act (40 CFR 260-265), 49 CFR Parts 171-179, Martin Marietta Energy Systems Policy Procedures ESH-14, ESH-16, and ESH-17.

Audience: This training program is required for those personnel at ORNL who generate, store, package, and prepare paperwork for disposal of solid low-level wastes through the Radioactive Waste Operations Group (RWOG), EHP Division.

Approach: Specific guidance is provided the generators on ORNL's classifications of wastes, identification of materials regulated by RCRA that **should not** be included in solid low-level waste to be buried, guidelines for handling solid low-level wastes, and correct completion of appropriate forms. After a discussion of this information, the participants are given a scenario and asked to complete the required paperwork. This activity is reviewed in class and questions answered.

Materials: The program has been developed using various media: transparencies, handouts, and scenario worksheets. Participants are provided handout materials to supplement the material used by the instructors.

Documentation/Examination: Participants are tested at the end of the program through a written examination. Participants are issued certificates upon successful completion of the training program. Documentation is maintained in the TRT training files. Pertinent information will also be kept in the TRT training documentation data base.

Coordinator: Edith Jones (576-7712)

HAZARDOUS AND MIXED WASTE GENERATOR TRAINING

Regulatory/Administrative Source: DOE Orders 5480.3 and 5820.2A, Resource Conservation and Recovery Act (40 CFR 260-265), 49 CFR Parts 171-179, Martin Marietta Energy Systems Policy Procedures ESH-14, ESH-16, and ESH-17.

Audience: This training program is required for those personnel at ORNL who generate, store, package, and prepare paperwork for disposal of hazardous and mixed wastes through the Hazardous Waste Operations Group (HWOG), EHP Division.

Approach: Specific guidance is provided the generators on identification of materials regulated by RCRA, other materials regulated by ORNL, requirements for the management of waste accumulation areas, and correct completion of appropriate forms. After a discussion of this information, the participants are given a scenario and asked to complete the required paperwork. This activity is reviewed in class and questions answered.

Materials: The program has been developed using various media: transparencies, handouts, and scenario worksheets. Participants are provided handout materials to supplement the material used by the instructors.

Documentation/Examination: Participants are tested at the end of the program through a written examination. Participants are issued certificates upon successful completion of the training program. Documentation is maintained in the TRT training files. Pertinent information will also be kept in the TRT training documentation data base.

Coordinator: Edith Jones (576-7712)

WASTE MINIMIZATION TRAINING

Regulatory/Administrative Source: DOE Orders 5480.3 and 5820.2A, Resource Conservation and Recovery Act (40 CFR 260-265), 49 CFR Parts 171-179, Martin Marietta Energy Systems Policy Procedures ESH-14, ESH-16, and ESH-17.

Audience: This training program is required for those personnel at ORNL who generate, store, package, and prepare paperwork for disposal of solid low-level or hazardous and mixed wastes through the Radioactive Waste Operations Group (RWOG) or the Hazardous Waste Operations Group (HWOG), EHP Division.

Approach: Specific guidance is provided on waste minimization activities at ORNL, methods for waste minimization, and responsibilities for waste minimization at ORNL.

Materials: The program has been developed using various media: transparencies and handouts. Participants are provided handout materials to supplement the material used by the instructors. This program has been developed in such a way that the Waste Minimization Coordinators in the ORNL divisions could present the material themselves. When the training is presented by the division coordinator, the participants can receive certification through TRT if all requirements have been met.

Documentation/Examination: Participants are tested at the end of the program through a written waste minimization suggestion form. Participants are issued certificates upon successful completion of the training program. Documentation is maintained in the TRT training files. Pertinent information will also be kept in the TRT training documentation data base.

Coordinator: Edith Jones (576-7712)

TRANSPORTATION SAFETY TRAINING PROGRAMS: DOT REGULATIONS FOR PACKAGERS AND SHIPPERS

Regulatory/Administrative Source: Title 10 CFR Part 71; Title 29 CFR, Parts 1910.120 and 1910.1200; Title 40 CFR, Parts 262-265; Title 49 CFR, Parts 100-199, 390-399; CERCLA; DOE Orders 1540.1, 2; 5480.1A, 3, 3A, 4, 13; 5483.1A; 5700.6B; MMES Policy Procedures; and ORNL Standard Practice Procedure 65

Audience: Personnel responsible for packaging, handling, shipping, and transporting hazardous materials.

Approach: This training program has been designed to meet the needs of workers involved in various aspects of packaging, storing, shipping, and transporting hazardous materials and wastes.

Materials: The program uses various media: overhead transparencies, videotape, handouts, worksheets. Participants receive a workbook, a copy of the 49 CFR Transportation Regulations, a copy of the IATA Regulations, and other handout materials as necessary.

Documentation/Examination: Participants will be tested at the end of each module through written examinations, worksheets, group activities. Participants will be issued a certificate upon successful completion of the training program. All documentation will be maintained in the TRT training files. Pertinent information will also be kept in the TRT training documentation data base.

Coordinator: Edith Jones (576-7712)

TRANSPORTATION SAFETY TRAINING PROGRAMS: DOT FOR VEHICLE OPERATORS

Regulatory/Administrative Source: Title 10 CFR Part 71; Title 29 CFR, Parts 1910.120 and 1910.1200; Title 40 CFR, Parts 262-265; Title 49 CFR, Parts 100-199, 390-399; CERCLA; DOE Orders 1540.1, 2; 5480.1A, 3, 3A, 4, 13; 5483.1A; 5700.6B; MMES Policy Procedures; and ORNL Standard Practice Procedure 65

Audience: Vehicle operators, who because they transport hazardous materials, must complete the DOT Motor Carrier Safety Written Examination, and meet DOT and State of Tennessee Certification requirements.

Approach: The Vehicle Operator's Certification Training Program has been designed to prepare vehicle operator's to successfully complete the DOT Motor Carrier Written Examination, road test, and various knowledge and skills examinations required by the State of Tennessee.

Materials: The program uses various media: overhead transparencies, videotape, slides, handouts, and worksheets. Participants receive a study guide, a copy of the Federal Motor Carrier Safety Regulations Pocketbook, a copy of the Tennessee Commercial Driver License Manual and other handout materials as necessary.

Documentation/Examination: The DOT Motor Carrier Safety Written Examination will be administered at the end of the training program. Participants will be issued a Certificate of Written Examination upon completion of the written examination. Pertinent information will be kept in the TRT training documentation data base.

Coordinator: Edith Jones (576-7712)

TRANSPORTATION SAFETY TRAINING PROGRAMS: DOT FOR INCIDENTAL MATERIALS HANDLERS

Regulatory/Administrative Source: Title 10 CFR Part 71; Title 29 CFR, Parts 1910.120 and 1910.1200; Title 40 CFR, Parts 262-265; Title 49 CFR, Parts 100-199, 390-399; CERCLA; DOE Orders 1540.1, 2; 5480.1A, 3, 3A, 4, 13; 5483.1A; 5700.6B; MMES Policy Procedures; and ORNL Standard Practice Procedure 65

Audience: Personnel responsible for handling, loading, and storing hazardous materials.

Approach: This program has been designed to meet the needs of workers involved in various aspects of handling, loading, and storing hazardous materials and wastes.

Materials: The program uses various media: overhead transparencies, videotape, handouts, worksheets. Participants receive a workbook, appropriate portions of the 49 CFR Transportation Regulations, and other handout materials as necessary.

Documentation/Examination: Participants will be tested at the end of each module through written examinations, worksheets, group activities. Participants will be issued a certificate upon successful completion of the training program. All documentation will be maintained in the TRT training files. Pertinent information will also be kept in the TRT training documentation data base.

Coordinator: Edith Jones (576-7712)

SAFETY WORK PERMIT

Regulatory/Administrative Source: 29 CFR 1910 and 1926 safety regulations, MMES Policy Procedure ESH-8 and ORNL Safety Manual Procedure IS-6.1.

Audience: MMES personnel responsible for filling out any part of a Safety Work Permit.

Approach: Since many forms of maintenance, tests, and inspections are performed on systems including electrical, mechanical, and chemical, it is necessary to train employees on how to perform their work safely. ORNL Safety Manual Procedure 6.1 requires that a safety work permit be issued for work that involves the establishment of boundaries and controls to protect workers from unusual hazards. The training approach taken under this program was the establishment of training materials which teaches the trainee step by step how to fill out a Safety Work Permit. A review of who should issue a Safety Work Permit, who should request one, and what assistance is available to help an employee fill out a Safety Work Permit is also performed. This training program vastly improves the communication links between P&E craft groups and facility supervisors who request work to be performed at their facility. Personnel are informed that work is not commenced until a Safety Work Permit has been issued.

Materials: Course consists of a 2-hour classroom session which reviews the requirements under IS-6.1. This course contains a comprehensive lesson plan, vugraphs, trainee workbook, and an exercise which is completed out-of-class by all trainees.

Documentation/Examination: Testing is accomplished by the completion of an exercise out-of-class which requires the trainee to thoroughly review the trainee workbook. This program has a thorough lesson plan and a set of vugraphs as well as equipment used for demonstration.

Coordinators: R. Don Kennedy/W. Mike Moreland
(576-5106/576-7712)

CONFINED WORK SPACES

Regulatory/Administrative Source: DOE Order 5480.4; ANSI Z117.1, Safety Requirements for Working in Tanks and Other Confined Spaces; OSHA 1910.146 (not finalized); Confined Space Entry, Safety Standard, ORNL Industry Safety Procedure 8.3, April 1986.

Audience: Employees who would enter, as a part of their work activities, areas that would meet the definition of a confined space. Confined spaces have few ways in or out, are difficult to get into and out of, are not regularly occupied by human beings and may contain hazardous atmospheres or other safety and health hazards.

Approach: A short training session is given on the following topics: the definition of a confined space, examples of areas considered confined spaces, health and safety hazards associated with working in a confined space, and proper work procedures and safety measures to be used when working in a confined space. Review of the regulations and ORNL procedures include pictorial examples of confined spaces at ORNL.

Materials: Copies of the vu-graphs used by the instructor are issued to each trainee, including a copy of ORNL IS 8.3. Examples of confined spaces at ORNL are reviewed, using on-site pictures to illustrate the likely work environments.

Documentation/Examination: A short examination is used to require the trainee to demonstrate knowledge of confined space entry requirements and practices.

Coordinator: Allison V. Keebler (574-1482)

SPILL RESPONSE

Regulatory/Administrative Source: Clean Water Act, 40 CFR 112.10(iii); 40 CFR 151.

Audience: MMES personnel who potentially may become involved in a spill response scenario.

Approach: This training program was developed to comply with training requirements specified under 40 CFR Part 112.10(iii) involving implementation of the ORNL Spill Prevention, Control, Countermeasures, and Contingency Plan (SPCCCP). Individuals who have the potential to become involved in a spill response scenario, including initial notification of a spill, are instructed on spill events that have occurred and their responsibilities in responding to the spill.

Materials: Course consists of a 1-hour classroom session which reviews spill response requirements. This course contains a lesson plan, vugraphs, and an exercise which is completed in class by all trainees.

Documentation/Examination: Testing is accomplished by the completion of an exercise in class which requires the trainee to demonstrate his minimum responsibilities when a spill occurs.

Coordinators: D. Allen White (4-1482)

INDUSTRIAL SAFETY FOR SUPERVISORS

Regulatory/Administrative Source: OSHA Regulations 29 CFR 1910 and 1926, DOE Order 5483.1 and ORNL Safety Manual.

Audience: MMES personnel who supervise or plan to supervise personnel performing daily operational, maintenance, and research tasks which involve potentially hazardous situations.

Approach: This training program was developed to inform supervisors of their responsibilities in overseeing that safety precautions are taken during all operational, maintenance, and research functions where there is a potential for hazardous conditions. This program informs supervisors of the many regulatory and procedural requirements which must be followed in order to ensure worker safety during the performance of a task.

This course is based on general guidelines that have been developed in the commercial sector and will include:

- Electrical Safety
- Protective Equipment
- Material Handling/Storage/Loss Control
- Industrial Housekeeping
- Fire Hazards
- Equipment Safeguarding
- Industrial Hygiene
- Hand and Power Tools
- Safety Motivation and Training
- Job Safety Analysis
- On-Job Training
- Safety Inspections
- Accident Investigation

Materials: Course consists of an 8-hour classroom curriculum. Several modules contain group interaction and role playing exercises to enhance a supervisors perception of how it feels on the other side. This course contains lesson plans, vugraphs, and an

exercise for each module which are completed in class by all trainees.

Documentation/Examination: Testing is accomplished by the completion of exercises in class which requires the trainee to demonstrate his/her comprehension of the material presented.

Coordinators: R. Don Kennedy/Edith Jones
(576-5106/576-7712)

ORNL HAZARD COMMUNICATION TRAINING PROGRAM

Regulatory/Administrative Source: 29 CFR 1910.1200 OSHA Communication Standard. DOE 5480.10 Contractor Industrial Hygiene Program; DOE Issue No. 14 EH-0050/2. Martin Marietta Energy Systems Procedure ESH10, Hazard Communication.

Audience: All ORNL employees shall receive information on the existence and content of the Standard. Specialized training is also required for employees assigned to a work area where hazardous materials are present.

Approach: One of the major aspects of the Hazard Communication Standard involves the training and informing of employees on the chemical, physical, and biological hazards that exist in the work place. Training/information sessions for all employees are held at specific times coordinated by the divisions and the Industrial Hygiene Department (IHD). New employees are informed of existence and the content of the Standard at new employee orientation sessions. Specific training is conducted in each division or department on an as-needed basis. Training must be conducted at the time of initial assignment and whenever a new hazard is introduced into the work area. Retraining will be conducted periodically. First-line supervision, assisted by IHD, shall identify and develop employee training programs whenever a potential health hazard exists requiring engineering controls, administrative procedures, or personal protective equipment.

Materials: All employees must view a videotape entitled "What's It All About?" The videotape describes the OSHA Hazard Communication Standard. A discussion/question-answer period accompanies each presentation. Written material entitled "What You Should Know About Hazard Communication" describing the regulation is also distributed at the information meetings. First-line supervisors or the principal investigators on projects are responsible for identifying and ensuring that their employees are apprised of hazardous situations in the work area. The IHD is available to assist in this training. Audiovisual programs are available to give general information on seven categories of hazards. These are corrosives, solvents, oxidizers,

poisons, gases, explosives, and carcinogens. In addition, videotapes are available on other industrial hygiene topics. Information found on Material Safety Data Sheets for hazardous materials is available and should be reviewed with and understood by the employee. All presentations conducted by the IHD include interactive question and answer sessions.

Documentation/Examination: A description of available training material is maintained in the IHD Training Manual and/or is available from the IHD. Learning exercises for all videotapes are included in the IHD Training Manual if further reinforcement is desired. All attendance of training is documented and maintained on the IHD/Medical data base.

Coordinator: F. K. Edwards (574-6169), Industrial Hygiene Department

ORNL RESPIRATORY PROTECTION TRAINING PROGRAM

Regulatory/Administrative Source: ANSI Z88.2 Practices for Respiratory Equipment; 29 CFR 1910.134 Respiratory Protection, OSHA.

Audience: All routine wearers and potential wearers of respiratory equipment at ORNL.

Approach: In conjunction with the required annual fit test, employees are given hands-on demonstration of the basic respiratory protective devices used at ORNL. A 15-minute film produced by Tel-A-Train, Inc. is also shown at this time. A separate training is also being developed for supplied air respiratory equipment.

Materials: Films: The Care and Use of APR's (Air Purifying Respirators). Respiratory Protective Equipment Demonstrated: Half face air purifying respirators, full face air purifying respirators, supplied air, and various cartridges and canisters specific for classes of contaminants.

Documentation/Examination: Records of annual training performed by the Industrial Hygiene Department are kept in conjunction with fit test records on the medical computer data base. Sign-up sheets with each individual's signature are kept in the mask fit facility in the Industrial Hygiene Department.

Coordinator: Teresa R. Presley (574-6170), Industrial Hygiene Department

ORNL ASBESTOS PROTECTION TRAINING PROGRAM

Regulatory/Administrative Source: EPA Worker Protection Rule 40 CFR Part 763; OSHA Construction Standard 29 CFR 1926.58; OSHA General Industry Standard 29 CFR 1910.1001.

Audience: All employees with the potential of being exposed to airborne concentrations of asbestos, actinolite, tremolite, anthophyllite, or a combination of these at or above the action level of 0.1 f/cc of air.

Approach: Training is required prior to or at the time of initial assignment unless the employee has received equivalent training within the last 12 months. Thereafter, training is required at least annually.

Individuals who receive training are divided into two categories:

1. Those who work routinely with asbestos-containing materials (ACM).
2. Those who by the nature of their work may encounter ACM on an occasional basis during certain types of repair projects.

Individuals who work routinely with ACM receive training relating to the OSHA Construction Standard. This involves work practices and engineering controls related to major asbestos demolition, removal, or renovation projects. Topics of importance include: glove box techniques, tent enclosures, negative air machines, wetting agents, and protective clothing. Due to the nature of the work, these individuals also receive training on heat stress and safety aspects.

Individuals encountering ACM on an occasional basis receive training from the General Industry Standard. These individuals are trained according to the specific jobs they are carrying out such as removing or repairing floor tile, ceiling tile, or transite material. The training includes the types of tools to be used, local exhaust ventilation, wet methods, housekeeping, etc.

All individuals working with ACM receive training on:

1. Recognition of the different types of asbestos and how they were used.
2. Health effects and diseases associated with exposure to asbestos.
3. Synergistic effects of smoking and working with asbestos as it relates to lung cancer.
4. The types of operations that can result in exposure.
5. The uses and limitations of respirators and protective clothing.
6. The Medical Surveillance Program.
7. The industrial hygiene personal sampling and air monitoring program.

Materials: A 35-minute videotape entitle, "Asbestos - Controlling the Hazard," is viewed. Slides reviewing the OSHA Asbestos Standards are shown. Each individual receives a copy of 29 CFR 1926.58 and 29 CFR 1910.1001. There is a question and answer period following the training.

Documentation/Examination: Sign-up sheets with each individuals signature is kept on file in the Industrial Hygiene Department. A list of personnel trained is kept on file and entered into the medical computer database. A short, written test is given following the training.

Coordinator: B. D. Wilson (574-1551), Industrial Hygiene Department

INSTRUCTOR SKILLS WORKSHOP

Regulatory/Administrative Source: 5480.5, 5480.6, 5480.11, 5480.xx (DOE Training Accreditation Draft)

Audience: Technical training personnel.

Approach: The intent of this 24-hour program is to provide a foundation for planning, developing, and implementing instructional programs. This program presents a wide variety of material relative to learning behaviors, educational theory, and instructional methodology, presented on a team-teaching basis by several instructors. This provides participants opportunity to observe a variety of instructional styles, mannerisms, and personalities. Following the classroom instruction, the participant will prepare and deliver a 10-minute presentation, using the concepts provided by the program. The presentation will be videotaped with a subsequent critique by the instructors. This program will include: adult learning concepts, instructional systems development, DOE documentation requirements, methods of teaching, technical lesson plans development, presentation skills, effective use of visual aids, and test construction and evaluations.

Materials: A variety of media will be used during the training program to demonstrate use of the media in a classroom presentation. Flipcharts, video equipment, films, handouts, and a participant notebook will be used during the program.

Documentation/Examination: Participants will be required to present a 10-minute lesson of instruction to class participants demonstrating the concepts, methods, and techniques recommended by this program. The instructors will complete Instructor Evaluation Guides throughout the training and will review with the participant the videotaped presentation to provide feedback to the program participants. Copies of the final Instructor Evaluation Guides completed by the instructors will be maintained in the TRT training files to document successful completion of the training program. An instructor's manual is being developed.

Coordinator: Edith Jones (576-7712).

Courses under Development

As regulations change and programs face new compliance or performance improvement standards, there is need for development of additional ESH courses. Some of those courses now under development are Industrial Safety for Supervisors and Industrial Safety in the Laboratory. As these courses mature they will become standard offerings from TRT.

Internship Programs

An important function in the TRT Program is the maintenance of university and college liaison in the areas covered by the ESH disciplines. In addition to assisting in the development of appropriate technical programs in colleges and universities, TRT actively sponsors internships within TRT and within other parts of the Environmental and Health Protection Division, using ORNL's Office of University Relations and other employment mechanisms to bring students on-site for 3- to 6-month internships. Currently, internships are in place for health physics technicians and waste management technicians from Roane State Community College and Chattanooga State Technical Community College, for industrial hygienists and other health specialists from the University of Tennessee School of Public Health, and for technical instructors from the University of Tennessee's Technological and Adult Education Department. In addition, additional opportunities are being planned for the newly developing Roane State programs for industrial hygiene technicians.

6. PROGRAM EVALUATION GUIDELINES

The Technical Resources and Training Section shall be evaluated periodically to determine the effectiveness of its training programs. The results of these evaluations shall be reported to the Environmental and Health Protection Division by the TRT Section Head.

Training Program Evaluation and Control

In order to determine whether the goals and content of the training program are compatible with the missions of the organization, an effective evaluation system is needed. This function determines the program's effectiveness. Internal and external evaluation steps are used in this phase to provide the information needed for assurance that the program accomplishes its objectives.

Internal Evaluation

Assessments based on Kirkpatrick's four levels of evaluations shall be made on the following points:

- Reaction - Were participants pleased with the program?
- Learning - What did the participants learn in the program?
- Behavior - Did participants change behavior based on the program?
- Results - Did change positively affect the organization?

Evaluation of the training process will be conducted on a continuous basis during training implementation. The process evaluation will focus on the following training activities:

- Training material development monitoring by technical and instructional review of all lesson plans, exam/test items, OJT checklists, student materials, handouts, and any other supporting materials. These reviews shall be documented (see Appendix F).
- Program implementation monitoring using the following method: Training sessions (classroom and OJT) will be observed periodically to ensure quality presentations are conducted. As a minimum, each instructor shall be evaluated during a presentation at least annually as part of the TRT instructor qualification process. These observations shall be documented by the evaluator using the instructor evaluation form shown in Appendix C.
- Program implementation will be evaluated by means of the student critique form (example as shown in Appendix I). Each instructor is responsible for distributing and collecting the critique forms upon completion of each training session.

Evaluation of training program content will be monitored on a continuous basis during program implementation. The content evaluation process will focus on the following program components, where appropriate:

- Position Specific Task Lists - All position specific task lists will be monitored continuously. Modifications in plant systems, components, equipment, procedures, etc., which impact the way tasks are performed will be reflected in the JTA data base for those positions affected. Associated learning objectives and training materials shall then be changed to reflect actual job content.
- Program Learning Objectives (terminal and enabling) - All learning objectives associated with training program lesson plans will be reviewed prior to use in the training environment. The purpose of this review will be to evaluate both the instructional adequacy (i.e.,

appropriate wording) and the technical accuracy of the objective content. These reviews shall be documented using the form shown in Appendix F.

All test items submitted with lesson plans shall be reviewed. This review shall focus on the adequacy of each item to measure a specified learning objective. Each item shall also be reviewed for proper format and wording to ensure compliance with standard testing good practices. The purpose of the examination review is to ensure that all exams actually measure student achievement of specified learning objectives.

Program documentation shall be used as the major source of feedback information regarding overall program effectiveness.

External Evaluation

In addition to internal evaluation, a properly planned and conducted external evaluation will occur. An independent outside organization shall evaluate the training program at least every five years. Frequency shall be determined by Management.

Control

The final function in this process is that of maintaining quality control throughout the program. This will be done through revisions that keep training viable, relevant and technologically up-to-date. Amendments will include modifications in objectives to meet prevalent needs, adjusting subsequent learning activities, reallocating subject material emphasis to current areas of concern and distributing time allocations to meet such demands. This quality control function will meet the appropriate standards.

Evaluation of Instructors/Coordinators

As noted earlier, the evaluation of the instructors/coordinators shall be based upon data gathered from opinion surveys of both the trainee and his supervisor and from evaluations performed by members of the TRT Program (see Instructor Qualification and Appendix C).

Materials Control

All training materials shall be evaluated periodically to ensure accuracy, adequacy, and timeliness. Course objectives shall be reviewed, supporting material shall be verified and/or up-dated, and record copies shall be maintained.

7. DOCUMENTATION AND RECORDKEEPING PROCEDURES

Training documentation is required to assure consistent and reliable entry, maintenance, and retention of information concerning initial qualification and requalification of ORNL employees.

An adequate records retention system is necessary to document job-related training regarding the safe and efficient operation of ORNL. Any ESH training delivered to ORNL personnel to qualify, requalify, or enhance their ability to perform their job duties and tasks is documented.

Training program materials and trainee records shall be maintained by the Documentation and Materials Control Coordinator. This section describes the materials and records associated with program development, maintenance, and specifies record retention requirements.

Training records will be developed, retained and maintained by the TRT in accordance with the guidelines presented in this document.

Attendance records will be maintained for all employees enrolled in classroom training activities related to qualification, requalification, or job enhancing training in the performance of their job duties and tasks. On-the-job (OJT) training documentation (i.e., OJT checklists) will be retained as proof of job qualification.

Storage and Retention

Training records storage shall be established in secured, fire-proof storage facilities. Training records should be divided into two groups:

- Record units having short-term retention value (hard copy files that contain only the current and previous year of training) (NOT YET IMPLEMENTED).
- Record units with long-term retention. (All other years of training to be stored on microfiche.) (NOT YET IMPLEMENTED.)

Records shall have adequate protection to ensure their integrity, e.g., fire protection equipment available, water penetrations near the storage and floor drains where appropriate, fire-proof file cabinets or safes.

Retention Schedules

The "original" training documentation shall be kept indefinitely. Retraining documentation shall be maintained until superseded by more recent retraining. Superseded retraining documentation shall be destroyed. Tables 7.1 and 7.2 show that guidance for courses related to safety and health require at least 75-year retention; others need not be kept for such extended periods.

Program Materials

A systematic approach is used to develop materials for the training program. Appropriate documentation is developed with associated materials. Changes, deletions, or additions may be made with the approval of the Section Head or designated alternate. Distribution of the various program materials depends upon the nature and intent of the material. For record purposes, the Documentation and Materials Control Coordinator maintains current copies of the individual items. These records include the items listed below:

TABLE 7.1: INDIVIDUAL TRAINING RECORDS DISPOSITION

Description of Record	Authorized Disposition
1. OJT checklist completed during qualification	Destroy 4 years from termination or transfer of employee
2. Final written examinations used for qualification/certification	Destroy 4 years from termination or transfer of employee
3. Oral examinations given for qualification/certification	Destroy 4 years from termination or transfer of employee
4. Operator evaluation records	Destroy 4 years from termination or transfer of employee
5. New employee indoctrination checklists	Destroy 4 years from termination or transfer of employee
6. Record of exemptions granted for any of Items 1 through 5	Destroy 4 years from termination or transfer of employee
7. Checklists completed for requalification/recertification	Destroy if superseded by new documents or 4 years from termination or transfer
8. Records of oral examinations given for qualification/recertification	Destroy if superseded by new documents or 4 years termination or transfer
9. Written examinations given for requalification/recertification	Destroy if superseded by new documents or 4 years from termination or transfer
10. Results of medical examinations (only pass/fail or restrictions detailed data goes to medical file)	Destroy if superseded by new documents or 4 years from termination or transfer
11. Records of courses/training sessions attended/completed (includes safety areas if directly applicable to the employee's job.	Destroy 75 years from date of termination (to be filed with personnel records after employee terminates)
12. Documentation of qualification for one-time-only special tests or operations	Destroy 2 years after completion of test or operation

NOTE: Long-term records shall be transferred to microfiche after first year of retention.

TABLE 7.2: TRAINING PROGRAM RECORDS DISPOSITION

Description of Record	Authorized Disposition
Training program records relating to the handling of hazardous, toxic, or radioactive materials, radiation safety or criticality safety, or any training where chronic exposure may have impact:	
1. Description of course content, course outline, examination banks, examination cover sheets, attendance rosters, and documentation of required performance items	Destroy 75 years after last session
Training program records other than those related to "A" above:	
1. Examination banks, examination cover sheets, attendance rosters, and documentation of required performance items	Destroy 2 years after last session
2. Training plan, description of course content, course outline, course lesson plans, course training aids, and all correspondence concerning the establishment, administration availability of a course	Destroy when superseded, obsolete, or on course termination
3. Drill guides/scenarios	Destroy when superseded, obsolete, on course termination, or when facility is decommissioned

NOTE: The preceding information is suggested as good practice in Reference H of this procedure.

- Job Descriptions
- Questionnaires
- Task Analyses
- Task Lists
- Procedures Manuals
- Instructor Skills Curriculum
- Lesson Plans and Associated Aids/Materials
- Written and Skill Demonstration Examinations
- Glossaries

The lesson plan with associated aids and materials is the primary group of program materials used by the instructor when conducting classes. The Documentation and Materials Control Coordinator shall maintain current files of lesson plans with specified instructional materials. Each package shall be numerically identified and contain all instructional materials for the specific class.

Personnel Records

Certain documents/records pertaining to the individual trainee become part of the trainee's training file maintained by the Documentation and Materials Control Coordinator. The following records, where appropriate, are required in the training file:

- ESH Training Cover Sheet
- Personnel Data Sheet
- Record of On-The-Job Training
- Waiver of Classroom Training
- Skill Demonstration or Written Exam
- Qualification Record
- Qualification Statement

Access and Security

Training record security shall be maintained by lock and key. Removal of training records shall be by authorized personnel only with the approval of the Documentation and Materials Control

Coordinator (DMC) or the ESH Training Manager. Information in the trainee record shall be made available only to the trainee, designated training personnel and the trainee's line supervisor/management and auditors. Personnel authorized to retrieve hard copy training records include:

- Division management
- Line management
- Designated ORNL training personnel
- Other plant personnel and official visitors as approved by the ESH Training Manager.

All training records shall be considered confidential and access to records shall be controlled and limited to authorized personnel. Hard copy training records shall be physically secured. Computerized training records shall be available only to authorized personnel.

Audits

Employee training records shall be reviewed annually by the TRT Section to ensure completeness and accuracy. Employee training records shall also be subject to audits and reviews by outside agencies. Such agencies may represent the DOE (TSA team, accreditation review teams, etc.). Employee training records may also be examined by plant Quality Assurance to determine compliance with management commitments and/or government regulations or guidelines.

Lesson Plan

The Documentation and Materials Control Coordinator maintains one hard copy of all lesson plans. Superseded lesson plans are destroyed when approved revisions are filed, except for the record copy maintained by the Document and Materials Control Coordinator.

Record of On-The-Job Training

This completed record is filed indefinitely in the trainee's permanent file maintained by the Documentation and Materials

Control Coordinator. The original record may be filed at the facility where the trainee is assigned if so required.

Evaluation Form

This form becomes a part of the Documentation and Materials Control Coordinator's files. Retention is not regulated; disposal is made as desired.

Supervision Opinion Survey or Other Questionnaires

Disposal is made as desired after usefulness of material has been accomplished.

Personnel Training Data Sheets

Where appropriate, these files are retained in TRT by the Documentation and Materials Control Coordinator for permanent retention in the individual's file. Copies of individual files will be given to other on-site training organizations upon request.

Computer Record System

The computer record system is not the official training record. It is simply an administrative tool used by management and the training group for review and verification of employee training.

Data included in this system:

- NAME
- BADGE NUMBER
- SOCIAL SECURITY NUMBER
- DIVISION CODE
- DEPARTMENT CODE
- COMPANY CODE
- JOB CLASSIFICATION
- TRAINING CODE
- DESCRIPTION
- WORK ORDER NUMBER
- INSTRUCTOR
- TRAINING DATE

- NO. OF HOURS TRAINED
- EXAM GIVEN
- EXAM PASSED
- EXAM SCORE
- NEEDS RETRAINING
- RETRAINING DATE
- NEEDS QUALIFYING
- QUALIFICATION DATE
- PASS QUALIFICATION
- NEEDS REQUALIFICATION
- REQUALIFICATION DATE

This training data base alerts the training section and management as to who is in the training program sequence and when additional training or testing is scheduled or needed. The verification and update portion of the system alerts management of pending retraining or requalification requirements.

Appendix K contains instructions for using the computer data base.

8. RESOURCES

Resources are often in short supply to meet the growing employee training requirements being promulgated by the Federal government to protect the workers, the public and the environment. ORNL, like many others, has been assigning increasing resources to meet the demand for a better trained workforce, and the birth and growth of the TRT Section is but one example of this increased awareness of training needs.

The rapid growth of TRT training programs has been possible due to the acquisition of technically trained, highly motivated training personnel. They ARE the key resource of the Section.

Other resources aiding in TRT's rapid growth are a megascanner, 8-color plotter, laser printers, and a bank of personal computers equipped with presentation software that allows the instructors to personally control the preparation of training aids. Other equipment and resources vital in this effort are the videotaping/editing systems and players, and use of Martin Marietta Energy Systems' Photography and Color Television Departments.

The resources most lacking at this time are adequate classroom, laboratory, and office space for the TRT Section. As the Section continues to grow, it is increasingly difficult to find adequate facilities to house the instructors, the growing number of classes, the widening range of instructional activities, and the varied types of equipment, clothing and other training aids required by the ESH training programs described in Chapter 5. These needs will have to be addressed as the TRT Section makes long-range plans.

The development of a Contamination Control Training Laboratory in Building 3042 (the Oak Ridge Research Reactor) has been undertaken by the TRT Section and the Research Reactors Division's Training Section. Classroom space and a hands-on contamination control training laboratory containing personal protection equipment and clothing, appropriate health

physics and industrial hygiene instrumentation and safeguards, and some mock operational equipment. This Laboratory will greatly enhance TRT's ability to offer consistent, high-quality hands-on experience with contamination control.

Need for one to two more dedicated classrooms has been identified and space is being sought to house these classrooms. One option under consideration is the construction of a new office and training building for TRT and the Industrial Hygiene Section.

Staffing continues to grow at a significant rate, as additional programs and more stringent requirements create an increasing demand for ESH training and the accompanying documentation. Technical training assistants have been added to the staff to assist the instructors in meeting multiple class development and implementation.

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APPENDIX A
QUALITY ASSURANCE EVALUATION

QUALITY ASSURANCE EVALUATION [QAE]

Environmental and Health Protection Division

Date 7/17/89

Activity No.: TRT-001

QAP No.: QAP-X-89-EHP/TRT-001

Title: Technical Resources and Training Section, Environmental and Health Protection Division

Description: Environmental safety and health training for ORNL employees and contractors

INSTRUCTIONS: Complete checklist and assign a Q-Category. If ANY response is YES, a Category I or II QA Plan must be prepared. If ALL responses are NO, a Category III Plan may be prepared. In all cases a RATIONALE for the choice of category must be given. Minimum required attachments, if the QAE is to be used as part of the QA Plan, are an organization chart, a Functional Responsibilities Matrix, and a Quality Records list.

Quality Category Checklist	Yes	No
1. Does the project/activity involve design, construction, maintenance, or modification of engineered safety systems or structures?		X
2. Are there unique sponsor requirements?		X
3. Are data or results of analyses to be used for design or construction of engineered safety systems or structures?		X
4. Could failure result in the loss of an ORNL facility?	X	
5. Could failure result in significant risk of inadvertent environmental, public, or personal exposure to biological, chemical or radiological hazards that would exceed the current authorized levels?	X	
6. Could failure cause significant adverse publicity that could damage the laboratory's reputation?	X	
7. Could failure cause significant negative impact on an important or critical area of research?	X	
8. Is there a significant risk of release of incomplete or inaccurate data?		X

Q-CATEGORY

II

Select I, II or III

Rationale for Q-Category:

Failure to train personnel to have adequate knowledge of their complex work place and the necessary skills to protect both themselves and the environment when handling potential radiation, chemical, and safety hazards can result in (1) the loss of an ORNL facility; (2) the significant risk of inadvertent environmental, public, or personal exposure to biological, chemical or radiological hazards that would exceed the current authorized levels; (3) significant adverse publicity that could damage the Laboratory's reputation, and (4) significant negative impact on important or critical areas of research.

A significant activity, item, material, or process is one that would cause a dramatic negative impact on cost, health, safety, environment, or the laboratory's facilities or reputation, or a dramatic violation of state or federal regulations should failure occur. An insignificant impact would not be expected to exceed consequences beyond those expected from minor, normal, day-to-day operational failures. Decisions regarding the significance of an impact due to failure must include consideration of cost, schedule, complexity, and safety.

ACTIVITY PHASE MATRIX

Indicate activity phases such as design, construction, procurement, operations, etc.

Phase	Responsible Manager	Scheduled Completion Date
NA		

QUALITY ASSURANCE PLAN MATRIX

Reference existing QA Plans that will be used to control the activity.

Activity Job Elements	QA Plan Title	QA Plan Number	Responsible Organization
NA			

Add attachments or explanations if necessary.

QAE Approval:

Division Responsible Manager Emily A. Cajinkaus Date 10-2-89

Engineering Responsible Manager _____ Date _____

QA Specialist Teresa L. Baer Date 10-9-89

Records and Controlled Document List

QAP No.: QAP-X-89-EHP/TRT-001

Title: Technical Resources and Training Section

Record Name/Title	RP	Master File Point	Duplicate File Point	Record Character
ESH Individual Training Records		4500S, R-211		QA Record: [X] Yes [ ] No Controlled: [ ] Yes [X] No
ESH Program Training Records		4500S, R-211		QA Record: [X] Yes [ ] No Controlled: [X] Yes [ ] No
ORNL Environmental Safety and Health Training Operations Plan (ORNL/TM-11264)		4500S, R-211	4500S, S-260	QA Record: [X] Yes [ ] No Controlled: [X] Yes [ ] No
Standard Operating Procedures for Environmental Safety and Health Training		4500S, R-211	4500S, S-260	QA Record: [X] Yes [ ] No Controlled: [X] Yes [ ] No
Standard Practice Procedure for Environmental Safety and Health Training		In all Standard Practice and Procedures Manual	4500S, R-211	QA Record: [ ] Yes [X] No Controlled: [ ] Yes [X] No
				QA Record: [ ] Yes [ ] No Controlled: [ ] Yes [ ] No
				QA Record: [ ] Yes [ ] No Controlled: [ ] Yes [ ] No
				QA Record: [ ] Yes [ ] No Controlled: [ ] Yes [ ] No
				QA Record: [ ] Yes [ ] No Controlled: [ ] Yes [ ] No
				QA Record: [ ] Yes [ ] No Controlled: [ ] Yes [ ] No

FUNCTIONAL RESPONSIBILITIES PROFILE

Environmental and Health Protection Division

Project Number: TRT-001

Attachment _ _

Project Title: Technical Resources and Training

RESPONSIBILITY DESIGNATION

A = Approve
C = Concur
I = Input
R = Review
S = Surveillance
P = Prepare/perform

Blank: not applicable

LEAD RESPONSIBILITY

ACTION	Line management	Technical mgt., SMEs	ESH Tr. Mgr. (TRT Mgr.)	Training Group Leaders (TRT)	Instructors/Coordinators (TRT)	Division Tr. Coordinators	Documentation and Material Control Coordinator (TRT)	QAS - ECHP	Trainees				
	Place responsibility designation in appropriate box												
Identify training requirements	R/I	I	I	I	P	I		S					
Identify target audience	I	I			P	I		S					
Conduct job analysis					P								
Conduct task analysis					P								
Develop course outline	C	C	A	A	P	C							
Develop training material	I	I		I	P	I							
Review lesson plan, test, material	C	C	A	A									
Train instructors	I	I	A	A	P	I							
Implement training					P								
Schedule trainees	P	I				P							
Evaluate training	P	P							P				
Evaluate instructors			P	P					P				
Document training				I	I		P	S					
Review training			P										
Revise training	I	I			P		I						

Use printer 8font
Filename:FUN-RESP.FRM

PROCEDURE MODULAR PROFILE

Environmental and Health Protection Division

INSTRUCTIONS: *Indicate which procedures apply, provide comments or reference operating procedures, manuals, notes, or reference other requirements or comments.*

QAP Number: QAP-X-89-EHP/TRT-001	*Date:* 7/17/89
Title: Technical Resources and Training Section, Environmental and Health Protection Division	

NQA-1 Element and Implementing Procedures	APPLY Y	APPLY N	Add or reference comments, procedures, or requirements in Notes or attachments.
1. ORGANIZATION			ORNL Environmental Safety and Health Training Operations Plan (ORNL/TM-11264)
QA-EHP-1-100: Organization and Responsibilities	X		Standard Practice Procedure for Environmental Safety and Health Training
2. QUALITY ASSURANCE PROGRAM			
QA-EHP-2-100: The Quality Assurance Program	X		ORNL Environmental Safety and Health Training Operations Plan (ORNL/TM-11264)
QA-EHP-2-101: Quality Assurance Procedures	X		
QA-EHP-2-102: The Preparation of Quality Assurance Plans	X		QA Plan is included/published as a part of the training plan
QA-EHP-2-103: Quality Assurance Status Reporting	X		
QA-EHP-2-104: Indoctrination and Training	X		
QA-L-2-104: Quality Assurance Planning for Capital Projects		X	
3. DESIGN CONTROL			
QA-EHP-3-100: Controllng Design		X	
QA-EHP-3-101: Conducting Technical and Peer Reviews	X		Technical Review is handled as described in the training plan
QA-L-3-101: Deviation Control		X	
QA-L-3-102: Quality Verification Decal		X	
4. PROCUREMENT DOCUMENT CONTROL			
QA-EHP-4-100: Procurement Requirements and Contol		X	
QA-4-101: Quality Assurance in Research and Development Sub-contracts		X	
5. INSTRUCTIONS, PROCEDURES, AND DRAWINGS			
QA-EHP-5-100: Instructions, Procedures and Drawings	X		ORNL Environmental Safety and Health Training Operations Plan (ORNL/TM-11264) Standard Operating Procedures for Environmental Safety and Health Training
QA-EHP-5-101: The Preparation of Standard Operating Procedures	X		
QA-EHP-5-102: Procedure Change Directive	X		
6. DOCUMENT CONTROL			ORNL Environmental Safety and Health Training Operations Plan (ORNL/TM-11264)
QA-EHP-6-100: The Control of Documents	X		Standard Operating Procedures for Environmental Safety and Health Training

PROCED-1.FRM

PROCEDURE MODULAR PROFILE

Environmental and Health Protection Division

QAP Number: QAP-X-89-EHP/TRT-001 | *Date:* 7/17/89

NQA-1 Element and Implementing Procedures	*APPLY* Y	N	*Add or reference comments, procedures, or requirements in Notes or attachments.*
6. DOCUMENT CONTROL - continued			ORNL Environmental Safety and Health Training Operations Plan (ORNL/TM-11264)
QA-EHP-6-101: Controlling the Distribution of Documents	X		Standard Operating Procedures for Environmental Safety and Health Training
7. CONTROL OF PURCHASED ITEMS AND SERVICES			
QA-EHP-7-100: Controlling Purchased Items and Services		X	
QA-L-7-101: Supplier Quality Problem Reporting		X	
QA-L-7-102: Supplier Deviation Requests		X	
8. IDENTIFICATION AND CONTROL OF ITEMS			
QA-EHP-8-100: The Identification and Control of Items		X	
9. CONTROL OF PROCESSES			
QA-EHP-9-100: The Control of Processes		X	
10. INSPECTION			
QA-EHP-10-100: Planning, Conducting, and Reporting Inspections		X	
11. TEST CONTROL			
QA-EHP-11-100: Planning and Controlling Tests		X	
12. CONTROL OF MEASURING AND TEST EQUIPMENT			
QA-EHP-12-100: The Control and Calibration of Measuring and Test Equipment		X	
13. HANDLING, STORAGE, AND SHIPPING			
QA-EHP-13-100: Handling, Storage and Shipping of Items and Materials		X	
14. INSPECTION, TEST, AND OPERATION STATUS			
QA-EHP-14-100: Inspection, Test and Operating Status		X	
QA-EHP-14-101: Conducting and Reporting Readiness Reviews		X	Readiness review for TRT consists of course module review and course pilots
15. CONTROL OF NONCONFORMING ITEMS			
QA-L-15-100: Identification and Control of Nonconforming Items		X	
QA-EHP-15-100: Material Review Boards for Managing Nonconforming Items or Services		X	

PROCED-2.FRM

PROCEDURE MODULAR PROFILE

Environmental and Health Protection Division

QAP Number: QAP-X-89-EHP/TRT-001 | *Date:* 7/17/89

NQA-1 Element and Implementing Procedures	APPLY Y	APPLY N	*Add or reference comments, procedures, or requirements in Notes or attachments.*
16. CORRECTIVE ACTION			
QA-EHP-16-101: The Control and Management of Corrective Actions	X		
QA-L-16-100, Rev. 1: Quality Problems	X		
QA-L-16-101, Rev. 1: Quality Investigations	X		
QA-L-16-103: Quality Event Reporting	X		
17. QUALITY ASSURANCE RECORDS			ORNL Environmental Safety and Health Training Operations Plan (ORNL/TM-11264) Standard Operating Procedures for Environmental Safety and Health Training Training Records
QA-EHP-17-100: Record Management System Requirements	X		
QA-EHP-17-101: Identifying Quality Assurance Records	X		
QA-EHP-17-102: Managing Quality Assurance Record Files	X		
QA-EHP-17-103: Management of Multi-media Quality Assurance Records	X		
18. AUDITS			
QA-EHP-18-100: Conducting and Reporting Internal Quality Assurance Audits	X		
QA-L-18-101: Quality Assurance Audit Personnel Qualification Requirements	X		
QA-EHP-18-101: Planning, Conducting, and Reporting Surveillance	X		
19. SOFTWARE			
QA-L-19-100: Software Quality Assurance		X	
20. ENVIRONMENTAL , SAFETY, HEALTH, AND WASTE MANAGEMENT QA PROGRAM			
QA-EHP-20-100: Environmental, Safety, Health, and Waste Management Quality Assurance Requirements	X		

Comments:

PROCED-3.FRM

APPENDIX B
ESH TECHNICAL INSTRUCTOR QUALIFICATION FORMS

ESH TECHNICAL INSTRUCTOR QUALIFICATION DOCUMENTATION CHECKLIST

Name: _____ **Date:** _____

Badge No.: _____ **Division/Section:** _____

Job Title: _____

Instructions: Check appropriate areas where documentation has been included in Instructor Qualification File.

Work Experience

_____ Resume (including previous work experience)*
_____ Instructor evaluations*
_____ Position description and/or Job/Task Analysis*
_____ Written comments from trainees, supervisors, managers, etc.

Training and Education

_____ Educational background (transcripts optional)*
_____ Instructor Skills Workshop or equivalent*
_____ Certificates from skill enhancement programs*
_____ Licenses
_____ Professional certifications
_____ Apprentice/journeyman level training records
_____ Military training
_____ Nuclear power operating facilities training

Professional Activities

_____ Publications
_____ Committees
_____ Professional membership
_____ Presentations

*Required documentation for all instructors.

ISW2
04/28/89

APPENDIX C
INSTRUCTOR EVALUATION GUIDES

INITIAL QUALIFICATION FOR ESH INSTRUCTOR

Effective for one year
(starting on _____ and expiring on _____)*

NAME: _____ BADGE NO.: _____

GROUP/SECTION: _____

DIVISION: _____

JOB TITLE: _____

AREA OF RESPONSIBILITY: _____

INSTRUCTOR QUALIFICATION

The above-named individual has satisfactorily completed the requirements indicated as required for initial qualification. This includes: (1) completing Instructor Skills Workshop or equivalent; (2) having necessary technical qualifications; and (3) demonstrating satisfactory classroom performance.

_____ _____
Verification Official Date

The above-named individual's qualifications have been reviewed and approved:

_____ _____
Group Leader Date

_____ _____
Section Head, Technical Resources and Training Date

_____ _____
Division Director, Environmental & Health Protection Date

*The Division Director, Environmental and Health Protection Division, will fill in the STARTING and EXPIRATION dates.

ISW003

RENEWAL FOR ESH INSTRUCTOR QUALIFICATION

Effective for one year
(starting on _____ and expiring on _____)*

NAME: _____ BADGE NO.: _____

GROUP/SECTION: _____

DIVISION: _____

JOB TITLE: _____

AREA OF RESPONSIBILITY: _____

INSTRUCTOR QUALIFICATION

The above-named individual has been actively and extensively engaged as an ESH Instructor under his/her existing qualification. This individual has performed his/her required duties in a responsible and reliable manner and is considered capable of continuing to do so. In addition, this individual has successfully completed the requalification requirements; therefore, the qualification shall be extended for the period indicated above.

The above-named individual's qualifications have been reviewed and approved:

_____ _____
Verification Official Date

The above-named individual's qualifications have been reviewed and approved:

_____ _____
Group Leader Date

_____ _____
Section Head Date

_____ _____
Division Director, Environmental & Health Protection Date

*The Division Director, Environmental and Health Protection Division, will fill in the STARTING and EXPIRATION dates.

ISW003

APPENDIX D
EXAMPLES OF LESSON PLANS

MODULE: WASTE MINIMIZATION

Program Title: WASTE GENERATOR TRAINING

Lesson: WASTE MINIMIZATION TRAINING

Lesson No.: 002 **of** 005 **Rev.:** 004 **Time:** 45 minutes

Date: 04/16/89

Terminal and Enabling Learning Objectives:

T.O.: The trainee will be able to examine his/her work place and procedures and practice waste minimization whereever possible.

E.O.:

1. Define waste minimization.
2. Identify one method of waste minimization in his/her workplace.
3. List methods of waste minimization.
4. Identify two waste minimization activities currently underway at ORNL.

Regulatory Compliance:

DOE Order 5820.2A, Radioactive Waste Management
40 CFR Part 262 Appendix, Uniform Hazardous Waste Manifest

References:

Handout from **Regulatory Overview Seminar**, presented by EMPE, Inc., May 25, 1988.

Trainee Preparation:

Not applicable

Presentation Method:

Lecture and Guided Instruction

Evaluation:

Waste Minimization Suggestion Form

Instructional Aids:

Overhead Projector and Screen

Slide Book

Leader's Guide

Handouts:

Waste Minimization Suggestion Form

Evaluation Form

Sign-in Sheet and Clipboard

Flipchart, Easel, Markers

Content Outline	Instructor Notes
I. Preliminaries	
A. Introduction	Display overhead #1 (MIN1D4).
We are here today to discuss a important effort and goal of the Oak Ridge National Laboratory that has changed the way waste is generated, handled, and disposed of: "Waste Minimization."	
B. Review Training Objectives	Display overhead #2 (MIN14D4).
The objectives of this training is for you to understand:	
What waste minimization is.	
Why waste minimization is a goal of ORNL.	
Who is responsible for implementing waste minimization efforts.	
How waste minimization is implemented (methods):	
throughout industry	
at ORNL in general	
within ORNL Divisions	
What your role is in implementing waste minimization NOW and in the FUTURE.	
II. Who?	Display overhead #3 (Division photo).
A. Everyone should be involved. Rather than large waste streams that would be found in production facilities, ORNL generates numerous, small waste streams. And there lies the challenge for all of us.	Ask: **Who** is involved in, and should be concerned with, waste minimization at ORNL?

	NOTE: Will collect photos that represent each division so that division-specific photos can be used here.
B. The _____ [appropriate division name would be inserted here] should be concerned, ORNL should be concerned, and Martin Marietta Energy Systems should be concerned.	Display overhead #4 (MIN5D4).
C. The Law says that the Oak Ridge National Laboratory must formally conduct a waste minimization effort. Annual reports must be submitted to the EPA showing progress of minimizing waste generation at the Lab. All divisions including yours can play some role in minimizing waste generated at the laboratory.	
III. What?	Ask: **What** is waste minimization? Display overhead #5 (MIN2D4).
A. You might ask yourself, "What exactly is waste minimization?" For several years various industries have been researching and devising methods for reducing the volume and/or toxicity of hazardous waste generated. Everyday someone comes up with a new scheme for minimizing waste generation. The methods that are generally practiced by industry are:	
Waste recycling with which most of you are familiar, such as recycling of aluminum cans.	Display overheads #6 [Photo 05836-88 (lead ingots)], #7 [Photo 05830-88 (lead furnace)], #8 [Photo 05831-88 (lead bricks)].
Waste segregation which may reduce the volume of hazardous waste by segregating waste streams which are hazardous from those that are non-hazardous.	
Volume reduction, through compaction or incineration, as well as source control and alternative treatment.	Display overhead #9 (MIN3D4).

B. The EPA defines waste minimization as a practice involving the reduction in volume and/or toxicity of generated hazardous waste. There is much controversy today concerning whether or not waste minimization can include volume reduction only. The reason for this controversy is that even if a certain volume of a generated hazardous waste is reduced, the toxicity still remains the same. Therefore harm to public health and/or the environment is not really reduced just through volume reduction.

IV. Why?

Ask: **Why** should ORNL be concerned with waste minimization?

A. Waste Minimization in some form has been practiced by various industries throughout this century as a method for "cost savings" such as through recycling or reprocessing in an effort to make a manufactured product less expensive, thus more competitive in the market place.

Display overhead #10 (MIN4D4).

B. Since the oil shortages in the early 1970's, the U.S. Congress has written legislation such as the Resource Recovery Act and the Resource Conservation and Recovery Act (RCRA) in an effort to regulate industries so that waste generated will not cause harm to human health or the environment. The Enviromental Protection Agency has set forth regulations that require facilities which generate, store, treat, or dispose of hazardous waste to implement a program to reduce the generation of hazardous waste.

C. A new DOE Order 5820.2A will require ORNL to minimize radioactive wastes.

D. The reason behind the waste minimization effort required by the EPA is because if waste generation throughout the U.S. continues, there will not be enough burial space or tank storage capacity to accommodate the waste, thus causing more probable harm to human health and the environment as well as an increase in waste handling/disposal costs.	Display overheads #11 (Photo 5143-86), #12 (Photo 5822-88), #13 (Photo 5817-88), #14 (Photo 6409-87), #15 (Photo 5821-88).
E. This is why everyone must play a role in minimizing waste generation as much as possible, so that our children's children will not be forced to live on earth where every square inch contains hazardous waste of some form or another.	
F. The Oak Ridge National Laboratory has a commitment to protect human health and the environment.	
G. We are also motivated by economics.	
V. How?	Ask: **How** can we minimize wastes?
A. How can a company (MMES), laboratory (ORNL), division (_____), or individual employee minimize waste? Many specific methods can be used. However, an individual must research each method to see which methods are applicable to the process involved, as well as the cost and time involved in implementing a waste minimization effort. Every employee can evaluate his/her job function to first see if the following methods are feasible:	Display overhead #16 (MIN6D4).
Material substitution	
Process optimization	
Segregation	
Recycling	
Toxicity reduction	

Treatment	
Selling waste as raw material	Display overhead #17 (MIN8D4).
B. How has ORNL as a whole approached the waste minimization effort? Let's look at some of the elements in the ORNL Waste Minimization Program:	
Plan and implement an ORNL-wide chemical inventory.	
This task will enable us to evaluate whether or not we are actually reducing the volume and/or toxicity of waste we generate. You must first know what you have before you can reduce the generation of it.	Display overhead #18 (Photo 5832-88).
Implement a surplus chemical distribution system.	
ORNL over the past few years has been encouraging various labs to share those chemicals that are not totally used up. A surplus system exists whereby chemicals which are still good can be redistributed to labs which need them.	
Involve ORNL personnel in waste minimization.	
Evaluate hazardous materials procurement and tracking systems.	
Systematically review applicable ORNL procedures.	
Establish criteria to measure progress.	
C. Let's look at what ORNL has done to date:	Display overhead #19 (Chart 1).
Chart 1 shows how the generation of Liquid Low-Level Waste has been reduced by several of the above methods. As you can see, the volume of Liquid Low Level Waste over the past few years has been cut in half.	Display overhead #20 (Chart 2).

On Chart 2 you can see that dilute liquid low-level waste (LLLW), solid low-level waste (SLLW), and transuranic (TRU) waste have been reduced over the last three years. However, due to the cleaning out of laboratories of expired and non-reusable chemicals as well as an increase in the amount of mixed waste being generated due to decontamination and clean-up operations being conducted at ORNL, the generation of Mixed Waste and Hazardous Waste has increased.	
D. ORNL has implemented several projects in the past to support the efforts mentioned including:	Display overhead #21 (MIN6AD4).
Waste generation chargeback system.	
Construction of manhole monitors and development of a waste tracking system whereby generators can be charged for waste place in the low-level liquid waste system. Chargeback is also used for TRU, solid low-level waste, hazardous waste, and mixed waste.	Display overhead #22 (Photo 05835-88).
Procurement control.	
Implementation of the AVID system to encourage smaller volume procurement of chemicals thereby reducing the level of unused chemicals which have to be disposed of because of expiration.	
Waste recovery and recycling.	
Operation of silver, lead, and used battery recovery systems thereby reducing the volume and toxicity of waste generated that contains silver, lead, etc.	Display overhead #23 (Photo 5827-88).
Process modifications (i.e., distillation and process water recirculation).	
Volume reduction.	

Operation of a Drum Compactor to reduce the volume of compactible Solid Low Level Waste which is disposed of at SWSA 6; thus, extending the life of the SWSA 6 disposal area.	Display overhead #24 (Photo 3773-78).
Groundwater infiltration reduction.	
Lining of process and sanitary sewer system piping to reduce the volume of infiltrating groundwater. In the past this groundwater caused substantial increases in the volume of water having to be treated by the Process Waste Treatment Plant and Sewage Treatment Plant.	Display overheads #25 (Photo 05833-88) and #26 (Photo 05839-88).
VI. You!	Display overhead #27 (MIN12D4). <u>Ask:</u> What can **YOU** do?
A. Let's begin by looking at the major elements of the waste minimization effort. ORNL is currently taking action in several areas to reduce waste generation in the near term. This involves:	Display overhead #28 (MIN14D4).
Studies to identify and characterize all waste streams at the plant.	Display overhead #29 (Process Flow Diagram).
Segregation of those waste streams which, when unmixed, reduce the volume and/or toxicity of the waste generated. One good example is segregating non-radiological waste streams from contaminated waste streams.	
Modify processes such as recirculating cooling water.	
Train and communicate waste minimization practices to ORNL employees, which is why we are here today.	
Force waste generators to evaluate the cost effectiveness of waste minimization through charging back costs required to handle their waste streams.	
B. What can you do to help reduce the generation of waste in your division? Here are a few items which you can specifically deal with:	

Closure of unneeded drains. Recirculation of once-through cooling water through installation of a heat exchanger unit. (Bldg. 4505, Metals and Ceramics is currently doing this.) Notify your supervisor of piping that you know is improperly connected to other piping systems, such as a Sanitary Sewer line connected to a Liquid Low-Level Waste Line.	
These are just examples. There are many opportunities for waste minimization awating discovery and correction.	Display overhead #30 (MIN9D4).
VII. Summary	
In the course of your work, be aware of the waste you may be generating. Follow the procedures, think about what you're doing, and use some common sense. You can really make a difference; for instance, if you spot a problem, report it; and if you have an idea, share it. Remember, waste minimization is everyone's job.	Display overhead #31 (MIN15D4). <u>NOTE</u>: Rather than this last overhead, we could introduce the slogan for the waste minimization campaign. Using the slogan would lead nicely into an explanation of the campaign.
VIII. Exercise and Evaluation	
Ask participants for suggestions of methods to minimize wastes in their areas. Record on flipchart. Distribute Handout #2 (Waste Minimization Suggestion form). Ask participants to think some methods that have been used in their areas or could be used to minimize wastes. Can be simple or complex. (Attending this training program could be an example.) If they absolutely cannot think of	

anything, they can use the information gathered on the flipchart.

Distribute Handout #3 (Waste Minimization Evaluation form).

MODULE: NATURAL RADIOACTIVITY

DURATION: 1 HOUR

TERMINAL OBJECTIVE: given completion of this module, the trainee will recognize the realities of natural radiation, that it exists in our solar system, and is a part of our everyday environment.

ENABLING OBJECTIVES: during a group discussion session the trainee will be able to:
1. Identify the sources of natural radiation
2. Identify some radioactive consumer products
3. Distinguish the risks associated with radiation relative to other health risks

RESOURCES:
1. Basic Radiation Technology--Daniel Gollnick, Chapter 6 "SOURCES", pg 96
2. Introduction to Health Physics--Herman Cember, Chapter 4 "RADIOACTIVITY", pg 79
3. NCRP 45 "NATURAL BACKGROUND RADIATION IN THE UNITED STATES"
4. NATURAL RADIATION-- Week 2 ORAU Training

PREPARATION of the TRAINER:
Materials Needed: Overviews, flipchart
Equipment Needed: Overhead projector, flipchart stand, markers

PREPARATION of the TRAINEE:
Given a written examination, the trainee will be able to:
1. Identify the sources of natural radiation
2. Identify radioactive consumer products
3. Identify risks associated with radiation as compared to other risks

SUBJECT MATTER (Natural Radiation)

In our environment we're subjected to all types of radiation. In fact, radiation from natural sources serves as the major source of radiation exposure to man. Exposures, except those from direct

cosmic radiation, are produced by radiation coming from the natural radionuclides in the environment (with origins in the earth's crust). This natural radiation accounts for 75% of a person's annual dose. Natural radiation is frequently used as a standard of comparison for exposures to various man-made sources of ionizing radiation. Radiation has been irradiating people since the beginning of time. As Daniel Gollnick stated there is no place on the earth, above it, or below the surface which is totally radiation free.

Three NATURAL ENVIRONMENTAL BACKGROUND RADIATION sources are categorized as:

1. EXTERNAL TERRESTRIAL (SHOW NATURAL RADIATION VUGRAPH)

a. Radionuclides deposited in the crust of the earth
b. Large number found in earth's soil

1. Ra-226 3. Th-232
2. U-238 4. K-40

c. CONCENTRATIONS are in parts per million range

*** Daniel Gollnick reported that, on the average, a square mile of surface dug out to a depth of one foot would contain one ton of K-40, three tons of U-238, and 6 tons of Th-232.

d. Types of rock which makes up the crust at some location is a major factor in determining the exposure rate of the external field. In descending order of exposure level:

1. IGNEOUS ROCKS (volcanic origin)
USA surface exposure rates 125 mR/yr

2. SEDIMENTARY ROCKS (much lower rates)
US sandstone - 50 mR/yr
limestone - 25 mR/yr

3. AVERAGE personal exposure in USA from this source - 40 mR/yr

2. INTERNAL TERRESTRIAL

a. Radionuclides sometimes end up in food or water used for human consumption or become airborne as radioactive gases or particulate. Some fraction in turn become deposited internally in the body. This so called BODY BURDEN produces a dose as the decay process occurs inside the body.

b. There are about 70 different naturally occurring radioisotopes which contribute to the internal dose.

1. MOST of the dose is due to K-40 (80%)

2. US average significant dose 27 mrem/yr

3. Many situations where much higher levels of naturally occurring radiation exists.

** Drinking water high RADIUM concentrations

US average -- 1 pCi/l

Colorado -- 40-50 pCi/l

Brazil -- 240 pCi/l

** Helsinki, Finland staff receive annual lung dose as high as 240,000 mrem -- inhaled RADON gas.

Most radon which emanates into the atmosphere from the ground is formed in the top 3 feet of soil.

Outdoor concentration average-- .2 pCi/l

Indoor concentration average --
.3-1.6 pCi/l cellar
.2-.8 pCi/l first floor
(source Paul Frame)

Ways to reduce concentrations:
* Increase ventilation in crawlspace
* Seal walls/floors
* Cover exposed soil

Ways to determine concentrations:
* Activated charcoal canister
(leave in living area)
* Track etching

3. COSMIC RADIATION

a. Out of this world source of radiation. The exact origin is still unknown. The composition (hydrogen and helium-- alpha) implies their origin in the stars.

b. Annual external from cosmic rays depends slightly on latitude and STRONGLY on ALTITUDE. Actually the atmosphere serves as a shield.

1. NCRP estimates US average dose - 28 mrem/yr

2. Colorado average -- 100 mrem/yr

*** During solar flares, 11 year cycle, dose rates at high altitudes are extremely high.

Measured -- 10 rem/hr at 80,000 feet
-- 100 mrem/hr at 30,000 feet
legally a high radiation field for radiation workers.

*** Because of the possibility of solar flares, supersonic aircraft required to have an operating radiation detector connected to an alarm in the cockpit-- if sounds aircraft dives to a lower alt. to complete flight.

4. ARTIFICIAL SOURCES (SHOW CONSUMER PRODUCTS VUGRAPH)

a. SMOKE DETECTORS

b. RADIUM DIALS (EXPLAIN EXAMPLE)
SHOW PLATE

c. LANTERN MANTLE (SHOW MANTLE)

d. OTHER (TV, MEDICAL , FOODSTUFFS)

In the discussion so far the term rem has been mentioned. Let's look briefly at what that means.
SHOW REM VUGRAPH (TO BE COVERED AGAIN IN LATER VUGRAPH)

A comparison of areas confirms the varying dose rates that occur in diverse portions of the USA.
SHOW NATURAL BACKGROUND VUGRAPH

Comparison of accidental deaths in industry by occupation types
SHOW PROB. ACC. DEATH VUGRAPH

Comparison of relative risks of annual deaths to activities
SHOW RELATIVE RISKS VUGRAPH

Data gathered on loss of life from other contributing factors
SHOW EST. LOSS LIFE VUGRAPHS

APPENDIX E
COURSE TRAINING PLAN FORMAT

I. COURSE CONTENT OUTLINE

A. Classroom Phase - Course Lesson Plans
B. OJT Phase - Job Qualification Requirements, including Checklists

II. SCHEDULE

A. Attendees/Target Audience
B. Course Loading

III. INSTRUCTOR QUALIFICATIONS

A. Qualification Requirements
1. Classroom Instructor Qualification
2. OJT Coach Qualification

IV. ATTENDEE PREREQUISITES

V. FACILITIES

A. Classroom(s)
B. Audio-visual Equipment

VI. EXAMINATION/EVALUATION METHODS

A. Pass/Fail Criteria
B. Remedial Training

VII. REQUALIFICATION REQUIREMENTS

A. Frequency
B. Content

VIII. RECORDS REQUIREMENTS

A. Attendance Records
B. Program Records

APPENDIX F
ROUTING SHEET for
TRT TRAINING LESSON PLAN

Routing Sheet

TRT TRAINING LESSON PLAN

PROGRAM TITLE:

LESSON TITLE:

LESSON NO.:

TO	NAME	ACTION	INITIALS/DATE
1. Originator		Prepare Plan	
2. Training Specialist		Review & Comment	
3. Training Specialist		Review & Comment	
4. Group Leader		Review & Comment	
5. ESH Training Manager		Approve	
6. Technical Manager		Approve	
7. Technical Manager		Approve	
8. Technical Manager		Approve	
9. Technical Manager		Approve	
10. DMC Coordinator		File/Maintain	

V003
04/25/89

APPENDIX G
EXAMPLE OF ON-THE-JOB REVIEW FORM AND PROCEDURES REVIEW FORM

ENVIRONMENTAL SAMPLING TECHNICIAN
ON-THE-JOB TRAINING CHECKSHEET

Name: _____ **Badge:** _____

Division: _____

Supervisor Name: _____ **Badge:** _____

I. Tour of Major NPDES Discharge Locations	Date/Initial
A. X-01 Sewage Treatment Plant	_____
B. X-02 Coal Yard Runoff Treatment Facility	_____
C. X-03 1500 Area (Northwest Tributary)	_____
D. X-06 190 Ponds Outfall	_____
E. X-07 3544 Process Waste Treatment Plant	_____
F. X-08 TRU/TURF Process Waste Basin	_____
G. X-09 HFIR Process Waste Basin	_____
H. X-11 3518 Neutralization Facility	_____
I. Proposed NRWTF Site	_____
J. White Oak Dam	_____

II. Issue and Describe Contents of Procedures for Environmental Monitoring and Surveillance _____

A. NPDES-01 _____

B. NPDES-02 _____

C. NPDES-03 _____

D. NPDES-04 _____

E. NPDES-05 _____

F. NPDES-06 _____

G. NPDES-07 _____

III. Procedure Performance Checklist

A. Oil and Grease

Properly collect weekly Oil & Grease grab samples (2) from sampling point X02 in accordance with procedures NPDES-02 and NPDES-03. _____

1. Obtain G-teflon line cap (2) containers from 4500-S, room R-251 _____

2. Attached proper preprinted label to containers _____

3. Add H_2SO_4 preservative in accordance with procedure NPDES-02 with proper cooling (4^oC) _____

4. Properly fill out NPDES Weekly Field Log sheet WEEKLY-1 prepared for X02 _____

5. Oil and Grease sample taken without flushing out preservative

6. Rubber Gloves were used by trainee when taking sample

7. Sampling containers were properly double bagged and placed in cooler

B. Flow rate, pH, Temperature

Determine properly the Flow Rate, pH, and Temperature at sampling location X02 _____

pH reading _____

Flow rate _____

Temperature _____

C. Sulfate, Nitrate samples

Properly collect a weekly grab sample for Sulfate (Sul), Nitrate (Nit) from sampling point X11 in accordance with procedures NPDES-02 and NPDES-03. _____

1. Obtain Polyethylene container from 4500-S, room R-251, maintain temp. at 4°C _____

2. Attached proper preprinted label to Sulfate, Nitrate sample container _____

3. Obtain grab sample _____

D. Total Organic Carbon

Properly collect weekly sample for Total Organic Carbon (TOC) from sampling point X11 in accordance with procedures NPDES-02 and NPDES-03. _____

1. Obtain G-teflon line septum (2) containers from 4500-S, room R-251 _____

2. Attached proper preprinted label to containers _____

3. Add H_2SO_4 preservative in accordance with procedure NPDES-02 with proper cooling (4^oC) _____

4. Obtain grab sample _____

E. Volatiles

Properly collect monthly grab sample for Volatiles from sampling point X01 in accordance with procedures NPDES-02 and NPDES-03. _____

1. Obtain a G-teflon lined septum container from 4500-S room R-251 _____

2. Attached proper preprinted label to container _____

3. Add 0.008% $Na_2S_2O_3$ preservative in accordance with procedure NPDES-02 with proper cooling (4^oC) _____

4. Obtain 2-40 mL grab samples _____

5. Properly fill out NPDES Monthly Field field log MONTHLY-1 prepared for X01 _____

F. Metals

Properly collect a weekly 24 hr. composite sample for Metals from sampling point X01 in accordance with procedures NPDES-02 and NPDES-03. _____

1. Obtain Polyethylene container from 4500-S room R-251 _____

2. Attached proper preprinted label to Metals sampling container _____

3. Add HNO_3 preservative: final pH < 2.0 _____

4. Pour One (1) liter sample from composite sampler container into prepared (preservative added) polyethylene container _____

G. Ammonia, Phosphorus

Properly collect a monthly 24 hr. composite sample for ammonia (Amm) and Phosphorus (Phos) from sampling point White Oak Dam (WOD) in accordance with procedures NPDES-02 and NPDES-03 _____

1. Obtain Glass container from 4500-S, room R-251 _____

2. Attach proper preprinted label to glass container _____

3. Add H_2SO_4 preservative: fi nal pH < 2.0 _____

4. Pour one (1) liter sample from composite sampler into prepared glass container. _____

5. Maintain sample temperature at 4^oC

H. Fecal Coliform

Properly collect a triweekly grab sample for fecal coliform from sampling point X01 _____

1. Obtain G-foil cover from 4500-S room R-251 _____

2. Attach proper preprinted label to cover _____

3. Add 0.008% $Na_2S_2O_3$ preservative to container _____

4. Obtain 200 mL grab sample _____

5. Properly fill out NPDES Triweekly Log WEEK3X _____

ENVIRONMENTAL MONITORING AND SURVEILLANCE PROCEDURES USE CHECKLIST

Name: _____ **Badge:** _____ **Division:** _____

Supervisor Name: _____ **Badge:** _____ **Division:** _____

FILL IN THE BLANKS TO THE FOLLOWING QUESTIONS:

Note: Use of Sampling Procedures is required

1. Where is the location/site of outfall #341?

2. In what building and room no. are sample collection containers prepared and stored?

3. What is the station for discharge serial #X02?

4. List the three types of weekly samples which are taken at discharge #X02.

Example: BOD

a._____

b._____

c._____

5. List the type of containers, volumes, and preservatives that must be used for each of the three types weekly samples taken at discharge #X02.

Container	**Volume**	**Preservative**
a. _____	_____	_____
b._____	_____	_____
c. _____	_____	_____
Example: Polyethylene	1 Liter	HNO_3 to pH 2.0

6. T or F: Oil and Grease samples should be taken in duplicate.

7. What is the station for discharge serial #X01?

8. List the four (4) types of monthly samples which are taken at discharge #X01.

Example: BOD

a._____

b._____

c._____

d._____

9. List the type of containers, volumes, and preservatives that must be used for each of the four types monthly samples taken at discharge #X01.

Container	Volume	Preservative
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____
Example: Polyethylene	1 Liter	HNO_3 to pH 2.0

Write out the word (s) that is represented by each of the following abbreviations:

Amm = _____

BOD = _____ _____ _____

Nit = _____

TDS = _____ _____ _____

PCB = _____ _____

TOC = _____ _____ _____

APPENDIX H
GENERAL EMPLOYEE TRAINING CHECKLISTS FOR COURSE DEVELOPMENT AND IMPLEMENTATION

TABLE 1. GENERAL EMPLOYEE TRAINING NEEDS ASSESSMENT CHECKLIST

Content	Slightly	Adequately	Extensively
1. To what extent, does your organization have in place well-established organizations that deal with the subject areas required in DOE's General Employee Training?	_____	_____	_____
2. To what extent, does yourorganization currently provide orientation for your employees?	_____	_____	_____
3. To what extent, does it explain about radiation hazards, effects and risk?	_____	_____	_____
4. To what extent, does it explain about hazardous material recognition, effects, and control?	_____	_____	_____
5. To what extent, does it explain about on-the-job safety in relation to the worker and the environment?	_____	_____	_____
6. To what extent, does it explain about what to do in an emergency, including response, evacuation, fire and health protection?	_____	_____	_____
7. To what extent, does it explain about the responsibility of the worker in carrying out the above activities?	_____	_____	_____
8. To what extent, does it identify the organizations established to address all of the subject areas?	_____	_____	_____
9. To what extent, is there an appropriate organization to provide, update, and document the training?	_____	_____	_____

TABLE 2. GENERAL EMPLOYEE TRAINING CHECKLIST FOR COURSE DEVELOPMENT AND IMPLEMENTATION

	Similar	Different
AUDIENCE		
1. Job classification	_____	_____
2. Employee educational background	_____	_____
3. Work activities	_____	_____
4. Job location	_____	_____
5. Work schedules	_____	_____
6. Potential for exposure to hazards	_____	_____
	Yes	**No/Needs Improvement**
CONTENT		
1. Will general awareness of subject areas be sufficient?	_____	_____
2. Is a detailed understanding of the subject areas required?	_____	_____
3. Should a dual structure be established specifying different levels of training for specific worker groups?	_____	_____
4. Would the established organizational entities be helpful in the development of content?	_____	_____
5. Does content include only the most important information, keeping irrelevant or trivial information to a minimum?	_____	_____
6. Is content structured in a way that proceed from the known to the unknown, from the simple to the complex, and from the easy to the difficult?	_____	_____

DELIVERY

Notes

1. To what size group will the training to be presented?

2. What training tools are best suited to the intended audience?

3. What efforts may be made to hold the attention of the audience?

4. What efforts may be made to relate the information to the experiences of the audience? Will the audience understand how the information relates to them?

5. May certain reinforcements be used to better retention of the training material?

6. What restrictions are imposed upon delivery (deadlines, scheduling, presentation time, etc.)?

APPENDIX I

EXAMPLES OF INSTRUCTOR and COURSE EVALUATION FORMS

FORM 1. GENERAL EVALUATION FORM

What was most useful about the training program?

In what ways could the training program be improved?

What suggestions do you have for the leaders?

Other comments?

FORM 2. INSTRUCTOR AND COURSE EVALUATION

INSTRUCTOR(S)_____

COURSE _____

DIRECTIONS

We would like your help in improving future training sessions. This feedback evaluation instrument enables you to rate the instructor, the technical material content, and the training environment on several parameters. You will note that the form is divided into 2 major sections. Part I asks you to make an evaluation on certain elements of the training with the use of a Likert-type scale. Please circle the number that best reflects your response for each statement posed. Part II asks you to respond to specific questions about the training plus allows you to make any additional comments that you would like. Please respond honestly and as accurately as you can. Leave blank any item that does not apply. Your signature to this evaluation is not required but you may sign if you wish.

THANK YOU FOR YOUR ASSISTANCE

PART I

FEEDBACK EVALUATION

On a scale of 1 for the lowest and 10 for the highest, circle the number that best reflects your degree of agreement with each statement posed concerning the training just completed.

1. The training room was well lighted. 1 2 3 4 5 6 7 8 9 10

2. Questions were used to solicit my response. 1 2 3 4 5 6 7 8 9 10

3. The content represented in this training was directly related to my work. 1 2 3 4 5 6 7 8 9 10

4. The presentation was well illustrated. 1 2 3 4 5 6 7 8 9 10

5. Objectives of the training program were explained fully. 1 2 3 4 5 6 7 8 9 10

6. The presentations involved questions and discussions. 1 2 3 4 5 6 7 8 9 10

7. The training environment was conducive to learning. 1 2 3 4 5 6 7 8 9 10

8. The technical content used in presentation was supportive of the training. 1 2 3 4 5 6 7 8 9 10

9. The content presented in the training helped me reach the training's objective. 1 2 3 4 5 6 7 8 9 10

10. Outside disturbances were kept to a minimum. 1 2 3 4 5 6 7 8 9 10

11. Seating was adequate for viewing the training presentation. 1 2 3 4 5 6 7 8 9 10

12. The audio-visual materials were supportive of the training delivered. 1 2 3 4 5 6 7 8 9 10

13. The training room temperature was comfortable. 1 2 3 4 5 6 7 8 9 10

14. The content used in the presentation was understandable. 1 2 3 4 5 6 7 8 9 10

15. The presentation was adequately summarized and reviewed. 1 2 3 4 5 6 7 8 9 10

PART II
FREE RESPONSE SECTION

The following section is designed to allow you to express your opinions about this training and to communicate directly to the instructor(s) your particular feelings and suggestions concerning the course.

1. The most useful part of this training course was:

2. It would have been helpful to put more emphasis on:

3. We spent too much time talking about:

4. More time should have been spent on:

5. To make the course better, I would recommend:

ADDITIONAL COMMENTS:

APPENDIX J
ENVIRONMENTAL SAFETY AND HEALTH TRAINING REQUIREMENTS REVIEW

ENVIRONMENTAL SAFETY AND HEALTH TRAINING REQUIREMENTS REVIEW

Name: _____

Badge No.: _____

Dept. No.: _____

Division: _____

Job Classification: _____

Supervisor: _____

NOTE: Please fill out and return to ESH Training Manager, Environmental and Health Protection Division, for all new hires and transfers or changes in job responsibilities. This form is required to track mandatory ESH training requirements. Thank you.

I. Does the employee work in/with or routinely enter to work on or inspect any of the following*:

_____Reactor Facility
_____Non-reactor Nuclear Facility
_____Hazardous Waste Treatment, Storage or Disposal Facility (TSD)
_____Radioactive Waste Disposal Facility
_____Remedial Action/Cleanup Programs
_____Construction Projects
_____Construction Projects in areas where likely to encounter radiation (Radiation Category 3 areas)
_____Handling of Radioactive Sources
_____Radioactive Materials/Waste Packing/Shipping/Transportation
_____Hazardous Materials/Waste Packing/Shipping/Transportation
_____X-ray Machine Operation
_____Laser Operation
_____Handling of Asbestos/Man-made Fibers (except Fiberglass)
_____Carcinogens
_____Respirators
_____Posted Noise Areas
_____Confined Spaces
_____Potential for Temperature Stress (Heat, Cold)

II. Does the employee's job assignment involve exposure to radiation, while working on, with, or in the proximity of radiation producing machines or radioactive materials and is the employee likely to be exposed above 0.1 rem (0.001 sievert) per year, which is the sum of the annual effective dose equivalent from external irradiation and the committed effective dose equivalent from internal irradiation? (See Radiation Worker Definition)

____Yes_____No

III. Does the employee work in the following disciplines*:

_____Environmental Compliance
_____Environmental Sampling
_____Industrial Hygiene
_____Industrial Safety
_____Radiation Protection
_____Radiation Monitoring
_____Technical Training

IV. Is the employee a designated equivalent to any of the above?

_____Designated Equivalent.* If designated equivalent, be sure to mark the proper program(s) above.

*An individual may be designated as equivalent to an employee in one of these facilities or programs in order to highlight the individual as needing the same degree of formal training as the group of individuals that he/she is categorized with. The reason for this designation might be because of their relative interaction with processes involving radioactive or hazardous materials.

_____

Supervisor **Date**

OPTIONAL:
Past Training Pertinent to Assignment:

Past Job Experience Pertinent to Assignment:

_____

RECEIVED AND REVIEWED:

_____

ESH Training Manager or Delegated Reviewer(s) **Date**

Action Items:

APPENDIX K
INSTRUCTIONS--TRAINING RECORDS DATA BASE

Getting Started

TO ACCESS PROGRAMS FOR DATA BASES: type Password.

This executes Foxrun, a user-friendly language using Dbase III commands. The 'TRAINING PROGRAM MAIN MENU' containing the following options will appear on the screen.

1. Class Update
2. Student Update
3. Reports
4. Training Codes
5. Maintenance for Data Base
6. Company Update
7. Division Update
8. Instructor Update
X. Exit to DOS

Student Data Base

TO ACCESS STUDENT DATA BASE: select 2 (for student update).

The 'STUDENT' menu containing the following options in the student data base will appear on the screen.

A. Add a student
D. Delete a student
L. List students
M. Modify a student
S. Status (display) of student
F. Find a student
X.Exit to previous menu

TO ADD A STUDENT TO THE DATA BASE: select A (add a student).

The 'ADD A STUDENT, BADGE NO.' prompt will appear on the screen.

Enter the student badge number.If an ORNL badge number has not been assigned, use the student's social security number. If the student did not write either number on the sign-in sheet, check the Non-Employee Data reprint in the Data and Material Control Coordinator's office. Martin Marietta employees' badge numbers are available on the PDP-10 in a 1022 database called Pers. Mic. If neither numbers are available, assign the next identifying number in the book in the Data and Material Control Coordinator's office.

press return.

The 'Student Data Entry' form will appear on the screen. All information should be entered in uppercase.

FIRST NAME:_____ LAST NAME:_____

FIRST INITIAL:__ MIDDLE INITIAL:__

SS#:_____ COMPANY CODE:____

DIVISION NO:___ DEPARTMENT NO:____

JOB CLASSIFICATION:_____

After all information has been entered for the student, the 'ADD A STUDENT, BADGE NO.' prompt will reappear. If all badge numbers have been entered,

press return.

The 'STUDENT' menu will reappear.

TO DELETE STUDENT DATA: select D. Enter student's badge number. Press y, if the record which appears on the screen is to be deleted.

TO VERIFY STUDENT DATA: select L (to print). The user has the option to 1Print report on screen. 2(y/n). 1Print report on printer. 2(y/n). Printing the report on the screen allows for the verification of data before printing (or producing) a hard copy.

TO MODIFY STUDENT DATA: select M; enter student's badge number. Use enter key or arrow keys to move cursor to information needing changing. Correct information and press return to the end of screen or press the control and end keys to save and exit the record.

TO FIND A STUDENT: select F. Enter the last name of the student. The badge number, name, division, and company will be provided for all students with this last name.

TO EXIT STUDENT DATA BASE: select X.

The 'TRAINING PROGRAM MAIN MENU' will reappear on the screen.

Class Data Base

TO ACCESS CLASS DATA BASE: select 1 (from the 'TRAINING PROGRAM MAIN MENU').

The 'CLASSES' menu will appear on the screen. The options function the same as those in the student data base.

Select A (to add student to class)

The 'ADD A CLASS ENTRY' form will appear.

Enter student badge number (70001)

Enter training code (01002)
Enter date (04/30/89)
Press return.

The 'ADD A CLASS' form will appear on the screen.

BADGE NO:70001 NAME: JANE DOE

TRAINING CODE:01002

DESCRIPTION: OFF-SITE CONTRACT PERSONNEL

TRAINING DATE: 04/30/89 NO. OF HOURS: 0.00 Work Order:____

INSTR1:_____ INSTR2:_____

INSTR3:_____ INSTR4:_____

EXAM GIVEN:_____ EXAM PASSED:_____ EXAM SCORE:____

NEEDS RETRAINING: ____ RETRAINING DATE: ____

NEEDS QUALIFYING: ____

QUALIFICATION DATE: ____ PASS QUALIFYING: ____

NEEDS REQUALIFYING: ____ REQUALIFICATION DATE: ____

After all information has been entered, press return or the control and end keys.

The 'ADD A CLASS ENTRY, BADGE NO.' prompt will reappear. After all badge numbers have been entered, press return.

The 'CLASSES' menu will reappear.

To exit class data base and return to the 'TRAINING PROGRAM MENU', select X.

Reports

TO ACCESS THE REPORT DATA BASES: select 3.

The 'REPORTS' menu containing the following options appears on the screen.

1. All training - sorted by division
2. Select a company/division
3. All training - sorted by training code, date
4. Select a training code - sorted by student name
5. Select a training code - sorted by training date
6. Select a training code - sorted by division
7. Select a training code - sorted by company
8. Instructor report
9. Training in specified period
10. Needs retraining report
11. Needs requalifying report
12. Student's training history

X. Exit to previous menu

1. All training sorted by division - a report of all the classes for each company in the class data base. The report includes the company, division, name, badge number, training code and date, and the number of hours trained.

2. Select a company/division - a report of all the training classes completed by students in a particular company and/or division during a specified period. The user has the option of choosing the company or division during a specified period or choosing both. The report format is the same as Report 1 (Classes for all companies /division).

3. All training - sorted by training code, date - a report of all the training classes in the class data base. The report includes the training code, name, badge number, company, division, date, exam score, time length of class (hours), retraining, and requalification (yes or no).

4. Select a training code - sorted by student name - a report of a training class for a specified period. The report format is the same

as Report 3 (Classes for all training codes). The student's names are list alphabetically.

5. Select a training code - sorted by training date - a report of a training class for a specified period. The report format is the same as Reports 3 and 4. The dates are listed chronologically.

6. Select a training code - sorted by division - a report of the training received by employees in various divisions during a specified period. The user has the option of choosing the training (code) for a specified period in a particular division (training code, division, date) or choosing training (code) for a specified period (training code, date) or choosing all training for a particular division during a specified period (division, date). The report is sorted by division codes and the students' names are listed alphabetically. The report includes the division, name, badge, training, date, exam score, length of time (hours) retraining, and requalification (yes or no).

7. Select a training code - sorted by company - a report of the training received by employees from different companies during a specified period. The user has the same options as listed for Report 6. The report is sorted by company codes and the students' names are listed alphabetically. The report is the same as Report 6 with the exception that the company name (not division) is listed.

8. Instructor report - a report of the number of students each instructor has trained and the total number of hours each instructor has contributed (since 1986) to the training of students. The report includes the instructor, number of trainees, and number of hours used training students.

9. Training in a specified period - a report of the number of students participating in a training class on a given day and the number of hours used for the training session.

10. Needs retraining report - a report of students to be retrained in a requested period. The report includes the name, badge number, company, division, retraining deadline, and training code (for class).

11. Needs requalifying report - a report of students who will have to be trained and/or retrained for requalification in their craft or profession. The report includes the name, badge number, company, division, requalify deadline, and training code.

12. Student's training history - a report of all the training which a student has received. The prompt requires that the user enter the student's badge number. The report includes the name, badge number, company, division, training, date, exam given (yes/no), passed exam, score, length of time (hours), needs retraining and requalification.

Training Codes

TO ACCESS TRAINING CODES DATA BASE: select 4.

The 'TRAINING CODES' menu which have similar options as the student and classes menu will appear. When the options add, delete, modify, and status are selected, the 'TRAINING CODE' prompt will appear on the screen. For example, if the user select the option "add", the following form will appear.

ADD A TRAINING CODE

TRAINING CODE:_____

The user enters 9999 as the training code. (The option selected will appear where the word add is in the form). For the option "add" only, a second 'ADD A TRAINING CODE' form requesting the description for the training code will appear.

ADD A TRAINING CODE

TRAINING CODE: 9999

DESCRIPTION:_____

If the option "list" is selected, a report of the training codes will be generated. The user has the option of listing the report on the screen or printing the report. (See To Verify Student Data)

Maintenance for Data Base

The data base will be updated and maintained by the Documentation and Materials Control Coordinator.

Company Update

TO ACCESS THE COMPANY DATA BASE: select 6.

The options for the 'COMPANIES' menu are the same and function the same as in the student, class, and training data bases. When the option "add" is selected, an 'ADD A COMPANY' form requesting the company code will appear, after which a second 'ADD A COMPANY' form requesting the company name will appear on the screen (see Section 4, Training Code, for the forms format).

Division Update

TO ACCESS THE DIVISION DATA BASE: select 7.

The options for the 'DIVISION NAMES' menu are the same and function the same as in the above data bases. The 'ADD A DIVISION' forms are similar to those in Training and Company Updates.

Instructor Update

TO ACCESS THE INSTRUCTOR DATA BASE: select 8.

The options for the 'INSTRUCTORS' menu are the same and function the same as in the above data bases. The forms for 'ADD AN INSTRUCTOR' are the same as in the Training, Company, and Division Updates.

Exit to DOS

After all updating have been completed, the user should select X to exit the program. This option will take the user back to the Disk Operating System.

INTERNAL DISTRIBUTION

1. D. R. Alford
2. J. L. Anderson
3. T. D. Anderson
4. J. S. Bogard
5. J. D. Bolling
6. G. W. Bowman
7. W. D. Burch
8-18. H. J. Burum
19. H. M. Butler
20. A. P. Callahan
21. P. N. Coffey
22. S. M. Cohn
23-83. E. D. Copenhaver
84. C. D. DeVaney
85. J. D. Dickens
86. L. M. Dickens
87. D. T. Duncan
88. J. L. Eggers
89-94. S. G. Elliott
95. C. C. Emery
96. W. W. Evans
97. M. L. Franks
98. A. J. Frederick
99. F. E. Gethers
100. S. C. Gibbs
101. H. S. Giles
102. M. R. Guerin
103. J. A. Harvey
104. D. R. Henderson
105. C. M. Hopper
106. C. W. Houck
107. T. H. Howell
108. J. M. Hutson
109. H. D. Hymer
110. H. L. Jennings
111. K. A. Jessen
112. E. K. Johnson
113. C. M. Jones
114. E. C. Jones
115. N. L. Jones
116. E. R. Kackenmester
117. A. V. Keebler
118. C. M. Kendrick
119. R. D. Kennedy
120. S. P. Ketterer
121. M. S. Kohring
122. S. N. Lane
123. R. J. Lanphear
124. R. J. Lauer
125. J. S. Lee
126. P. Marsh
127. M. E. Martin
128. M. C. Matthews
129. M. P. May
130. R. K. McConathy
131. L. E. McNeese
132. D. R. Miller
133. K. Miller
134. A. J. Millet
135. R. L. Mlekodaj
136. W. M. Moreland
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