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CONTINGENCY PLANNING AND EMERGENCY RESPONSE  
IN CONSTRUCTION ACTIVITIES:  
TRAINING THE CONSTRUCTION WORKER

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Abstract

Construction activities have been identified as having the potential for environmental and/or health impacts at Oak Ridge National Laboratory, particularly as site cleanup and restoration plans are initiated. In addition to other control measures, ORNL has chosen to institute special training for all construction workers and related contractors. Individuals are given training to help them understand how construction activities at ORNL can potentially have adverse effects on the environment and their health and to teach them how to respond to potential chemical and radiation hazards.

Workers are given a review of basic information on radiation and chemicals in a framework that emphasizes the situations in which workers or the environment may be exposed to potential risk. Specific instructions are presented on what to do when contamination is suspected, with identification of emergency procedures and response personnel.

Courses are designed to meet the needs of different audiences:

- Construction workers
- Construction supervisors
- Project and contractor managers

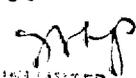
The courses are implemented at different levels of detail, based on projections of potential for exposure. Over 460 persons have been trained this fiscal year.

Introduction

The Oak Ridge National Laboratory (ORNL) is a multiprogram laboratory that conducts research and development activities for DOE and other U.S. government agencies as well as for private industry and institutional organizations. Programs at ORNL cover almost all areas of science and technology. Supporting these programs are facilities such as nuclear reactors, radiochemical

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laboratories, accelerators, hot cells, chemical and biological research laboratories, and waste treatment facilities.

While special research facilities are important, the people who work on-site are an even more valuable resource. Some years ago, ORNL initiated a general employee training program designed to make employees more aware of the health, safety, and environmental risks associated with the laboratory's operation, and to outline the efforts being made to protect the employees and the environment through procedures and controls.

The need to verify that similar information was being offered to subcontractor personnel, such as construction workers and well drillers, became apparent. Because of the history of the Laboratory and of the technologies used, potential environmental and occupational health concerns are being identified. Decommissioning, demolition, replacement, and upgrade of both production facilities and waste handling systems have been expanding over the past several years. In the area of environmental health and safety, ORNL has a responsibility for all persons on site, as well as a responsibility to all employees.

A release of radioactive material from a ventilation improvements project in 1985 and other environmental concerns prompted a decision that specific training in the recognition and prevention of unplanned releases should be given to all personnel involved in construction projects.<sup>1</sup> The Environmental Compliance and Health Protection (EC&HP) Division was assigned the responsibility for developing, implementing, and managing an environmental health and safety training program for construction workers.

In addition to meeting the need to inform construction workers about environmental health and safety issues, the training program had to meet several other program requirements. Various levels of training were needed: managers, construction engineers, and construction workers. The program had to be flexible enough to properly train the workers as a necessary prerequisite for construction projects. The training programs also needed to be in place as soon as possible.

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<sup>1</sup>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).

## Program Development

### Objectives

After a preliminary needs assessment, the curricula for the construction worker program was developed to ensure that construction workers perform their duties safely, to increase worker awareness of risks and hazards, to outline ORNL's efforts to protect construction workers, and to reduce the number of incidents involving potential impact to the workers or the environment. To accomplish these objectives the training program addressed:

- Identification of the types of hazards present;
- Review of the correct work procedures for handling potentially hazardous materials;
- Outline of the correct procedures to follow if worker suspects the presence of hazardous materials; and
- Review of the worker's responsibility to protect self and the environment.

### Content

The basic training program covered the above objectives with subject modules on hazardous material control, radiation protection, responsibilities of the worker, actions to take if questionable material found, and some operational requirements while working on the ORNL site.

In the development of the course material, an effort was made to determine the most effective way to present the training material. The literature confirmed that adult students are more likely to learn information if they can see a fairly immediate use for the new material in their own experiences. Adults remember longest the learning experience that is interesting, vivid, and intense.<sup>2</sup> The Technical Resources and Training (TRT)

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<sup>2</sup>NAPCAE, Tested Techniques for Teachers of Adults, Washington: National Association for Public Continuing and Adult Education, 1972.

Group's task was to present "the right material at the right time in the right amount so that motivation would be maintained."<sup>3</sup>

For the construction workers to really understand why an environmental health and safety training program was important to them, they first had to know what type of facilities and materials ORNL staff had been working with for the past 40 years. Therefore, after a brief introductory segment outlining the program, a videotape was shown of actual facilities and activities at ORNL. This overview helped the workers better understand the reasons for implementation of certain ORNL health and safety procedures and guidelines. Although many of the construction workers would never work in all of the areas shown in the videotape, they did have a better understanding of the type of facilities that might be located in the vicinity of their work area.

In the next phase of training development, other special training modules were developed for supervisors and managers of construction projects, as well as for other special contractor groups. The training program for supervisors and managers of construction projects emphasized project planning and potential problem analysis.<sup>4,5</sup> These areas are an integral part of compliance with environmental health and safety guidelines because these planning skills and techniques allow for better control of radioactivity and other hazardous materials.

Additional training modules are being developed to address job-specific needs such as: correct contamination zone clothing and work practices, proper disposal of wastes, containment measures, and spill control and prevention.

### Media

Various media were developed to be used in the training program: transparencies; flipcharts; color videotapes; handouts, including 3 x 5 in. pocket cards printed with emergency numbers and special instructions; and an awareness review quiz to be completed at the end of the training program. The pocket cards (see Fig. 1) were

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<sup>3</sup>Curtis Ulmer, Teaching the Disadvantaged Adult, Washington: National Association for Public School Adult Education, 1969.

<sup>4</sup>Kepner-Tregoe, Problem Analysis and Decision Making, New Jersey: Princeton, 1979.

<sup>5</sup>Charles H. Kepner and Benjamin B. Tregoe, The New Rational Manager, New Jersey: Princeton (1981).

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 incident. The videotape was prepared in four segments. The first segment, as previously discussed, explains the potential hazards found on the ORNL site; the second, discusses the worker's responsibility to protect him or herself and the environment and some reminders when working on the ORNL site; the third segment was filmed at various construction projects and highlights worker protection techniques; and the fourth, contains construction examples of previous practices and a summary of current site status. The third segment is used as a tool to facilitate discussion on good work practices, protective clothing and equipment, warning signs and zones, prevention and containment of spills, and identification of correct procedures and incorrect procedures. The fourth segment is used in the management training program as a project planning activity. The managers are encouraged to identify the steps necessary to safely direct construction activities on this site.

#### Summary

ORNL has established a comprehensive training program to fulfill its environmental health and safety responsibility for construction-related training. During this fiscal year, approximately 40 training programs have been conducted, reaching approximately 460 trainees. These trainees represent 30 subcontractor organizations working on a wide variety of construction projects at ORNL.

Special attention has been paid to enhancing the effectiveness of the training project. Emphasis has been given to the importance of safeguarding the health of all employees and subcontract personnel working on site as well as safeguarding the integrity of the environment.

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**DO'S AND DON'TS WHEN WORKING ON ORNL SITE**

- Do Wear Your Badge at all Times.
- Do Practice Good Work Habits.
- Do Use Available Control Measures and Protective Equipment.
- Do Observe ALL Warning Signs and Zones.
- Do Dispose of All Wastes as Instructed.
- Do Contact Your Health Physicist if You Suspect a Problem.
- Do Practice Good Personal Hygiene.
- Do NOT Eat, Drink, or Smoke Where Hazardous Materials are Suspected.

**ACTIONS TO TAKE IF QUESTIONABLE MATERIAL IS FOUND  
DURING CONSTRUCTION/WELL-DRILLING ACTIVITIES**

- STOP ALL OPERATIONS
- Move Away From Suspect Contamination But Don't Leave Work Site.
- Notify Your Supervisor of Potential Problem.
- If Health Physicist is On Site, Follow His/Her Instructions.
- If No Health Physicist is Present, Call 911.
- Notify Project Engineer.
- Stand By and Follow Instructions.

Fig. 1. Handout Used in Construction Worker Training Program.