

CONF-8610178--1

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DE87 002169

RADIATION PROTECTION TRAINING FOR  
DIVERSE GENERAL EMPLOYEE POPULATIONS

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Prepared by the Oak Ridge National Laboratory  
Oak Ridge, Tennessee 37831  
operated by  
Martin Marietta Energy Systems, Inc.  
for the  
U. S. Department of Energy  
Under Contract No. DE-AC05-84OR21400

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Radiation protection training for the general employee at the Oak Ridge National Laboratory has undergone a great deal of restructuring in the last two years. The number of personnel totally dedicated to nuclear facilities is less than 1/5 of our employees and the percentage of contracted employees who are dedicated radiation workers is much smaller (for example, additional health physicists, waste treatment specialists). However, the aging of our facilities and increasing emphasis on environmental control means that everyone needs to understand the basics of radiation protection. In accordance with changing DOE guidelines<sup>1</sup> and internal ORNL policies,<sup>2</sup> greater emphasis has been placed on keeping training focused on current issues, training the total workforce, and requiring some type of testing or feedback mechanism.

Those of us dealing with radiation workers at plants like ORNL tend to forget that a large part of the plant population has very little knowledge of or interface with the nuclear facilities on-site. We chose to rethink how we could make the large population more aware of the nuclear facilities without alarming them--in effect, how to instill respect, but not fear, of radiation in the work environment.

Our strategy was simple: (1) We sampled the non-radiation-worker population to establish levels of knowledge and areas of interest. (2) We developed materials to help them understand that their work environment is near to and could be affected by adjacent nuclear facilities. (3) We attempted to point out possibilities for the contamination of their workplace via daily activities.

One simple technique we employed was a video walk to the cafeteria wherein we identified the different types of radiation facilities along the route--accelerators, research labs, reactors, waste management areas, hot cells, chemical processing areas, and isotope production and shipping facilities.<sup>3</sup> Seeing what types of nuclear activities go on at ORNL (possibly next door) created an appetite for even more information.

Once we had gone behind the scenes, it was necessary to give all the employees basic applied information about radiation--that is, to go behind the nuclear energy image or mystique to specific information on types of radiation, acute and chronic effects, safety strategies, monitoring and control activities, and emergency response. Here again, it was important to go from the familiar to the new, to illustrate the concepts and practices related to radiation protection by tangible examples from the daily environment. In this way, our workers could easily place themselves into the situation under discussion and see the utility of the instruction.

For example, we illustrated the types of radiation by demonstrating penetration and shielding characteristics followed by a review of various sources of radiation (the sun, food, x-rays, television viewing, workplace exposure, etc.). This was reinforced by updating the ANS Radiation Dose sheet<sup>4</sup> by including ORNL workplace range of exposures for both radiation and non-radiation workers. This particular sheet allows the employee to sum up his/her personal radiation dose from multiple sources.

The level of information needed may vary even between general employees. To implement the initial training to 5,000 employees as quickly as possible, a program was developed that was administered by division safety officers. Each employee was given a desktop reference kit<sup>5</sup> with pertinent telephone numbers and other emergency information. The feedback mechanism was an awareness review that required each employee to actively participate and each supervisor to review and acknowledge that participation. While such awareness measures may not be fully effective, they do stimulate involvement and positive reinforcement on locating available resources when the need arises. We have been able to implement this system with minimum resources and maximum coverage in 6-8 months. The program has been completed by approximately 70% of the Laboratory employees. Examples of the desktop reference kits and the videotape are available for viewing at the TRADEing POST.

While this course has been aimed directly at ORNL employees, the need to verify that similar data has been offered to contractor personnel such as construction workers and well drillers became apparent. Decommissioning, demolition, replacement, and other such remedial actions directed at both production facilities and waste handling lines and facilities has been expanding tremendously over the past two years. The entire site has been zoned to indicate the possibility of encountering radioactive contamination, and contractors are subsequently assigned to work according to these zones. In addition, differing radiation protection requirements are established for each zone. Only our own Plant and Equipment personnel and one major Engineering subcontractor are allowed in the zones with most potential for encountering radioactive contamination. Therefore, another type of general employee training is required for our other Engineering subcontractors who come on site but do not work in the higher risk zones.

Much of this training is quite similar to our General Employee Training. However, we are developing more directed tools such as information printed on small card stock (to fit pockets), including radio call numbers as well as telephone numbers, relating the safety protection "Do's and Don'ts" to construction type activities, etc. An information sheet and some samples from the program are available in the TRADEing POST.

We are also adapting the construction general employee training to include additional strategy planning and problem recognition/solving skills, contamination control techniques, and health and environmental incident analysis. This material will be presented to engineers and engineering management associated with construction. While the guidelines do not specifically call for these items, they are an integral part of compliance with health and environmental guidelines because these skills and techniques allow for better control of radioactivity and other hazardous materials. These adaptations are still under development; however, we are already presenting the first classes in this series. Though our environmental safety record is good, ORNL hopes to reduce its reportable environmental incidents; both these adaptations may advance this goal. Call Edith Jones or Benny Houser to exchange ideas and materials related to these programs.

In summary, we are still trying to achieve our stated goal of instilling respect, but not fear, of radiation in the work environment. We believe that we are developing flexible tools for meeting this objective for several diverse general employee populations. Continuing efforts include consideration of computer-based training for retraining, developing additional modules for specialized groups and jobs, and testing/documentation appropriate to each population segment.

## REFERENCES

1. DOE Order 5480.1A. Environmental Protection, Safety, and Health Protection Program for DOE Operations (Chapter V: Safety of Nuclear Facilities; Chapter VI: Safety of Department of Energy-Owned Reactors).  
  
DOE Order 5500.2. Emergency Planning, Preparedness, and Response of Operations.  
  
DOE Order 5500.3. Reactor and Nonreactor Nuclear Facility Emergency Planning, Preparedness, and Response Programs for DOE Operations.  
  
DOE Order 5480.2. Hazardous and Radioactive Mixed Waste Management.
2. Martin Marietta Energy Systems, Inc., Policy Procedure ESH-8. Safety Review and Documentation Program.  
  
Oak Ridge National Laboratory, Standard Practice Procedure 29. Safety Review and Documentation Program.
3. ORNL General Employee Training, Videotape No. 0503, Martin Marietta Color Television Center, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, (Length 32:42 minutes). For further information, contact Emily D. Copenhaver.
4. Average Personal Radiation Dose. Sheet developed by American Nuclear Society (555 North Kensington Avenue, La Grange Park, Illinois 60525) and adapted by ORNL to include workplace radiation dose.
5. General Employee Training Reference Guide, Oak Ridge National Laboratory, Oak Ridge, Tennessee. (Packet of materials for use as desktop reference.)
6. Edith C. Jones can be reached by telephoning 615-574-6675 (FTS 624-6675) or writing to Technical Resources Group, Environmental and Occupational Safety Division, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee 37831-6103.  
  
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