

TAILORING TRAINING TO THE NEED:
REACHING ALL THE WORKERS

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ABSTRACT

By developing a comprehensive concept for radiation protection training at Oak Ridge National Laboratory, we are providing a complete program with easy access for additional radiation protection training upon demand. A framework for implementation of a program tailored to reach differing segments of the workforce quickly and effectively is outlined and illustrated with ORNL program experience.

INTRODUCTION

Development of a broadly based radiation protection program at Oak Ridge National Laboratory (ORNL) has grown out of multiple program and regulatory needs to better train all levels of personnel and to better document such training's applicability to the jobs to be performed. An earlier paper has detailed the ORNL organizational structure and general strategy;¹ here a framework for implementation of a performance-based, multi-level program is given.

FLEXIBILITY IN ACTION

Given the breadth and nature of ORNL's programs, the Technical Resources and Training Program (TRT) of the Environmental Compliance and Health Protection Division finds it more effective to be able to employ several methods of operation in the coordination of the environmental, safety, and health training (ESH) programs at ORNL. Since the desired result is a consistent, documented program, we fulfill several different roles for ORNL divisions' ESH programs. TRT's primary methods of operation are:

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¹Emily D. Copenhaver, Building the Basis for a Comprehensive Radiation Protection Program for a Multi-Program Laboratory, Paper Presented at TRADE Radiation Protection Special Interest Group Meeting, October 28, 1987, Atlanta, Georgia.

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

DEVELOPING AND IMPLEMENTING PROGRAMS

In the majority of cases, TRT develops and delivers the needed ESH training after a needs or job/task analysis has been completed with assistance from the user group. The amount of time required for a training program may range from 2 to 40 hours dependent upon the type of training needed. The level of training needed is based on the needs assessment, as well as on recommendations of the radiation protection staff, level of 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,^{2,3}
- Construction workers, and
- Special visitor groups.

ADVISING ON PROGRAMS

Some divisions have resources that permit them to develop and implement training that strongly integrates ESH information in other technical training programs. When working with these divisions, TRT serves in an advisory role: reviewing materials, suggesting changes, and giving final approval. An example of this method of operation occurred with a specific ORNL division. In this division, the potential safety hazards such as high-level pulsed-phase radiation, electricity, and lasers are quite different from most of the other ORNL operations. After a needs assessment by TRT and the division staff, it was determined that special skills were needed to develop appropriate ESH training and that the expertise existed in their own division. Therefore, the division developed its own training program, including a videotape, entirely in-house. As long as their training program would meet documented DOE guidelines, ORNL's objectives were met.

²R. J. Lauer, ORNL Reactor Maintenance Personnel Training Program, ORNL/TM-10134, Oak Ridge National Laboratory, October 1986.

³E. L. Preston et al., Qualification Requirements and Training Programs for Nonreactor Nuclear Facility Personnel in the Operations Division of the Oak Ridge National Laboratory, ORNL/TM-9560, Oak Ridge National Laboratory, November 1985.

APPROVING PROGRAMS

Other 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 the program if it is consistent with the objectives of ORNL's program. Sometimes TRT may impose an additional testing requirement, as is done with some subcontracted radiation protection staff members. In another example, all training being developed by the subcontractors for the ORNL environmental characterization program⁴ will be reviewed and approved by TRT as a part of the operating agreement with the subcontractors.

IDENTIFYING CONTENT LEVEL

Another area where flexibility is required in our programs is in content level. The varying levels of worker knowledge, job/task criteria, and availability of supplemental radiation protection coverage make it necessary to develop most of the radiation protection information for several comprehension levels.

Obviously, the highest level of training is the Technician Training Program offered to our own radiation protection personnel,^{5,6} reactor operators, and other radiation workers. The purpose of the formal radiation protection training program is to qualify 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 required to complete the Technician Training Program unless it is determined that review of one or more sections of the training would be of benefit to them.

⁴Environmental, Safety and Health Plan for the Oak Ridge National Laboratory Remedial Investigation/Feasibility Study, ORNL/RAP-Sub/87-30B-99053V/1200, Bechtel National, Inc., September 1987.

⁵J. S. Abercrombie and B. C. Thorpe, "Preparing the Radiation Protection Worker to Meet Multiple Needs," to be published in Proceedings of the Oak Ridge Model Conference, October 13-16, 1987, Oak Ridge, Tennessee.

⁶Oak Ridge National Laboratory, Technical Qualification Requirements and Training Programs for Radiation Protection Personnel at Oak Ridge National Laboratory, ORNL/TM-10119, April 1986.

Qualification of radiation workers subject to higher level of exposures is based on successful completion of the formal training program and written and operating examinations administered by the department training coordinator. Training credentials are reviewed by the department head and then submitted to the division director in order to complete evaluation of the individual and finalize the necessary qualification documentation. Qualification is for a two-year time period and applies only to a specific ORNL work area. If the radiation protection technician moves to another work area, he/she must also qualify to work in the new area.

Qualification programs for other employees who need more comprehensive radiation protection training are developed in concert with the division facility managers and training coordinators. For example, TRT has worked closely with another ORNL division to develop and implement an ESH training program for an high radiation level analytical chemistry laboratory. In this case the chemists working in this laboratory were provided specific information on the hazards of radiation and the safeguards used at ORNL. This training program has been piloted, and, after an end-of-the-course evaluation by both TRT and the facility staff, is being revised to include more detailed information on biological effects of radiation and on instrumentation.

Other programs, such as the construction-related ones,⁷ have also been developed at several knowledge levels depending upon the needs of the particular audience. In addition to a basic ESH orientation program for construction workers, we have developed a training program for the managers of construction activities. This program emphasizes the importance of including ESH issues for more effective project planning.⁸ We are developing a more comprehensive, hands-on training for workers engaged in site characterization activities in areas with potential for radiation exposure. Part of the training will involve worker demonstration of dress out techniques, a contamination control exercise, a waste management exercise, and an emergency management review. This course will be given by late fall of 1987.

⁷E. C. Jones, "Contingency Planning and Emergency Response in Construction Activities: Training the Construction Worker," to be published in Proceedings of Oak Ridge Model Conference, October 13-16, 1987, Oak Ridge, Tennessee.

⁸Edith Jones and D. Allen White, "Keeping Safety and Health Up Front: Training for Project Planning and Implementation," to be published in Proceedings of the Oak Ridge Model Conference, October 13-16, 1987, Oak Ridge, Tennessee.

FEEDBACK AND EVALUATION

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. Evaluation changes from a complicated, elusive generality into clear and achievable goals if we break it down into logical steps.⁹ These steps, as defined by Kirkpatrick,¹⁰ are as follows:

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

As yet, our training programs have not been fully evaluated. We have used post-class questionnaires to determine the reaction and learning of the participants (Steps 1 and 2). Evaluation tools are being developed to measure the behavior of the participants and results to the organization (Steps 3 and 4) and assess the strengths and weaknesses of the radiation protection training programs.

SUMMARY

By building flexibility into our program development, we are able to meet a variety of different operational needs more effectively. The structure of the training organization allows it to develop and implement programs itself, to advise other organizations on programs that they present, and provide approval on all ESH training done by subcontract for ORNL staff and/or subcontractors. By developing training material at several levels, organization- or group-specific ESH training can be accomplished at reasonable cost. The time required to conduct a preliminary needs assessment, develop a organization-specific training program, and present the organization in the division has been shortened considerably.

⁹Robert L. Craig, Ed., Training and Development Handbook, New York: McGraw-Hill Book Company, 1976.

¹⁰D. L. Kirkpatrick, "Evaluating Training Programs: Evidence vs Proof," Training and Development Journal, 9-12, November 1977.