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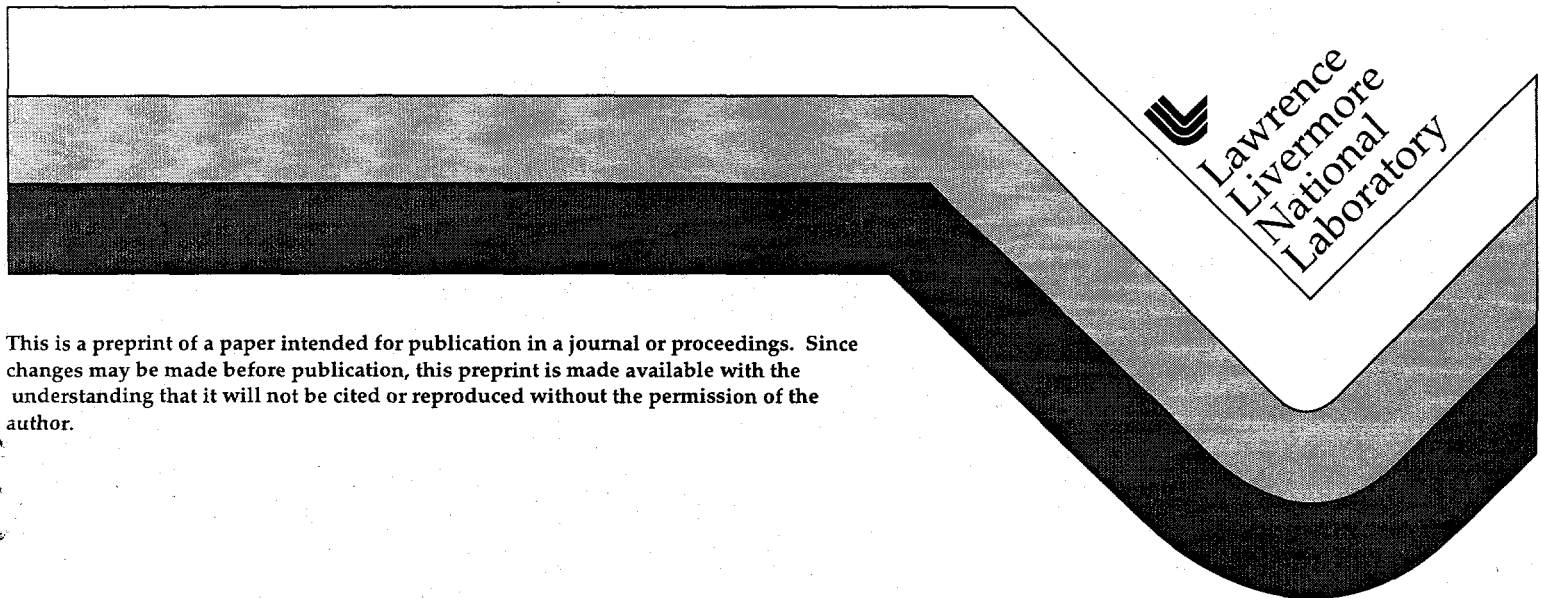
Training and Qualification of Health and Safety Technicians at a National Laboratory

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TRAINING AND QUALIFICATION OF HEALTH & SAFETY TECHNICIANS AT A NATIONAL LABORATORY.

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INTRODUCTION

Over the last 30 years, Lawrence Livermore National Laboratory (LLNL) has successfully implemented the concept of a multi-disciplined technician. LLNL Health & Safety Technicians have responsibilities in industrial hygiene, industrial safety, health physics, as well as fire, explosive, and criticality safety. One of the major benefits to this approach is the cost-effective use of workers who display an ownership of health and safety issues which is sometimes lacking when responsibilities are divided. ("Not my problem" is not a true statement at LLNL.) Although LLNL has always promoted the concept of a multi-discipline technician, this concept is gaining interest within the Department of Energy (DOE) community. In November 1992, individuals from Oakridge Institute of Science and Education (ORISE) and RUST Goetech, joined by LLNL established a committee to address the issues of Health and Safety Technicians. In 1993, the DOE Office of Environmental, Safety and Health (EH-40), in response to the Defense Nuclear Facility Safety Board Recommendation 91-6 (DNFSB an oversight organization appointed by the Executive Branch of the Federal Government), stated "DOE projects, particularly environmental restoration, typically present hazards other than radiation such as chemicals, explosives, complex construction activities, etc., which require additional expertise by Radiological Control Technicians." They followed with a commitment that a training guide would be issued.

The trend in the last two decades has been toward greater specialization in the areas of health and safety. In contrast, the LLNL has moved toward a generalist approach integrating the once separate functions of the industrial hygiene and health physics technician into one function. The compartmentalization of health and safety disciplines often leads to an inequity in resources, with an overemphasis on one risk to the detriment of other risks. This is very commonly seen in the area of radiation protection. Robert Alexander, past president of the Health Physics Society, in a recent meeting addressed the problems in allotment of resources when one safety discipline is overemphasized. He stated that 96% of the occupational risk at a nuclear power plant is non-radiological---and yet the greater percentage of resources is allocated to radiation protection. Unfortunately the overemphasis on occupational radiation issues can create an imbalance in the protection of the worker. An integrated health and safety technician can help to restore the balance and provide for a healthier and safer work environment.

HISTORY OF THE HEALTH AND SAFETY TECHNICIAN AT LLNL

LLNL is a high technology research institute operated by the University of California at Livermore for the DOE. LLNL occupies a one mile square site in the Livermore Valley approximately 45 miles east-south-east of San Francisco.

LLNL was founded in 1952 at the site of a former naval air station. It was originally an off-shoot of the University of California Radiation Laboratory at Berkeley, and was established at the urging of Dr. Teller as a competitor of Los Alamos in the development of nuclear deterrents. When LLNL was first operated in the mid-1950's, safety support consisted of 6 separate safety groups divided among a number of both technical and non-technical organizations. This division led to uncoordinated and occasionally conflicting safety efforts to laboratory programs.

In the 60's, as research programs matured and the character of the laboratory became more firmly established, management sought a more unified safety program and adopted the matrix management approach. The matrix management approach is in existence today. It has contributed to the continuing growth of LLNL which now employs over 8,000 people, supplemented by several thousand contractors. LLNL also plays host to over 60,000 visitors per year.

TRAINING OF HEALTH AND SAFETY TECHNICIANS

The standard entry educational background of our technicians is an A.A. or B.S. degree or experience in the Nuclear Navy Propulsion Program. The Laboratory then provides a core of courses taught by the various disciplines and formal on-the-job training (OJT).

The DOE standardized Radiological Control Technician training consists of IV Phases:

Phase I, Standardized Academic Training:

The standardized academic training has been divided into two sections, core academics and site academics.

The core academics section includes the following 13 lessons:

- Basic Mathematics and Algebra
- Unit Analysis and Conversion
- Physical Sciences
- Nuclear Physics
- Sources of Radiation
- Radioactivity and Radioactive Decay
- Interaction of Radiation with Matter
- Biological Effects of Radiation
- Radiological Protection Standards
- ALARA
- External Exposure Control
- Internal Exposure Control
- Radiation Detector Theory

The site academics section contains the following 19 lessons:

- Radiological Documentation
- Communication Systems
- Counting Errors and Statistics
- Dosimetry
- Contamination Control
- Airborne Sampling Program/Methods
- Respiratory Protection
- Radiological Source Control
- Environmental Monitoring
- Access Control and Work Area Setup
- Radiological Work Coverage
- Shipment and Receipt of Radioactive Material
- Radiological Incidents and Emergencies
- Personnel Decontamination
- Radiological Considerations for First Aid
- Radiation Survey Instrumentation
- Contamination Monitoring Instrumentation
- Air Sampling Equipment
- Counting Room Equipment

Phase II: Core/Site Practical Training:

The practical phase consists of two parts: training and evaluation.

The training portion consists of instruction and on-the-job training (OJT) conducted by OJT trainer/evaluators. After trainees have demonstrated the ability to perform a task under direct supervision, they will be evaluated using the Job Performance Measures. The Job Performance Measures identify the knowledge and skills needed to accomplish the task. The DOE core task list includes the following 13 tasks:

Qualification area: Radiological Instrumentation

- Complete a performance test on portable hand held instruments
- Complete a performance test on health physics counting equipment

Qualification area: Radiological Protection

- Perform a contamination survey
- Perform a radiation survey
- Obtain air samples
- Perform a leak test on a radioactive source
- Post a radiological area to reflect associated hazards
- Perform a radioactive material shipment survey

Qualification area: Emergency Preparedness

- Respond to a high airborne activity alarm
- Respond to an uncontrolled release of radioactive material
- Respond to a radiation alarm
- Respond to an injured person located in a radiological area
- Direct and monitor personnel decontamination

Phase III: Oral Examination Boards

Phase IV: Facility Practical Training:

This training allows each site to qualify technicians to a select facility. LLNL has identified tasks and grouped them in duty areas.

Additional LLNL Training for the Health and Safety Technician:

Industrial Hygiene classes:

- Industrial Ventilation & Air Cleaning
- HEPA Filters
- Hood Survey Course
- Confined Space Hazards
- Handling Chemical Carcinogens
- Industrial Toxicology
- Chemical Safety & Spill Clean-up
- Analytical Lab Overview
- Noise
- Respiratory Protection
- Non-Ionizing Radiation

Industrial Safety classes:

- Precautionary Labeling
- Accident Reporting
- Accident Prevention Theories
- Compressed Gases
- High-Pressure Safety
- Eye Protection
- Laser Protection
- Electrical Safety
- Seismic Program
- Hand & Portable Tools
- Construction Safety
- Cranes & Hoists
- Working at Heights
- Industrial Safety Overview
- Material Handling
- Machine Guarding & Welding
- Pressure/Cryogenics

Fire Safety classes:

- Fire Protection System Sprinklers and Alarms
- Emergency Planning and Evacuation

- Fire Hazards
- Flammable Liquid Safety

Explosive Safety classes:

- Explosives Safety Orientation
- Explosives Safety Practice

Environmental Safety classes:

- Sanitation and Water Systems
- Environmental Protection

Emergency Preparedness classes:

- Earthquake Preparedness
- Emergency Response
- CPR Training

By utilizing a multi-discipline approach the laboratory has found the overall training of Health and Safety Technicians is much more efficient. Many tasks traditionally performed by industrial hygiene technicians are similar to those performed by radiation protection technicians. In addition, health physics aspects of tasks such as air monitoring have benefited from the rigor exhibited in the tasks as performed in industrial hygiene surveys.

SUMMARY

In summary, our experience with the integrated approach for Health and Safety Technicians support at LLNL has been excellent. It offers our operating managers efficient support in a single safety contact which has access to the professional staff. During off-shifts we can still provide a broad range of safety coverage with a limited number of people. Such training and experience gives us a group of people who are capable of moving from one area of our operation to another in response to programmatic and funding shifts.

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